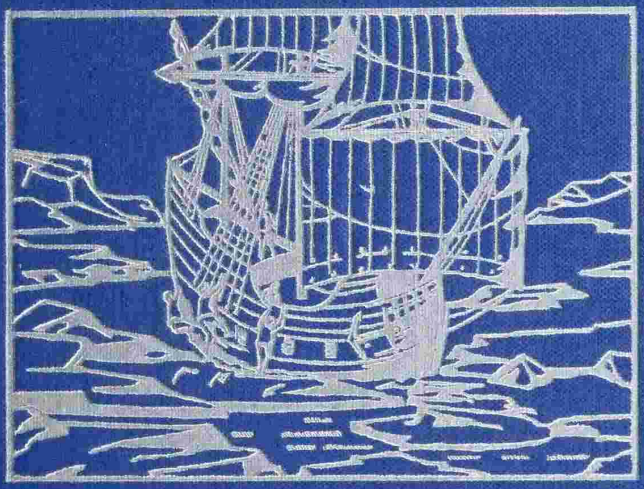
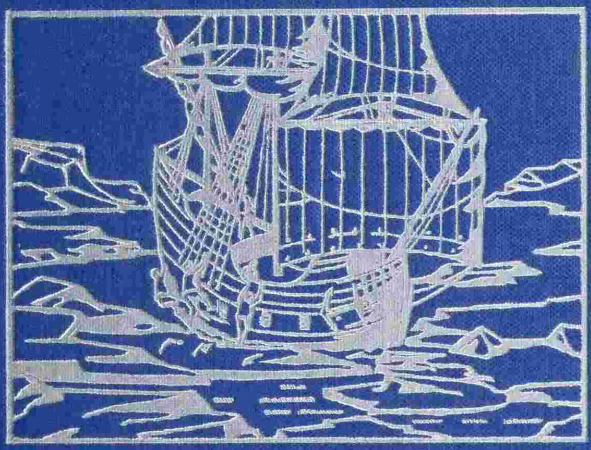
THE LANDS OF SILENCE



CLEMENTS R. MARKHAM

1921

THE LANDS OF SILENCE



CLEMENTS R. MARKHAM

1921

THE LANDS OF SILENCE

CAMBRIDGE UNIVERSITY PRESS

C. F. CLAY, MANAGER

LONDON: FETTER LANE, E.C. 4



NEW YORK: THE MACMILLAN CO.
BOMBAY, CALCUTTA, MADRAS: MACMILLAN AND CO., LTD.
TORONTO: THE MACMILLAN CO. OF CANADA, LTD.
TOKYO: MARUZEN-KABUSHIKI-KAISHA

ALL RIGHTS RESERVED



Sir Clements R. Markham, K.C.B., F.R.S.

printed by George Henry, A.R.A.

THE
LANDS OF SILENCE

A HISTORY OF ARCTIC AND ANTARCTIC EXPLORATION

BY

SIR CLEMENTS R. MARKHAM,
K.C.B., F.R.S.

CAMBRIDGE
AT THE UNIVERSITY PRESS
1921

PREFACE

ALTHOUGH there were few subjects in which the late Sir Clements Markham was not interested, it may safely be said that Polar Exploration stood nearest his heart. Not many persons had studied the ground as thoroughly as he; no one was more widely acquainted with its explorers. I was anxious therefore that his recollections of the personality and work of the many distinguished Arctic navigators he had known should not be lost, and some years ago suggested to him that he should record the story of the gradual revealing of the Polar regions to our ken. The idea pleased him, he began his task at once, and when, in January 1916, the sad accident occurred which brought his life unexpectedly to a close, the book, though unrevised, and with one or two chapters unfinished, was nevertheless in a tolerably complete state.

The author's death would necessarily have delayed the appearance of the work, but the prolonging of the war caused it to be laid aside altogether, and it was not until the beginning of this year that I took it in hand with the object of completing it for publication. So numerous are the works which have been consulted by the author that it was of course impossible for me to verify his facts and dates throughout, and the indulgence of the reader is therefore asked for any errors he may chance to notice. For Chapters LX and LXI, and a great part of Chapter XXXIV, which were merely outlined or left unfinished, the present writer is mainly responsible.

Between Sir Clements and his no less distinguished cousin, Sir Albert Markham, a life-long friendship existed, and the latter did not long survive him, dying soon after he had published his biography. I was fortunate enough, however, before he passed away, to obtain his kindly aid in reading the proofs of this volume, which, owing to his great knowledge of Arctic matters, quite apart from his own wide personal experiences of Arctic travel, was of no little value. The writer would desire here to render his affectionate tribute to the memory of a friend whose charming personality will long be recalled by all those who had the privilege of knowing him.

In the revision of Scott's journeys I have had the invaluable assistance of Mr Frank Debenham, Fellow of Gonville and Caius College, geologist to Capt. Scott's last expedition, to whom my very grateful thanks are due. To Mr Edward Heawood, Librarian of the Royal Geographical Society, the reader is indebted for the helpful chronological table and bibliography at the end of the volume; and, finally, I have to thank Mr H. A. Parsons, of the Cambridge University Press, for his most efficient assistance in compiling the index.

F. H. H. GUILLEMARD.

CAMBRIDGE,
October, 1920.

CONTENTS

PART I

CHAP.		PAGE
I.	THE ARCTIC REGIONS	3
II.	ICE AND ICEBERGS	7
III.	TRIBES AROUND THE POLE	13
IV.	ULTIMA THULE	26
V.	FIRST CROSSING OF THE THRESHOLD	30
VI.	THE NORSEMEN IN GREENLAND	38
VII.	NICHOLAS OF LYNN. ZENO. MEDIEVAL NAUTICAL INSTRUMENTS	53
VIII.	FIRST ENGLISH VOYAGES TO THE NORTH-EAST. WILLOUGHBY. CHANCELLOR. BURROUGH. PET	58
IX.	BARENTSZ. LINSCHOTEN. DE VEER	68
X.	SIR MARTIN FROBISHER	81
XI.	JOHN DAVIS	93
XII.	THE MERCHANT ADVENTURERS AND RICHARD HAKLUYT	104
XIII.	GREENLAND VOYAGE OF HALL AND BAFFIN	112
XIV.	EARLY SPITSBERGEN VOYAGES	117
XV.	EARLY VOYAGES TO HUDSON'S BAY	129
XVI.	WILLIAM BAFFIN	138
XVII.	JENS ERIKSEN MUNK. FOXE AND JAMES. WOOD	149
XVIII.	HANS EGEDE AND DANISH GREENLAND	158
XIX.	THE HUDSON'S BAY COMPANY. HEARNE AND MACKENZIE, COOK AND PHIPPS	165
XX.	RUSSIAN ARCTIC DISCOVERIES	175
XXI.	THE BRITISH WHALE FISHERY AND THE SCORESBYS	188
XXII.	BUCHAN AND ROSS	198
XXIII.	PARRY AND HIS SCHOOL	205
XXIV.	DISCOVERY OF THE NORTH COAST OF AMERICA. FRANKLIN. RICHARDSON. BACK. DEASE. SIMPSON. RAE	222
XXV.	JOHN ROSS, JAMES ROSS, AND THE NORTH MAGNETIC POLE	233
XXVI.	THE FRANKLIN EXPEDITION	238
XXVII.	THE SEARCH FOR FRANKLIN. I	248
XXVIII.	THE SEARCH FOR FRANKLIN. II	263
XXIX.	DISCOVERY OF THE FATE OF FRANKLIN	272
XXX.	THE EAST COAST OF GREENLAND. SCORESBY. CLAVERING. GRAAH. KOLDEWEY	279
XXXI.	SPITSBERGEN. EXPEDITIONS BEFORE 1872	285
XXXII.	FRANZ JOSEF LAND AND ITS EXPLORERS	289
XXXIII.	THE ROUTE BY SMITH SOUND. KANE. HAYES. HALL. NARES. MARKHAM	298
XXXIV.	SIR ALLEN YOUNG AND THE *PANDORA*. AMUNDSEN AND THE NORTH WEST PASSAGE	311
XXXV.	WEYPRECHT'S PLAN FOR SYNCHRONOUS OBSERVATIONS. THE GREELY EXPEDITION	316
XXXVI.	THE NORTH EAST PASSAGE. NORDENSKIÖLD. WIGGINS. DE LONG	322
XXXVII.	GREENLAND AND ITS INLAND ICE. NORDENSKIÖLD, NANSEN, PEARY	331
XXXVIII.	THE TRANS-POLAR DRIFT. NANSEN AND THE VOYAGE OF THE *FRAM*	340
XXXIX.	THE PARRY ARCHIPELAGO. SVERDRUP	347
XL.	ATTEMPTS TO REACH THE NORTH POLE. CAGNI. COOK. PEARY	351
XLI.	KOOLEMANS BEYNEN AND THE VOYAGES OF THE *WILLEM BARENTSZ*. SIR MARTIN CONWAY AND SPITSBERGEN. CAPTAIN BERNIER AND CANADIAN ARCTIC LANDS	358

XLII. EAST COAST OF GREENLAND. DANISH EXPEDITIONS 364
XLIII. LATER GREENLAND EXPLORATIONS. MIKKELSEN. RASMUSSEN. KOCH 376
XLIV. CONCLUSION 383

PART II

XLV. THE GREAT SOUTHERN CONTINENT 389
XLVI. CAPTAIN COOK. BELLINGSHAUSEN 394
XLVII. THE SOUTH SHETLANDS. FOSTER. WEDDELL 398
XLVIII. ENDERBY AND HIS CAPTAINS: BISCOE—KEMPE—BALLENY 403
XLIX. DUMONT D'URVILLE AND WILKES 407
L. FIRST ANTARCTIC VOYAGE OF SIR JAMES ROSS 410
LI. SECOND ANTARCTIC VOYAGE OF SIR JAMES ROSS 418
LII. THIRD ANTARCTIC VOYAGE OF SIR JAMES ROSS 422
LIII. ANTARCTIC OCEANOGRAPHY 426
LIV. REVIVAL OF ANTARCTIC EXPLORATION 430
LV. PRIVATE EXPEDITIONS—BORCHGREVINK. GERLACHE. NORDENSKIÖLD. BRUCE. DRYGALSKI. CHARCOT. FILCHNER 433
LVI. PREPARATIONS FOR THE SOCIETIES' ANTARCTIC EXPEDITION 444
LVII. THE SOCIETIES' ANTARCTIC EXPEDITION. FIRST YEAR 455
LVIII. THE SOCIETIES' ANTARCTIC EXPEDITION. THE *MORNING* 466
LIX. THE SOCIETIES' ANTARCTIC EXPEDITION. SECOND YEAR 471
LX. SHACKLETON'S ATTEMPT TO REACH THE POLE 478
LXI. AMUNDSEN'S JOURNEY TO THE SOUTH POLE 482
LXII. MAWSON'S EXPEDITION 486
LXIII. CAPTAIN SCOTT'S LAST EXPEDITION. I. 489
LXIV. CAPTAIN SCOTT'S LAST EXPEDITION. THE END 500
LXV. REMAINING ANTARCTIC WORK 505

CHRONOLOGY OF POLAR VOYAGES AND EXPLORATIONS 509

BRIEF BIBLIOGRAPHY OF POLAR VOYAGES AND TRAVELS 514

INDEX 519

MAPS AND ILLUSTRATIONS

PORTRAIT OF SIR CLEMENTS R. MARKHAM, by George Henry, A.R.A. (Photogravure by Mr Emery Walker from a photograph by Messrs Cooper and Humphreys) FRONTISPIECE

MAP OF THE POLAR REGIONS 5

EFFECTS OF PRESSURE ON ANTARCTIC ICE. (From Scott's *Voyage of the Discovery*) 11

INTERIOR OF GREENLAND HUT (*Billeder fra Grönland*, 1852) 22

GREENLANDERS DANCING (*Billeder fra Grönland*, 1852) 22

VIKING SHIP. (*Phot.* O. Vaering) 35

THE SOUTH-WESTERN EXTREMITY OF GREENLAND 40

RUINS IN KINGOA-DAL, SOUTH GREENLAND 48

THE ZENI MAP. (Based on the facsimile in *Voyages of the Zeni*, Hakluyt Society, 1873) 54

ASTROLABE IN GONVILLE AND CAIUS COLLEGE, CAMBRIDGE (EARLY 14TH CENTURY). (Venn, *Biographical History of Gonville and Caius College*, vol. IV.) 57

WILLEM BARENTSZ. (De Vries, *Oud-Holland*) 69

NOVAYA ZEMLYA, SHOWING ENTRANCES TO KARA SEA 71

"A WONDER IN THE HEAVENS, AND HOW WE CAUGHT A BEAR." (De Bry, *India Orientalis*, 1599) 73

"HOW OUR SHIP STUCK FAST IN THE ICE." (De Bry) 74

PART OF HONDIUS'S MAP OF 1611, SHOWING BARENTSZ'S DISCOVERIES 77

RELICS FROM BARENTSZ'S HUT. (From the National Museum, Amsterdam, by kind permission of the Directorate) 79

"THE EXACT MANNER OF THE HOUSE WHEREIN WE WINTERED." (De Bry) 79

SIR MARTIN FROBISHER. (Holland, *Heroologia*, 1620) 82

FROBISHER'S DISCOVERIES 87

THE VOYAGES OF JOHN DAVIS 97

MEMORIAL TABLET TO RICHARD HAKLUYT IN BRISTOL CATHEDRAL 111

PART OF NORTH-WEST SPITSBERGEN 120

SIR THOMAS BUTTON 136

BAFFIN'S MAP OF HUDSON STRAIT 139

BAFFIN'S DISCOVERIES 144

CAPTAIN THOMAS JAMES. (From *Voyages of Foxe and James*, Hakluyt Society, 1894) 153

PART OF FOXE'S MAP, 1635 155

HUDSON BAY 167

ALEXANDER MACKENZIE. (From the engraving by Condé, after Lawrence) 169

BERING'S VOYAGE FROM KAMSCHATKA TO NORTH AMERICA. (Synge, *A Book of Discovery*) 178

NORTH-EASTERN SIBERIA 181

NORTH-WESTERN SIBERIA 181

THE PARRY ISLANDS 210

SIR JOHN FRANKLIN 239

FACSIMILE OF FRANKLIN EXPEDITION RECORD. (M'Clintock, *Fate of Franklin*) 244

CRITICAL POSITION OF *H.M.S. INVESTIGATOR* ON THE NORTH COAST OF BARING ISLAND, AUG. 20TH, 1851. (Colour sketch by S. Gurney Cresswell) 264

LIEUT CRESSWELL'S PARTY SLEDGING OVER HUMMOCKY ICE. (Colour sketch by S. Gurney Cresswell) 268

JULIUS PAYER 290

LIEUT PARR, R.N., *H.M.S. Alert*. (*Phot.* Maull & Co.), COMMANDER A. H. MARKHAM, R.N., *H.M.S. Alert*. (*Phot.* Elliott & Fry), SIR GEORGE NARES. (*Phot.* J. Griffin & Co.), LIEUT P. ALDRICH, R.N., *H.M.S. Alert*. (*Phot.* F. Johnson), LIEUT L. A. BEAUMONT, *H.M.S. Discovery*. (*Phot.* Elliott & Fry) 302

SUB-LIEUT GEORGE LE CLERC EGERTON, R.N. (*Phot.* Elliott & Fry) 306

LIEUT WYATT RAWSON, R.N. (*Phot.* Maull & Co.) 306

THE *PANDORA* (CAPTAIN ALLEN YOUNG) IN PEEL STRAIT 312
ADOLF ERIK NORDENSKIÖLD 332
EAST COAST OF GREENLAND. (Based on map in Mikkelsen, *Lost in the Arctic*) 366
GREENLAND 377
ORTELIUS' MAP OF THE WORLD 391
GRAHAM LAND AND SOUTH SHETLANDS 399
MT EREBUS FROM THE SOUTH. (From Scott's *Voyage of the Discovery*) 416
ADÉLIE PENGUINS (From Scott's *Voyage of the Discovery*) 456
EMPEROR PENGUIN WITH CHICK (From Scott's *Voyage of the Discovery*) 456
CHASM SEPARATING ICE AND LAND IN LAT. 82° S. (From Scott's *Voyage of the Discovery*) 463
THE *MORNING*. (From Scott's *Voyage of the Discovery*) 466
TYPICAL LOOSE PACK—MT MELBOURNE IN DISTANCE. (From Scott's *Voyage of the Discovery*) 480
A TILTED BERG, SHOWING THE OLD SURFACE INCLINED TO THE LEFT (From Scott's *Voyage of the Discovery*) 492
TYPICAL BERGS—*TERRA NOVA* IN DISTANCE (From Scott's *Voyage of the Discovery*) 492
EMPEROR PENGUIN ROOKERY, CAPE CROZIER. (From Scott's *Voyage of the Discovery*) 497
BARRIER BERG AGROUND OFF KING EDWARD VII LAND. (From Scott's *Voyage of the Discovery*) 507

Acknowledgement is due to Messrs Smith, Elder & Co. and Mr John Murray for permission to reproduce the illustrations from Scott's *Voyage of the Discovery*, to Mr John Murray for permission to reproduce the facsimile of the Franklin Expedition Record; also to Mr William Heinemann for leave to use the map in Mikkelsen's *Lost in the Arctic*, to Messrs T. C. & E. C. Jack for the block from Synge's *A Book of Discovery*, and to the Hakluyt Society for the portrait of Thomas James.

ERRATUM

p. 100, line 4 from bottom:
for Sunrise *read* Sunshine

PART I

CHAPTER I

THE ARCTIC REGIONS

THE history of the Polar Regions, of those vast areas, difficult of access, which include millions of square miles of land and ocean at either extreme of our planet, is of surpassing interest and importance. It is not only that we here meet with examples of heroism and devotion which must entrance mankind for all time. It is not only that there are dangers to be encountered and difficulties to be overcome which call forth the best qualities of our race. These, no doubt, are the main reasons for the deep interest which polar exploration has always excited. But there are others of almost equal importance. These regions offer great scientific problems. They present wide fields of research in almost all departments of knowledge. They have in the past yielded vast wealth, and have been the sources of commercial prosperity to many communities, and they may be so again. Their history is a history of noble and persevering effort; extending over a thousand years in the Arctic where the work is well-nigh finished, but only just beginning in the Antarctic regions, where it will have to be completed by our descendants.

In approaching the subject it is well to have before our minds the extent of these great areas, the history of which we would grasp and understand. At the polar circle, which is 1410 geographical miles from the centre, they have a periphery of 8460 miles, and each includes 6,000,000 square miles. The Arctic and Antarctic circles are in 66° 32′ North and South, but these parallels are merely conventional. It is more convenient, as will be seen hereafter, to take the Polar regions as beginning at about the 70th parallel, the Sub-arctic and Sub-antarctic regions extending from 60° to 70°, a zone in which the fauna is richer and more varied.

The division of these polar regions into quadrants is useful because it facilitates geographical description and impresses the relative positions of the different parts on the mind. In the Arctic regions a line may be drawn from the Lofoten Islands to Bering Strait, with another crossing it from the head of Hudson's Bay to Cape Chelyuskin; thus forming four quadrants.

At the present day a fringe of coast lines forming the northern shores of the three great continents, with a deep interior polar sea, are the main features of the Arctic regions, but it was not always so. Looking back into remote geological periods, we have evidence of marvellous changes in the Arctic regions since the globe was a gradually cooling mass of vapour. In this process, extending over vast ages, the polar regions must have been, as they are now, cooler than the equatorial regions, and for the same reason. It was, therefore, in the polar regions that life first became possible, and here the life of the Silurian age arose. There is evidence of a continent in Jurassic and Tertiary (Miocene) times where now there is a polar ocean of great depth, save where Spitsbergen and Franz Josef Land exist as the sole remaining fragments of that continent. There is evidence that forests once flourished where now nothing higher than the dwarf willow can exist. There is evidence, too, of tremendous volcanic eruptions, covering great areas with sheets of basalt. In contemplating these mighty revolutions, and the gradual changes through long æons of ages, the leading fact connected with the polar regions is that here life first became possible. Here it was first possible that man could exist. The evidence that the arboreal vegetation of the miocene period originated round the north pole appears to be quite conclusive. The exploration of the Arctic area has disclosed proofs of wondrous secular changes which no imagination, however vivid, could surpass. Alike in the far south, as in the far north, there is food for the imagination—lights thrown

here and there on the history of a marvellous past. Such speculations are a fitting introduction to a study of the existing state of things, which has lasted through the historical period, and probably for ages before the dawn of history.



American Quadrant
Siberian Quadrant
Greenland Quadrant
Spitsbergen Quadrant

The two halves of the Arctic regions may be called the Old World or Eastern, and the New World or Western halves. In the former the water flows in, and in the latter it flows out, thus causing a great oceanic circulation not yet fully investigated, but now clearly understood in its general outline.

In the eastern half of the Arctic regions the warm current from the Atlantic flows along the coast of Norway and then bifurcates, one branch going north along the western side of Spitsbergen, the other continuing along the Lapland coast and turning up the west coast of Novaya Zemlya. All the great rivers of Siberia also empty themselves into this eastern half. Thus there is a constant tendency, aided by prevailing winds, for the whole drift from the eastern shores to flow across the Arctic Ocean to the western side.

On the American or western side the tendency is to flow outwards, but there is only one outlet, along the east coast of Greenland. The in-flow is insignificant, Bering Strait is shallow, and but a small volume of water finds its way within the Arctic area by that opening. The flow from all the American rivers, except the Mackenzie and Colville, is at once checked by land in front of their mouths. Hence the whole tendency of aqueous movement is to flow out, while there is only one means of escape.

The consequence of this general drift outwards, with but one corresponding outlet, is very remarkable. The harvests of ice are carried across the Arctic Ocean until they are brought up by the American coast and islands, where they are completely stopped. Then the ice gradually increases from annual snow falls and other causes until it becomes upwards of a hundred feet in thickness. There is some movement in the summer, and a tendency eastward to the north of Ellesmere Island and Greenland, to join the Greenland current. The other straits and channels are too shallow for such ice to pass. In one place alone, between Melville and Banks Islands, there is a drift of this heavy ice into the Parry Archipelago, for a distance of 500 miles, but it is then stopped by King William Island. Otherwise the only outward current for the heavy polar ice is down the east coast of Greenland. Even there the great body of ice comes from the Arctic Ocean itself, and but a small part is due to the escape of ice that has been pressed upon the western land. The outward current of Baffin's Bay only carries off the ice of one or two years' growth, which has formed in the bay itself and in the straits and channels leading into it. There is thus a vast accumulation along the outer shores of the western side, and the rising tendency of Arctic lands no doubt increases the difficulty of escape, and the consequent secular and unchanging block all along the western outer shores of the Arctic Ocean.

We may now turn to the quadrants of which mention has already been made on page 4. On the eastern side the first quadrant extends from the Greenwich meridian to 90° E., on an arc of the Arctic Circle, with two converging lines each 1410 miles long. In this quadrant we have Arctic Norway and Russia to Cape Chelyuskin, and the Spitsbergen, Franz Josef, and Novaya Zemlya groups of islands. It may be called the Spitsbergen Quadrant. The second quadrant on the eastern side includes the Siberian coast from Cape Chelyuskin to Bering Strait—the Siberian Quadrant. The third quadrant, being the first on the western side, includes Greenland, Baffin's Bay, and Baffin, North Devon, and Ellesmere Islands. The fourth quadrant, being the second on the western side, contains the northern coast of the American continent, and the Parry Archipelago. It is the American Quadrant.

It is desirable thus to have before us a general sketch of the Arctic economy before proceeding to the contemplation of the achievements of discoverers. We shall better appreciate their labours, their splendid efforts extending over centuries, if we know what they did not know, the results of their combined victories over the mighty obstacles which Nature placed in their way.

CHAPTER II

ICE AND ICEBERGS

A KNOWLEDGE of the nomenclature of polar phenomena is an essential preliminary to the study of the history of Arctic adventure. We must know the meanings of words which constantly recur and which form, as it were, the dialect of our subject. We begin then with the names for different forms and appearances of polar ice.

It used to be thought that ice could only be formed in creeks and inlets of the coast. It is now known that young ice forms on the surface of the open sea, and thickens into dense masses, where it is not disturbed by waves. *Young ice* then is the thin film first formed on the surface of the sea, when the temperature is sufficiently low in the autumn. When it becomes rather thicker it is called *bay ice*. In a ruffled sea the pieces of *bay ice* strike each other on every side, becoming rounded and having the edges turned up. This is *pancake ice*.

In a year, under favouring circumstances, the ice attains a thickness of six feet, in two years of nine feet. Sometimes masses of ice under-run each other, and the result is a thickness of 20 to 50 and even 100 feet.

A *field* is an expanse of ice of such extent that its termination is not bounded by the horizon. A *floe* is the same as a *field* except that its whole extent can be seen. *Floe bergs*, occurring on the northern shores of the polar ocean, are large masses of sea ice, broken off from ancient floes of great thickness, and forced upon the shore. *Ground ice* is formed on rivers or shallow inlets while the sea, as a whole, remains unfrozen. *Land ice* or the *land floe* is ice attached to the land.

Field ice varies in thickness from 15 to 20 feet. On its surface there is a deposit of several feet of snow which melts in the height of summer, forming numerous fresh-water pools on the ice. Generally an ice-field is traversed by long ridges of *hummocks*, often 40 to 50 feet high, brought about by the collision of two fields, the irresistible pressure causing them to rise up.

The term *floe* is applied to pieces which are from half a mile to a mile in diameter. Pieces smaller than a floe are called *drift ice*. When drift ice is so extensive that its limits cannot be seen, it is called a *pack*, when the pieces do not touch an *open pack*, when they are pressed together a *close pack*. A *patch* is a collection of drift ice, the limits of which are visible. A *stream* is a drifting line of drift ice. A *tongue* is a projecting point of ice, under water. A *calf* is a mass of loose ice lying under a floe near its margin, and, when disengaged from that position, rising with violence to the surface. *Brash ice* consists of fragments and nodules, the wreck of other kinds of ice, and *sludge* is the term applied to smaller pieces, generally saturated by the sea.

A bright white line on the horizon, seen over an ice-field, and denoting more ice, is known as the *ice-blink*. Over land or large masses of ice it generally has a yellowish tinge. On the other hand a blue streak on the horizon, denoting open water, is called a *water sky*. A *lane* or *lead* is a narrow track of open water between floes or pack ice. *Rotten ice* is old ice partially melted, and in part honeycombed.

When a ship is forcibly pressed by ice floes on both sides she is said to be *nipped*, and she is *beset* when closely surrounded by ice. To *bore* is to enter the ice under press of sail or steam and to

force a way through by separating the masses. *Sallying* is causing a ship to roll by making the men run in a body from side to side, to relieve her from adhesion of young ice.

An *ice foot* along a coast line is caused by the accumulation of the autumn snow-fall, as it drifts to the beach, being met by sea-water with a temperature just below the freezing point of fresh water. It is at once converted into ice, forming a solid wall from the bottom of the sea, constantly maintained. The upper surface of an ice foot is level with high water mark. The terrace above this wall, from its edge to the base of the *talus*, has a width dependent on the land slope. Thus an ice foot will not be found either where there are perpendicular cliffs or low coast lines, but only along sloping high lands under special conditions.

The most striking features in the polar landscape are the icebergs, and they are wholly derived from the land, the large icebergs from Greenland, from Spitsbergen much smaller ones. To understand their origin and movements we must turn to the great continental mass of Greenland. It consists of a vast ice-cap fringed by a strip of mountainous coast, which is penetrated by deep fjords and flanked by numerous off-lying rocks and islands. The area of Greenland is believed to be 512,000 square miles, of which 320,000 form the inland ice, and 192,000 represent the fringing margin of mountains not permanently ice-covered. The widest part is 900 miles across; at Disco in 70° N. it is 480 miles and thence the two coasts converge until they meet in a point at Cape Farewell in 59° 49′ N. The length of Greenland is 1400 miles. The Greenland ice-cap is by far the largest in the northern hemisphere—a continuous covering of snow, *névé*[1], or ice resting on land, known as the "Inland Ice." From it descend glaciers or rivers of solid ice, coming from their sources in the ice-cap.

The "Inland Ice" of Greenland rises to a height of 8000 feet, and the deep fjords run for 80 or 100 miles before they end at the foot of walls of ice rising abruptly from the water. These walls are the terminations of glaciers from the inland ice, which, constantly throwing off icebergs, are called discharging glaciers. There are eight principal discharging glaciers on the west coast of Greenland[2]. On the Greenland continent the snow, converted into ice by pressure, has in the course of ages filled all the valleys, covered the mountain tops, and formed a smooth plateau far above them, so that the thickness of the inland ice is measured by thousands of feet. The ice walls at the heads of the discharging glaciers are driven onwards by the force of gravity, the pressure of the superincumbent mass behind them being enormous. In some cases the rate of movement is as much as 28 yards in a day.

A discharging glacier, on reaching the sea, has a thickness of at least a thousand feet. It continues to slide along the bottom until it reaches a point where the depth of the water has sufficient buoyant force to lift it. Still it continues its course. The action of the tides gives rise to fissures in the enormous mass, and at length the foremost part is broken off, and drifts away as an iceberg. The icebergs are discharged from the fjords in vast numbers, and are eventually carried by the current of Baffin's Bay and Davis Strait into the Atlantic.

The icebergs are alike the grandest and the most beautiful features of the Arctic seas. Only one-seventh of their bulk appears above water, yet they may be hundreds of yards in circumference, and their peaks reach a height of 300 ft. A grander sight can scarcely be conceived than new-born icebergs drifting out from the fjord of their birthplace. When the icebergs drift well out into the open sea the weathering and consequent reduction in size begins. They eventually lose their equilibrium and capsize. The part that has been long under water becomes the upper part, and it is now that the bergs assume their most fantastic shapes. Very often a large piece breaks off from the parent berg, and falls into the sea, churning it up into creamy waves. This is called *calving*.

The colour of an iceberg is opaque white. Scattered through the mass, and sometimes visible on the surface, are strata of deep blue ice, varying in width from one to several feet. They have an exquisitely lovely effect, contrasting with the deep white of the rest of the berg. These blue stripes may be formed by a filling up of the fissures in the inland ice with water. Such refrigeration of the water in the fissures may be an important agent in setting these great mountains of ice in motion. Sometimes there is a passage right through an iceberg. But it is when a line of icebergs is refracted on the horizon that the polar scenery is converted into a veritable fairy land. Some are raised up into lofty pillars. Again a whole chain of them will assume the appearance of a long bridge or aqueduct, and as quickly change into a succession of beautiful palaces and temples of dazzling whiteness, metamorphosed by the fantastic wand of Nature. When the ice breaks up in summer, the current takes many of the icebergs into the Atlantic.



Effects of Pressure on Antarctic Ice

"Like a scarlet fleece the snowfield spreads
And the icy fount runs free,
And the bergs begin to bow their heads
And plunge and sail in the sea."

Antarctic Ice.

The difference between the two polar areas—the Arctic an ocean surrounded by continental lands, the Antarctic a continental land surrounded by oceans—causes the differences in the character of the ice with which the sea is laden.

The Antarctic continent is covered with an ice-cap, which along some coasts is buttressed by ice cliffs terminating in the sea, and on coasts facing east is bordered with lofty mountains through which glaciers have forced their way. Throughout the Antarctic regions there is evidence of much more extensive glaciation in former ages. The glaciers are for the most part receding, although there are proofs that some are still moving down to the sea. But there are fixed masses of ice on the sea coast, in the form of cliffs: tongues which could not have been deposited or fed by existing glaciers. At the period of maximum glaciation the climate was much milder, and as the severity of the temperature, due to less precipitation, increased, there must have been sterile ice conditions, and consequent retirement of glaciers and ice-fields. These receding glaciers do not supply bergs; and as the Antarctic icebergs are by far the largest in the world, their origin must be from some other source.

The great ice barrier of Ross fills a vast bay 400 miles across, and at least 300 miles deep, with soundings of about 600 ft. There is no reason why other such barriers should not exist in other parts of the Antarctic regions as yet unknown. These barriers must be the sources of the enormous tabular icebergs which float northward in such vast numbers. Their height is about 200 ft., and their length from one or two to as much as twenty miles.

Large floes are not very common, but there is a great deal of drifting ice, broken off from fixed land ice, which forms closely packed or sailing ice according to the winds. In December this pack ice is usually 300 miles across from 66° to 71° S. in front of the Ross Sea, but it lies further south in the King George IV Sea of Weddell. In February the Ross Sea is navigable, and the pack is scattered.

CHAPTER III

TRIBES AROUND THE POLE

BEFORE we begin to follow the achievements of the great Polar worthies, it seems desirable to take a brief survey of the dwellers on the threshold of the Arctic regions; for here are races who have for ages found homes along the European, Siberian, and American coasts of the Polar Ocean and in Greenland.

To begin with the Spitsbergen quadrant; the northern coast of Norway, now known as Finmarken, and the Kola peninsula face the Polar Sea, but, owing to the warm current from the south, this coast has its bays and inlets clear of ice throughout the year. The coast is lined by numerous islands, several of them of considerable size to the west of the North Cape, and is indented by deep fjords. The most northern point of Europe is in 71° 11′. Inland there is a flat mountain plateau, with a height of some 1500 feet, consisting of stony desert with a few patches of reindeer moss, and some morasses. The plateau is traversed by rivers such as the Tana and the Alten, which force their way through accumulations of gravel before reaching the sea. Pine forests have now receded from the coast to the foot of the gneiss mountains in the interior, and their place is taken by dwarf birch near the sea. The Kola peninsula, known to the Russians as the Murman coast, has high and precipitous granite cliffs and a line of central hills sending the drainage on one side to the Murman, and on the other side to the White Sea.

This is the land of the Lapps, encamped for hunting, and on the sea coast for fishing in summer. Their average height is about 5 ft. 1 in., and they have high cheek-bones, small elongated eyes, wide mouths, little or no beard, and dark straight hair. Their circular tents are made of coarse cloth supported by branch poles of birch and pine. A fire is lighted in the centre, and there is an opening at the top by which the smoke escapes. The Lapps are always wandering for food for their reindeer —moss and birch leaves, and in winter lichen. One family requires a herd of at least 200 animals. The Lapps drive their reindeer in sledges, make cheese from their milk, eat the venison, and make most of their clothing of the skins. These people can march great distances with a short quick step and carry very heavy loads. They live to a considerable age. Their language is Mongolian, and their religion one of magic and witchcraft, which inspired some awe in the minds of the Norsemen who enforced tribute from them.

Eastward from the White Sea the nature of the country changes, and we enter upon the *tundras*, a Russian name for the bare tracts between the forests to the south, and the shores of the Polar Ocean. The Petchora is the greatest river of the western tundra, flowing northwards along the western spurs of the Ural Mountains towards the gulf of Mezen, where the delta is 120 miles long, the channels winding in a network round islets and banks which shift their positions at every thaw. Fifty miles off the coast lies the island of Kolguev, 50 miles long by 40, entirely composed of sand and small stones, all its deposits being referable to oceanic forces; it is, indeed, essentially a water and ice-formed island.

The region from the White Sea to the Ural Mountains is inhabited by a race called Samoyeds, brachycephalic Mongols with a Finnish admixture. Of short stature, averaging a fraction over 5 feet, they have the short broad Mongolian face, long oblique eyes, high cheek-bones and flat noses. Like the Lapps they are dependent for locomotion, clothes, and food on their herds of reindeer, and they

also have dogs for rounding up the deer. Their boots, loose tunics, and winter cloaks are of deer-skin, and the Samoyed hut (*choon*) is made of birch poles covered with deer-skin for winter, and with strips of birch-bark sewn with sinews in summer. Like the Lapps too, and for the same reason —to drive off mosquitos—they light their fires inside the *choon*. The Samoyed sledge, drawn by three to five reindeer abreast, consists of two thick runners curved upwards in front, about 9 feet long and 30 inches wide, with four uprights and cross bars. These people worship great numbers of wooden idols grouped round a seven-headed idol of Kesaks. They come to the settlement of Khabarova, near the narrow strait which separates the mainland from the island of Waigatz, during the summer; and they look upon the latter as the holy island on which they wish to be buried.

Eastward of the Samoyed country is the Siberian coast, extending for 2000 miles of longitude along the Polar Ocean, a vast tundra traversed by three great rivers—the Obi and its tributary the Irtish, the Yenisei, and the Lena. To the east of the Lena there are three smaller rivers, the Yena, Indigirka, and Kolyma, but all have their sources far to the south of the Arctic Circle. Some other streams, merely rising in the tundra, flow into the Polar Ocean. These are the Piasina, Taimir, Khatanga, Anabara, and Olenek between the Yenisei and Lena, and the Alaseia between the Indigirka and Kolyma.

The three great rivers have remarkable width and volume. The Yenisei is more than three miles wide for at least a thousand miles, and a mile wide for another thousand. The 200 miles of delta have a width of 20 miles. The sudden melting of the winter accumulations of snow gives rise to floods of great magnitude. Vast harvests of ice are thus annually poured out. The tundra is generally a slightly rolling plain sloping towards the rivers, intercepted by deep river valleys with precipitous sides. The ground is frozen for several hundreds of feet below the surface, and for eight months, from October to May, the tundra is a sheet of snow 6 feet thick. In the summer a wild-looking country appears, full of small lakes, swamps, and streams, swarming with mosquitos and frequented by myriads of birds. The sun brings to life a brilliant Alpine flora, and the tundra has a carpet of grass and mosses.

The Siberian shores of the Polar Ocean forming the edge of the tundra are for the most part low and flat, and Cape Chelyuskin, the northern termination of the Taimir Peninsula in 77° 36′ N., is a low promontory.

This Siberian tundra is the coldest region in the world. The earth, alternating in many places with strata of solid ice, is hard frozen in perpetuity for a depth of several hundred feet. The mean temperature of January is -65°, but the interior is much colder than the sea coast, there being a difference of 20°. At Yakutsk -79° has been recorded, but the greatest natural cold ever measured is -93° at Verkhoyansk, in 67° 34′, near the river Lena.

A great part of the Siberian coast is quite uninhabited, but some hardy tribes extend their wanderings to, and even have permanent settlements on the shores of the polar sea. The Samoyeds, with both reindeer and dog-sledges, extend their wanderings to the Yenisei. The Ostiaks of the Obi and upper Yenisei rivers, numbering 27,000, are Finnish and have close racial affinities with the Samoyeds. They possess a fine breed of dogs, but live chiefly by fishing. The Yuraks of the Yenisei are a branch of the Samoyeds. The Tunguses and Yakuts wander further to the east, as far as the Kolyma.

The mysterious Onkilon or Omoki inhabited the river banks and sea shores of eastern Siberia. “Once there were more hearths of the Omoki on the shores of the Kolyma than there are stars in a clear sky.” They were established in fixed settlements. The remains of their forts, built of tree trunks, and their tumuli are found, especially near the banks of the river Indigirka. Nordenskiöld found the ruins of their house-sites near his winter quarters, and his excavating operations were

rewarded by finding a stone chisel with a bone handle, slate knives, bone and slate spear-heads, and a bone spoon. Some centuries ago there was great pressure from the south, and the Onkilon, Omoki, and Chelagi appear to have been driven northwards. The Omoki are said to have gone away over the frozen ocean, but it is not known whither. It is thought that they went to the land said to be visible from Cape Jakan in clear summer weather. At all events they disappeared.

Their place was taken by the tribe called Chukchis, who occupy the Siberian coast from Chaun Bay to Cape Chelagskoi. They are divided into reindeer or inland, and coast Chukchis, each with about 400 tents representing a population of 2000. The Chukchi race is the finest on the Siberian coast, the finest eastward of the White Sea. They are cleanly compared with the Samoyeds, with a higher type of head, more intelligent-looking, and with a reddish-white complexion. They are a hardy and thriving people, with many children, but indolent when not forced to exertion by want of food. They live in large and commodious tents both winter and summer, which are unlike those of any other tribe. The Chukchi tents consist of an outer and an inner tent. The outer one is of seal and walrus skins sewn to each other, and stretched over wooden ribs bound together by thongs. The inner tent is covered with reindeer skins and a layer of moss, and is warmed by oil lamps. The tents are usually pitched on the necks of land separating the strand lagoons from the sea. The boats of the Chukchis are of walrus hide sewn together, and stretched on a frame of wood or bone. Their dog sledges are very light and narrow, with runners of bone covered with layers of ice, and they use shoes for their dogs, to prevent their feet from being cut by the ice. Their snow-shoes, for the winter, have a frame of wood crossed by well-stretched thongs. Expert with lance, bow and arrows, fishing line and nets, they live on the spoils of the chase, to which cloudberries are added in favourable seasons, when the fruit is able to ripen. The Chukchis carve animals and other figures during the long winter nights, and display considerable skill and ingenuity in the conversion of all the means that Nature has placed within their reach to their own uses. They are brave and independent, intelligent and well disposed, and on the whole must be considered to be the finest of the Arctic races.

The dogs used for draught by the Siberian tribes have much resemblance to the wolf. They have long projecting noses, sharp upright ears, and long bushy tails curling over their backs. They vary in colour, and the size of a good sledge dog is about 2 feet 7 inches in height, and 3 feet in length. In summer they dig deep burrows in the ground or lie in the water to avoid mosquitos. The feeding and training of dogs is a special art, but their natural sagacity is extraordinary.

The homes of the Eskimo along the Arctic coast of North America present an aspect which differs, in several respects, from those of the Siberian coast. The American polar rivers are less numerous and of far less volume than those of Siberia, and for the *tundras* of Siberia are substituted the "*barren lands*" of North America, which are essentially different. The first consists of frozen earth and ice for an immense depth, the second of low granite and gneiss hills with rounded summits separated by narrow valleys. Except for limited deposits of imperfect peat-earth in the valleys, the surface of the "barren lands" consists of a dry coarse quartzose sand scattered over with granite boulders. The American Arctic coast is faced by islands, with narrow straits intervening, except for 800 miles to Bering Strait where it faces the heavy ice of the Polar Ocean.

This American coast produces edible berries and roots, and on the land are musk oxen, reindeer, wolverines, wolves, foxes, martens, hares, and marmots. Salmon, with other fish, frequent the rivers, and many wading birds, besides ptarmigan and willow grouse, ducks, geese, and guillemots, come to breed. It is a Sub-arctic, not an Arctic region. The whole coast, for 1700 miles, affords the means of subsistence.

Here the hardy little Eskimo race has dwelt for long ages, from the Aleutian peninsula to Hudson's Bay and Labrador. Their original position is supposed to have been the coast near Bering Strait, from Kotzebue Sound to the Colville river. They have preserved themselves, for generations, by their great faculty of obtaining subsistence by the most ingenious contrivances, and through hereditary skill and perseverance. Their tales and traditions go back for untold years, and with them have been transmitted those methods of hunting and fishing which long practice, through many generations, has perfected. Living mainly on seals, their southern neighbours, the Algonquin Indians, gave these coast people the name of *Askikamo* or seal-eaters, whence our word Eskimo, but they call themselves Innuit.

The American coast Eskimos have a dozen winter settlements, four of which are never altogether abandoned in the summer. They move about for purposes of bartering and trading, as well as for hunting and fishing; but they have permanent settlements, like that at Point Barrow, with a population of 300 souls in 50 huts. These Eskimos average a height of 5 feet 4 inches, with square shoulders, deep chests, and great muscular strength in the back. The hands are small and thick, and the lower limbs well proportioned. In walking their tread is firm and elastic, the step short and quick. Their hair is black and cut in an even line across the forehead, the complexion fair enough to make the rosy hue of the cheeks visible, giving place to a weather-beaten appearance before middle age. The face is flat and plump with high cheek-bones, forehead low, nose short and flat, eyes dark, sloping obliquely. The mouth is prominent and large, the jaw-bones strong, with firm and regular teeth. The expression is one of habitual good humour, but marred by wearing large lip ornaments of stone.

The dress consists of a frock reaching half down the thighs, with a hood and loose waist-belt, and a tail of some animal attached to it behind. The breeches are tied below the knee over long boots. The clothes are doubled, the inner frock of fawn-skin with the fur inwards, and the outer of full-grown deer-skin with the hair outwards. The winter habitations are entered by a passage 25 feet long, terminating under the floor of the *iglu* or hut, which is a square chamber from 12 to 14 feet by 8 or 10. The walls are of stout plank, and the roof has a double slope with a square window on one side, covered with a transparent membrane stretched by two pieces of whalebone. The oil burner or fireplace is the most important piece of furniture. It is a flat stone, hollowed on the upper surface, and placed on two horizontal pieces of wood fixed in the side of the hut a foot from the floor. A flame is kept up from whale or seal oil, by means of wicks made of dry moss. The summer tents are conical, of deer or seal-skins, on poles slung together by a stout thong.

In October the sea becomes closed and the men set nets under the ice for fish, also angling with hook and line through ice holes. In January they set out in search of reindeer, hollowing out dwellings in the snow-drifts. Their hunting employment lasts until April, when they return home to get ready their boats for whaling. In summer they are scattered over the country in search of seals and birds.

These Eskimos are described as cheerful and good-humoured, quick-tempered but placable, and with strong conjugal and parental affections. They are shrewd and observant and some exhibit considerable capacity. Far to the eastward, in Boothia, the Eskimos live in snow houses instead of wooden huts. These snow houses are built of large blocks of snow carefully laid and made in the shape of a dome with a square hole for light. The dog sledges of the Boothians are rude, and the runners made of folded seal-skin carefully coated with ice.

Still further east, in Melville Peninsula at the head of Hudson's Bay, the Eskimos average an inch or two more in height. Instead of lip ornaments, they tattoo the face, arms, and hands, and as with the Boothians their winter habitations are snow huts. Besides dog sledges they have *kayaks* 25

feet long, with a width of 21 and depth of 10½ inches, but no *umiaks* or women's boats. Their dog sledges are heavy, with runners of bone scarped and lashed together. Their weapons are spears, bows and arrows, and bird darts used with a throwing-stick.

Thus the Eskimos spread themselves over a vast extent of country, wandering from Bering Strait to Labrador, a distance of 2000 miles. They adapted themselves to their environment alike in the construction of their dwellings and in their contrivances for fishing and hunting. They are equally at home whether the building material is plank, drift wood, stone or snow; and with the same versatility they adapt their weapons and sledges to the materials within their reach. These Eskimos, by reason of their vigour and courage, of their shrewdness and intelligence, have been among the greatest and most successful wanderers on the face of the earth.

The problem of the peopling of Greenland has been more difficult to solve. It is now clear that the Eskimos, as we call them, who established themselves in Greenland, originally came from the north. We therefore seek for the evidence of movement of Arctic people. The most remarkable migration was that of the Onkilon, Omoki, and other Siberian tribes during a long period of years, owing apparently to pressure from the south. We are told that their abandoned *yourts* may still be seen near the Indigirka and Cape Chelagskoi. As we have already said, there is a tradition that they wandered away from Cape Jakan to the land in sight in the distance, which we now know to be Wrangell Island, and thence across the ice to the American continent. Finding the coast already occupied they went northwards and eastwards seeking for a home. They must have come in very small parties and at long intervals, for the desolate country could not sustain a large migration. Wandering along the coasts of Banks Island, they came to a region which, owing to the absence of open water during long intervals, was unable to support them.

This is one of the most wonderful migrations ever performed. It is unrecorded. But the long route is strewn with abundant vestiges of marches, during centuries perhaps, over the snow and ice, in search of an abiding-place. Many must have perished. We found relics at frequent intervals from Melville Island to Baffin's Bay. Their appearance and the lichens growing upon them, justify the conclusion that the movement took place centuries ago[3]. The relics consist of stone *iglus* or winter huts, circles of stones to keep down summer tents, stone fox-traps, stone lamps, graves built with stone slabs, and many articles brought from a distance. Among these were portions of the bones of whales used to support the roof of an *iglu*, other pieces cut into a shape for running melted snow into a vessel, pieces of the bone runners of sledges, and a willow switch 2 feet 3 inches long, covered with lichens[4]. These vestiges are numerous and continuous from Melville Island to Wellington Channel. Then the traces form two branches; one along the coast of North Devon to Cape Warrender and the north water of Baffin's Bay, the other up Wellington Channel and the western coast of Ellesmere Island, then across the land to Sir Thomas Smith's Channel. The most northern traces are near the 82nd parallel, where the framework of a wooden sledge, a stone lamp, and a snow scraper of walrus tusk were found[5]. Further north, life could not be supported, and the wanderers wended their way southward to Greenland. Perhaps a few followed the musk oxen and reached the east coast.

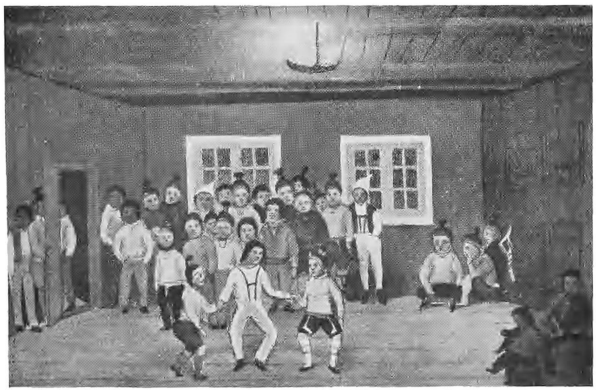
Thus, we may safely believe, was Greenland first peopled. A further proof is that they have the word *umingmak* (a musk ox), which does not exist in Greenland, but was met with in the far northern wanderings and the tradition handed down. Very gradually the Eskimos worked their way south along the west coast of Greenland. But they were in the region between Disco Bay and Holsteinborg in a far-off prehistoric period. There have been rich finds of implements in North Greenland (68° to 71°) in deep deposits of great age[6]. The Eskimo appeared much later in South Greenland.

The Greenland Eskimo differed very little from his congener of the North American coast. He was dolichocephalic, with a short broad face, small slanting eyes, cheeks broad, prominent, and round, hair straight and black, and about the same average height. In Greenland the Eskimos passed the winter in *iglus* or stone houses, the floors of which are sunk some feet below the surface of the ground. In summer they lived in skin tents, while their property was moved from one hunting encampment to another in their *umiaks* or women's boats, which are 30 feet long by 5 wide and 2½ deep, flat-bottomed, and made of seal-skins stretched on a frame. The *kayak* or hunter's canoe is the triumph of Eskimo art. It also consists of seal-skin stretched on a frame, but the frame, flat-bottomed and sharp at both ends, is designed on the most perfect lines for speed and buoyancy. It is entirely covered except a hole for the hunter, who ties a waterproof, which is attached all round to the *kayak*, around his waist when seated. Then, with his double paddle, he faces the wildest seas with dauntless courage, and with his harpoon secures his prey with unerring aim. The Greenland *kayak* is the most perfect application of art and ingenuity to the pursuit of necessaries of life to be found within the Arctic Circle.

The use of the *kayak* among the Eskimo of Hudson's Bay makes it probable that, at one time, there was some intercourse by way of Davis Strait.



Interior of Greenland Hut



Greenlanders dancing

Equally ingenious is the use of an air bladder attached to their harpoons to retard the seal in its rush when struck, and to keep the harpoon floating if the quarry is missed. The point of the harpoon is also so fitted that, when the seal is struck, it slips out of the shaft, obviating the danger of the shaft being broken by the animal's struggles, and of the barb slipping out of its body. The point is attached to the shaft by a thong.

Seals provide material for clothes, boots, tents, and food. The Greenland dogs are excellent for their purpose and draw sledges 30 or 40 miles a day over smooth ice easily; but the dog as a draught animal is an Asiatic invention. The Greenland sledge consists of a couple of boards for runners, 6 feet long, with cross pieces, and two upright poles for guiding. All is kept together by seal-skin thongs, thus affording elasticity. On smooth ice a pace of 16 miles an hour can be attained, the load for dogs being nearly 500 lb. Eskimo necessary furniture consists of lamps, wooden tubs, dishes, and stone pots. Their arms are bows and arrows, bird darts, javelins, and lances.

The wood required by the Greenland Eskimo is provided by the Arctic current. Flowing down the east coast of Greenland it is diverted by the Gulf Stream, turns round Cape Farewell, and flows up the coast of Greenland bearing abundance of drift wood. Again meeting the Baffin Bay current, it is turned again down into the Atlantic. This drift wood consists of coniferous trees which must come from Siberia. Pieces 60 feet long are found on the coast so far north as 60° 30′, one yielding 3 cords of wood in 63° N., and pieces of 12 to 30 feet are not uncommon.

The *Angekoks*, like the Shamans of Siberia, are the priests and physicians of the Eskimos, who believe in a great first cause, and in spirits, especially evil spirits, who have to be propitiated. They have myths and traditions, but none that throw any certain light on their origin and history. By far the best account of the arms, tools, and utensils of the Eskimos of West Greenland is by Porsild[7].

The most interesting tribe of Eskimos is that which was discovered by Sir John Ross on the north coast of Baffin's Bay, probably descended from the last Asiatic arrivals. Having no canoes their progress south was stopped at the curving shores of Melville Bay, 300 miles round, nearly all occupied by glaciers coming down to the sea. Ross named them the "Arctic Highlanders." They had dogs and sledges but no *kayaks*, consequently there was no communication with the Greenland Eskimos to the south.

The coast from Cape York to Etah, within Smith Sound, is the country of the Arctic Highlanders. It is broken by deep fjords, separated by magnificent headlands, the breeding-places of guillemots and kittiwakes, and the favourite home of millions of little auks or *rotches*. The Arctic Highlanders are stout well-built little men, thick-set and muscular, with round chubby faces, oblique eyes, and small and very thick hands. With marvellous endurance they are courageous, are ready to close with a bear, and have been known to enter into a conflict of four hours' duration with a fierce walrus, on weak ice. Without wood, without bows and arrows, without canoes, they still secure abundance of food with their spears and darts. In summer they live in seal-skin tents, in winter their habitations are circular stone huts built at permanent stations along the coast. Their utensils consist of shallow cups made of seal-skin for receiving the water as it melts from a lump of snow and flows down a shoulder blade of a walrus, and of stone lamps. They eat their food raw and in large quantities. Their weapons are a lance of narwhal ivory and a harpoon, and nets to catch the little auks and other birds. The Arctic Highlanders possessed knives of meteoric iron, made by inserting in a row along a slit made in a haft of stone or ivory a number of thin flakes, carefully chipped to a circular form. This meteoric iron came from three huge boulders at the back of Bushnan Island, near Cape York.

The Arctic Highlander wears a shirt of bird-skin neatly sewn together next to the skin, with the soft down inwards, over which there is a loose *kapetah* or jumper of fox-skin, tight round the neck,

where a hood is attached to it. The *nessak* or hood is lined with bird-skins and trimmed with fox fur. The breeches, called *nannuk*, are of bear-skin and come down to the knees, and above are just in contact with the *kapetah*, when the wearer is standing upright. On the feet bird-skin socks are worn with a padding of grass, over which come bear-skin boots. By means of their sledges these hunters can move swiftly to the bear-hunting grounds, and no hunters in the world display more indomitable courage and presence of mind, or more skill and judgment in the exercise of their craft. Their number, when first discovered, was about 300. From an ethnological point of view they are the most interesting of all savage tribes, by reason of their wonderful exodus and their isolation.

We have now passed in review all the dwellers on the Arctic Threshold, from Lapland round the northern shores of Siberia and America to Greenland, considering them with reference to their environment, and we have traced the wanderings of the Onkilon until we find the last remnant of the exodus on the northern shore of Baffin's Bay. Such a brief survey is a necessary introduction to the history of Arctic enterprise.

CHAPTER IV

ULTIMA THULE

THE first tidings of the existence of the Arctic Regions that reached the civilised world were due to the voyage of a Greek navigator of great knowledge and ability. The people of the Ionian city of Phocaea in Asia Minor, scorning to submit to Median domination, had formed a very flourishing commercial colony at Massilia, near the mouth of the Rhône, on the southern coast of Gaul. Strange products reached them from unknown regions to the north, coming over great distances and then down the river Rhône. These products included tin and amber. The interest of the able and imaginative Greeks of Massilia was aroused, and a strong desire was felt that the regions whence this tin and amber came should be discovered. Fortunately the colony possessed a man eminently fitted to conduct an exploring expedition, in the person of Pytheas, an astronomer and mathematician. As it is alleged by Polybius that Pytheas was in poor circumstances, it is probable that the voyage he undertook was not his own venture, but that he was placed in command of a government expedition. It is certain that he prepared for his perilous enterprise with great care. He first carefully fixed his point of departure at Massilia by erecting a large gnomon divided into 120 parts. Observing its shadow at noon of the day of the solstice he found that its length was 42 parts of the gnomon, less one-fifth, that is 41⅘ths to 120, or 209 to 600. This proportion gave 70° 47′ 50″ for the altitude of the sun. The length of the longest day was 15 hours 15 minutes. The obliquity of the ecliptic was found to be 23° 51′ 15″, which was deducted from the altitude. The complement of the result was the latitude of the place less the semi-diameter of the sun. With the semi-diameter added, the result is almost exactly the latitude of the Marseilles observatory, 43° 18′ N. Such accuracy is remarkable. The next step taken by Pytheas was to fix upon the nearest star to the pole as a guide for steering the ship. He found that there was no star on the pole, but that there were two very close to it. These would have been, in those days, β Ursæ Minoris and α Draconis, and Pytheas used one of these as his pole-star. During the voyage the latitudes were obtained by observation of the longest days. This involved long detentions at some of the ports.

The nearest approximation we can get to the date of the voyage of Pytheas is the time of Alexander the Great and of Aristotle, about 330 B.C.[8]

A Grecian ship in those days was strongly built on regular principles, with sails on the mainmast, and rowing power. A large vessel would be 150 to 170 feet long, with a tonnage of 400 to 500, much larger and more seaworthy than the crazy little *Santa Maria* in which, 1800 years afterwards, Columbus discovered the New World.

Well provided with all the knowledge of his time, Pytheas weighed anchor and began his coasting voyage by the Pillars of Hercules and the Sacred Promontory, the western limit of the known world. The Greek ships of the time averaged about 50 miles a day. Sailing on along the coast, Oestrymnis (Cape Finistère) was reached, the probable farthest point of Himilco the Carthaginian. The island of Uxisama (Ushant) is mentioned, with an observation for the length of the longest day equal to 49° N. Thence a direct course was shaped for Cantion (Kent) where there was a long stay, and the island of Britain was thus discovered. Here Pytheas made a long journey into the interior, visiting Belerion (Cornwall) and the tin mines, and noting several details respecting the habits and customs of the people, our remote ancestors. In those days Britain was

almost entirely in a wild state. The valleys were covered with primeval forests, their lower parts were occupied by vast swamps, and it was only on the downs and hill-ranges that there were *gwents* or open clearings. Still, the people raised wheat and other cereals, had domestic animals, iron tools and arms, wooden chariots with iron fittings, and ornaments of bronze and gold. Pytheas must have traversed the great forest of Anderida on his way to the tin mines, and he found the people hospitable. They did not use open threshing-floors owing to the rains, but threshed their corn in large barns. They stored the corn in pits under ground, and made fermented liquor from barley, which they used as wine. Their houses were of wood and thatch, and Pytheas mentions the war chariots, but adds that the chiefs were generally at peace with each other.

When Pytheas returned to his ship in some haven of Cantion he proceeded northwards. His next observation gave 17 hours as the length of the longest day. This would be in latitude 54° 2′ N., somewhere in the neighbourhood of Flamborough Head. Still coasting to the north in his great voyage of discovery, Pytheas came to a point at the northern end of Britain which, by a similar method of finding the latitude, must have been Tarbat Ness in Ross-shire. As he advanced towards the Arctic Circle he found that the cultivated grains and fruits and almost all the domesticated animals gradually disappeared. The people in the far north were reduced to living mainly on herbs and roots. The intrepid explorer still pressed onwards to discover the northernmost point of the British Isles. Coasting along the shores of Caithness and the Orkney Islands he finally arrived, conjecturally, at Unst Island, the northernmost of the Shetland Isles. Pytheas gives the name of Orcas to this extreme point of the British Isles, a name which in later times was transferred to the Orkneys or Orcades.

It was at Orcas that Pytheas received information of an Arctic land called *Thule*[9], at a distance of six days' sail, and near the frozen ocean. There was no night there in the summer solstice. During one season the night was continuous, and during another it was continual day. Pytheas does not say that *Thule* was an island, nor that he had been there. It was possibly the coast of Norway in the neighbourhood of Alstenoe and the Vefsen-fjord. Pytheas also received reports of the physical aspect of the Arctic region beyond Thule. His account has been turned into nonsense by Strabo, copying from the explorer's adverse critic Polybius. Yet even as we have it, the real meaning is clear enough. It is a good description of a fog at the edge of broken-up pack ice and sludge, "which can neither be travelled over nor sailed through."

Pytheas was thus not only the discoverer of Britain, but the first explorer who received information respecting the Arctic regions. He was, as Professor Rhys has truly said, "one of the most intrepid explorers the world has seen." To have taken five observations of the lengths of the longest days the voyage must have occupied about six years. Sailing south from Orcas, Pytheas returned to Cantion, and eventually to his home at Massilia, whence he is said to have set out on another expedition to examine the mouth of the Elbe, and the sources of amber. He lived to return once more to his home.

Pytheas wrote one, if not two books to describe the events and results of his memorable voyages. Both are unfortunately lost. We only know the story from the extracts in Strabo and other later writers[10].

The Ionians of Phocaea and Massilia had been trained as mariners and students for generations, alike in the mother city and in the colony, and all their admirable qualities seem to culminate in the life work of Pytheas. His learning and his discoveries form the fitting crown of their history. Pytheas was a geographer and an explorer in the highest sense. For he must have devoted long years to qualify himself for his great task, and his attainments placed him in the first rank of nautical astronomers before he undertook his voyages into the unknown ocean.

CHAPTER V

FIRST CROSSING OF THE THRESHOLD

THERE is one part of the Arctic and Sub-arctic regions, and one only, where a country retaining the warmth and the adaptability of the temperate zone as an abode for civilised man extends far beyond the Arctic Circle, and, as it were, connects the vast tracts of ice and snow with the habitable earth. This is the Scandinavian peninsula. It stretches northwards to 71° 10′ N., maintaining a temperature throughout its length which renders it fit for the abode of a race of men who have been leaders in progress and civilisation. This remarkable phenomenon is due to the flow of warm water from the Atlantic, which passes northward along the coast of Norway. The Atlantic current has the effect of ameliorating a climate which would otherwise be of Arctic severity, while at the same time it keeps off and checks the polar icebergs in their southerly drift, so that ice is never seen on the northern shores of Finmarken. Reclus has very truly said that this current has played a chief part in the modern history of mankind.

The Norsemen appear to have arrived in the Scandinavian peninsula, and superseded the Finnish tribes, a century or two before the Christian era. The physical geography of the region moulded the thoughts and lives of the new-comers. With a noble foundation to build upon, their character was evolved by their environment. The stormy seas and impenetrable fogs, the glories of the fjords with their mighty cliffs and glittering cascades, the valleys and lakes, the dense forests and mysterious ice fjells—all were made to form settings for the long array of fancies created by the glowing enthusiasm of the Norsemen.

But the imagination of these people had a still wider and loftier range. Influenced by the glories of nature which surrounded them, they sought for the origin and first impulses of created things and strove to make their conceptions co-extensive with the universe, while they peopled nature with supernatural agencies of all kinds. Yet there was a proud humility in the loftiest flights of their imaginations. They elaborated a mythology and cosmogony, but alone among religious beliefs that of the Norsemen recognised that there must be some greater and higher order of things to follow that which, in the youth of the world, sufficed partly to satisfy their own aspirations. Fimbultyn, "he who sent the heat," the great Helper, the mighty God, would guide the new order and live for ever.

The most beautiful myth in the northern mythology is that of Arctic day and night, of Balder and Hoder. It has been the theme of modern poets from Œhlenschlager to Matthew Arnold. The death of the Sun-God, the Deity of light and beneficence, through the treachery of Lok, but by the unknowing hand of his blind brother Hoder, the God of Darkness, is a myth the meaning of which is obvious. But the story of his death, of the mourning of all created things, and of the efforts to save the beloved one from Hela, the Goddess of Death, is deeply pathetic. The funeral of Balder attended by the whole pantheon, including giants and dwarfs, each deity with all his legendary attendants, and the launch of the flaming ship bearing the body into the silent sea, reaches the highest flight of poetic imagination.

Then Hermod, the messenger of the Gods, is sent by the All-father, on Odin's horse Sleipner, with an order for the death-goddess Hela in Nifelheim, her abode of ice and snow, to release Balder:—

"And he came down to ocean's northern strand
At the drear ice, beyond the giant's home:
Thence on he journeyed o'er the fields of ice
Still north, until he met a stretching wall
Barring his way."

The Arctic Circle! He puts Sleipner at it, the celestial steed clears it at a bound, and Hermod, the first Arctic explorer, enters Nifelheim. But the mission fails, for there was one thing that Odin could not do, and that was to undo what he himself had ruled. So Hela held her prey until the twilight of the Gods, when the old order passed away.

The Norsemen arrived in the Scandinavian peninsula, as we have seen, a century or two before the Christian era, and the whole body of their beliefs and legends, comprised in the Eddas, was written down mainly in the 14th century, so their gradual conception and evolution occupied several centuries. The lives of these people were passed in a hard struggle with Nature, in wild adventures by fjord and forest, and in constant warfare. The gods and giants seemed very near to them, to some even visible in those young days of the world. In the black clouds rolling down from the ice-fjells they saw the mighty Thor followed by the hosts of Asgard, just as they heard his pealing thunder. In the clang of battle the Val maidens, sweeping through the air on their celestial steeds, were realities. The temples and sacrificial ceremonies of the Norsemen were sacred. The seat-posts with deities carved on the ends, generally Odin and Thor, were the most venerated possessions of the chiefs.

As time passed, the districts along the coasts and in the more accessible parts of the interior rapidly became populous. Constant strife necessitated chiefs and leaders, but the people loved their freedom, and the right of speaking and voting in their assemblies. A free race, divided into many communities by the obstacles of Nature, continued to work out its destinies, and to multiply on the isles and fjords until the crowded state of their homes and the wild spirit of adventure drove them to the building of ships and the search for new homes beyond sea.

It is the proud boast of their descendants that the Norsemen were the first people who definitely abandoned the coast, and sailed boldly over the open sea. They crossed the North Sea to Shetland, Orkney, Caithness, and even Ireland, probably as early as the 6th century. They were also established in the Lofoten Islands and on the borders of Finmarken in those early days. There the tales of their folk-lore seemed to lure them further into the Arctic wilds. The fishermen of Værö and Röst, the most southerly of the Lofotens, when out at sea in stormy weather, fancied that they got a glimpse of a green and fertile island which they called Udröst, sometimes Alfland or the "elf land." But when they sailed towards its shore, it always disappeared in the clouds. It was said that only the wise and good have ever been on Udröst, and then only in thought. So says the Lofoten song:—

"In the westerly sea, off the Halgoland shore,
An isle floats alluring and bright.
But as soon, we are told in the fishermen's lore
As a sail comes completely in sight,

The clouds sink around it in darkness and mist
And the ship turns away on her keel;
For no man can land on those shores of the blest,
Nor can mortal its secrets reveal.

’Tis only in thought that wisdom can dwell
On the secrets of ice and of sea;
’Tis thus that the beautiful Alfland may well
Yield her wealth to the true devotee.

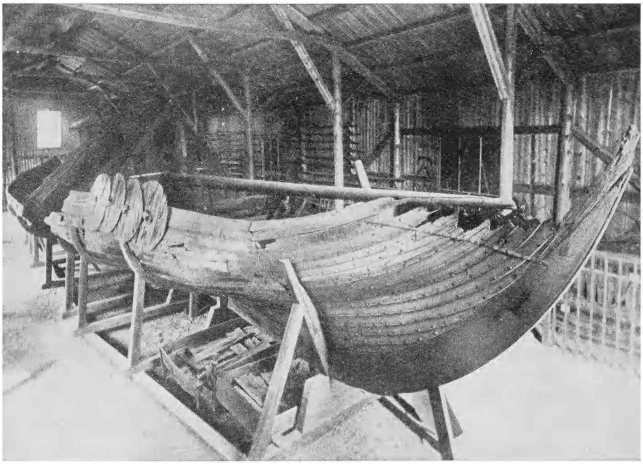
Let us stand then on Udröst if only in thought,
And there find the knowledge we seek:
The grand northern story as truthfully told
When we learn it from Andenäs peak.”

We hear the first authentic Arctic story from England’s own king, Alfred—the most truly great, the wisest, and the best monarch that ever ruled over any country. Always working for the good of his people, he translated the geographical work of Orosius for their benefit, inserting his own priceless additions and comments. Among them is the narrative of an Arctic voyage obtained at first hand from a native of that Halgoland whence Udröst was sometimes visible on the horizon. The explorer, named Ohthere, came to Alfred’s court to tell his story, and so it was saved from oblivion by being inserted in the King’s edition of Orosius. King Alfred describes Ohthere as a very wealthy man, owning 600 reindeer, horned cattle, sheep, and swine; as having a small extent of tilled land, but deriving the chief part of his revenues from the tribute of the Finns (as the Lapps were called) in skins and feathers, whalebone, and hides for making ropes. Ohthere gave the length of a walrus as 15 feet, and of a whale as 96 feet. He told the King that the best whale-fishing was off the coast of Halgoland. Ohthere’s own home was at Gibostad on the mainland of Senjen in the province of Halgoland, “the land of fire,” or “of the northern lights.” It was well within the Arctic Circle.

Ohthere wished to discover the coast beyond his ken, so he undertook a most adventurous voyage to the north and east, keeping the wild rocky shore on his starboard hand, and the wide Arctic sea on what he called his *boec bord*. He explored the whole of the Finmarken coast, mentioning the business of fishing for walrus or “horse-whales” as he called them, and he also described the Lapps, who were met with up to the North Cape.

Ohthere reached the most northern point of Europe. This is Nordkyn or Kinnerodde, at the eastern entrance of the Laxe fjord; but on the island of Magerö the low projecting spit of Knivskjärodde reaches still further north to 71° 11′. The bold black headland of the North Cape, with its flat summit and nearly vertical strata of mica slate, has a height of 1005 feet, but a mile less northing. The adventurous Ohthere was thus the first to round the North Cape. He then shaped a course eastward and finally entered the White Sea, sailing round the Kola Peninsula as far as the mouth of the Karzuga river, and coming into touch with people called Terfinna and Beorma. The former were the Finns of Ter, the old name for the Kola Peninsula; the Beormas were the North Karelians. This was the extent of Ohthere’s discoveries as recorded by King Alfred.

In those far-off days, when Alfred the Great was devoting his life to the good of his people, England was in the course of being made, and the Norsemen were destined to have no small share in the making of it. But it is worthy of note that even then the work of polar exploration and the achievements of explorers were the subjects of investigation by Alfred, an interest which has been continued for a thousand years.



Viking Ship

The difficulty of communication by land, and the innumerable bays and fjords in the country of the Norsemen soon led to extensive ship-building, each district doubtless following its own designs, to some extent, in build and rig. Fortunately we know exactly the build of the Viking ships, for one dating from the 9th century was discovered in 1880, buried in the blue clay at Gokstad near Sandefjord[11]. This Viking ship is of oak, clinker-built, fastened and riveted with iron bolts. In those days conifers had by no means superseded oaks in southern Norway. The ship has the lines of an excellent sea boat, 78 feet long over all, with a 66 ft. length of keel and 16 feet beam, but only 4 feet in depth. There was a mast and a long yard with a square sail, as well as 64 rowlocks for oars in the third row of planks from the top. The steer oar was fitted on the starboard quarter of the vessel, which was sharp at both ends and drew very little water. Wooden shields were hung round the bulwarks and the vessel contained utensils for cooking, bedsteads, and various other articles. Hundreds of such ships carried the Norse warriors along the coasts or to distant shores, some of them, such as the "Ormen lange" of Olaf Tryggvason, being probably much larger than the interesting relic of Gokstad.

The time came—as well in Norway as in Denmark and Sweden, and as it appears to come sooner or later in all lands—when the most powerful of the numerous chiefs forced the rest to submit, and united all into one kingdom. "Harold of the fair hair" descended from the Ynglings of Upsala, children of the God Frey, was the chief of Ringerike and Vestfold in the south of Norway, a valiant and persistent warrior. He succeeded in subjugating the whole country, and founded a dynasty which lasted for five centuries. Harold reigned from 860 to 930 A.D. His reign was the period of adventurous expeditions and of colonisation. The population was increasing, and some of the chiefs could not brook the enforced allegiance to an overlord. The spirit of adventure and discovery was in the air. The northern Vikings loved the freedom of a roving life upon the ocean. Brave and fearless, they were controlled only by their code of honour, and the precepts of Odin's rules contained in the Havamel or high song of Odin, and in the lay of the Valkyrie Sigfrida alone restrained them. Their fleets were the terror of all the coasts of western Europe, and no creek or haven was safe from the ravages of their leaders. Such a man was Rolf the Ganger, a chief in Nordmore, who finally established himself as Duke of Neustria. His commanding ability and statesmanship were shown by his great and enduring achievement. Other Vikings settled in the Faroes, Shetlands, Orkneys, Caithness, and the chief harbours of Ireland. Naddod seized the Faroes,

and in 863 Gardar Svafarson reached the coast of Iceland. It is curious that both in the Faroes and in Iceland Irish monks were found, who had gone there to find lonely places as dwellings for anchorites. They went away on the arrival of the Norsemen, as they would not live with heathens.

The great event of the period of Harold Haarfager was the colonisation of Iceland. It was a forbidding home, yet the leading men of the Norwegian fjords settled there in numbers. Ingulf Ormsson, who came in 875, was the first. Two years afterwards Gunnbjörn Ulfson followed, sailing westward until he discovered islets (doubtless on the east coast of Greenland) which were afterwards called Gunnbjörn's Skerries. He turned back, and shaped a course for Iceland, which he had passed without knowing it.

Iceland is separated from Norway by a wide and stormy sea with a depth of 2000 fathoms, while it has a sub-oceanic connection with the Faroes and the Hebrides by banks and ridges with a depth of only 100 fathoms. The great volcanic mass of the island embraces an area of 40,450 square miles just south of the Arctic Circle and consists of snowy fjells pierced by active volcanoes and very difficult of access. It has two plateaux, built up by volcanic rocks of older and of newer formation. The two deep bays of Breidifjord and Hunafloi divide the island into two separate table-lands connected by an isthmus only 4½ miles across, but 750 feet high. The only habitable parts of Iceland were and still are the narrow strips of land along the sea shore, and even the famous place where the Thingvalla or assembly of the people was held is in a plain which was formerly the bed of a lava stream, between the geyser district and Reykjavik.

The voyage to Iceland was long and dangerous, the difficulty of colonising insuperable to all but men endowed with the Viking spirit. The first settlers sent tidings that the sea abounded in fish, and that cattle could live through the winter, so the tide of immigration continued. The Icelanders elected their Judges, established district courts, and were ruled by their own freely-elected *Althing* or assembly, held on the banks of the lake called the Thingvalla Vatn. This land of freedom, under the Arctic Circle, became the fountain of northern mythology and history, and it is to the Skalds of Iceland that we owe nearly all our knowledge of the beliefs, as well as of the deeds, of the ancient Norsemen. Iceland was also the stepping-stone for further Arctic discovery.

The settlement of Iceland, with the roll of settlers, is recorded in a famous work written by Ari Froði (1067–1148) called the *Landnamabók*.

CHAPTER VI

THE NORSEMEN IN GREENLAND

THE enthralling story of the discovery of Greenland and America, as the actual beginning of great Arctic enterprises, must be introduced by some account of the authorities on which it rests, for parts of it have been the subjects of much criticism and dispute.

The earliest writer who mentions the deeds of the Norsemen in Greenland was Adam of Bremen, a Canon of the cathedral of that city and master of the cathedral school, A.D. 1070. In those days Svend Estridsen, a nephew (sister's son) of England's King Canute, was King of Denmark, whose memory was a storehouse of facts concerning the history of the Scandinavian races. Adam of Bremen accordingly made a journey to his court and spent some time there, and the King was his authority on all he was able to write relating to Greenland. Adam's testimony is, therefore, earlier than, and quite independent of Icelandic manuscripts, and becomes a test for the truth of the sagas and traditions. In this lies its great importance as an authority.

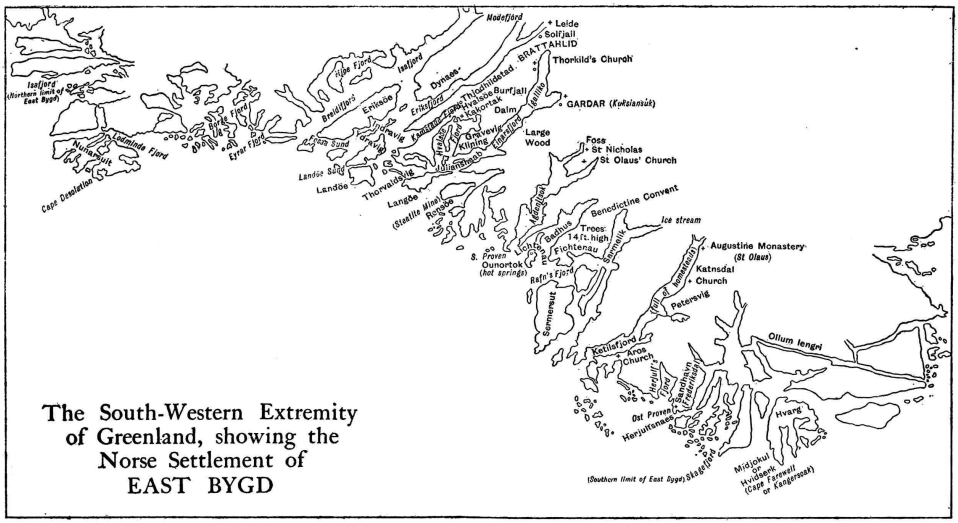
The detailed Icelandic narratives are two or three centuries later. The first is the *Hauksbok*, composed not later than 1334. Its name is derived from Hauk who was Lagman of Iceland in 1295, and in whose handwriting a portion is written. It contains the Saga of Erik the Red. The second manuscript is the Flatey book or Codex Flateyensis, so called from having belonged to one Finsson who lived on Flat Island, near the Breidifjord in Iceland. It is now in the Royal library at Copenhagen, having been brought from Iceland by Thormod Torfason (Torfœus) as a present to King Frederick III of Denmark. It was written about the year 1387 and contains the Saga of Olaf Tryggvason, King of Norway, in which two narratives are interpolated, the story of Erik the Red and the story of the Greenlanders.

The two versions in the Hauk book and the Flatey book differ materially in the details, but the main facts are the same. The version of the Hauk book is the older and appears to be the more reliable, and in the days of Hauk there was still communication with the Greenland colony. Two complete vellum texts of the Hauk book survive. The work, in addition to the Saga of Erik the Red, contains the Saga of Thorfin Karlsefni. Hauk, who was a descendant of Karlsefni, one of the Greenland heroes, died in 1334.

We learn from the Hauksbok that there was a man named Thorwald, living in the district of Stavanger, in the south of Norway, with his son Erik the Red. They had killed a man, and in consequence fled to Iceland and settled at Hornstrandir in Haukadal, on the north shore of Iceland's north-west peninsula. Here Thorwald died, and his son married a widow named Thorhild who bore him three sons, Thorstein, Leif, and Thorwald. He also had a natural daughter named Freidis.

Erik soon got into trouble again. His thralls caused a landslide on Valthiof's farm, for which a kinsman of Valthiof, named Eyulf the Foul, killed them. Erik retaliated by slaying Eyulf, as well as his friend Hrafn "the duellist," and being attacked by the friends of the men he had killed, was driven from Haukadal. He then went to settle on two small islands, called Oxney and Sudrey, at the mouth of Breidifjord, naming his dwelling-place Erikstad. Here he was soon again in trouble with a neighbour named Thorgest, with whom he quarrelled. Two of the sons of Thorgest with some others were killed, and the two enemies began to keep large bodies of men at their homesteads.

The people of Iceland were divided, but the adherents of Erik the Red were the weakest. When the Court met at Thorsness-thing, in spite of the efforts of his friends, Erik and his people were condemned to outlawry.



The South-Western Extremity of Greenland, showing the Norse Settlement of EAST BYGD

While Erik was concealed from his enemies who were seeking for him, a ship was equipped by his friends, for he had resolved to go in search of land which Gunnbjörn, son of Ulf the Crow, reported that he had seen. Erik, with his family and people, sailed out to sea from Sneefells Jokul, and the famous voyage began, in the year 983. Sailing westward, the adventurers rounded Hoitserkr, as they called Cape Farewell, and the south-west coast of Greenland was discovered, known afterwards as the East Bygd.

The wanderers found that they had reached a land with a climate like that of Iceland. The great ice current, flowing down the east coast of Greenland and diverted by the Gulf Stream, sweeps round Cape Farewell and is closely packed along this shore until late in the season. Almost the whole coast, with numerous islands and entrances to the deep fjords, may be taken in at a glance from Cape Farewell, or at least from Cape Christian to Cape Desolation. It comprises the whole of the ancient colony of the East Bygd. Great precipices face the sea, with black mountains, 3000 to 4000 ft. high, rising above them. Here and there, between them, a glimpse is caught of the glistening inland ice. Between the rocks and precipices the openings to the six deep fjords can be made out, which penetrate from 30 to 40 miles inland. The fjords, when frozen over in the winter, are colder than the sea coast, but they are warmer in summer, and there is then a rich vegetation. Groves of willows 8 feet high and of birch trees 14 feet high, rising out of thick beds of juniper, angelica, alchemilla, and several berries well known to the Norsemen, give beauty to the shores of the inner creeks. Nor is suitable pasture wanting for cattle and sheep. It might well receive the name of Greenland, as Erik saw it and named it, in the height of summer.

Erik wintered on an island called by his name, and devoted the next summer season to exploration. Thus they passed three winters, with the intervening exploring seasons. Finally he selected a place far up the Einarsfjord (*Igalliko*) for his homestead. It was named Brattahlid because it was under a steep hill side.

Erik resolved to found a Greenland colony; he therefore returned to Iceland and wintered under the protection of a powerful friend named Ingulf the Strong, at Holmslatr, on the south side of Hoamms-fjord. In the spring he began to organise his expedition to form a settlement in the new land. Many friends and adherents accepted the invitation, and in 985 A.D. a fleet of ships arrived in the fjords of Greenland with horses, cattle, sheep, goats, and building materials. Red Erik made his home with his wife and sons at Brattahlid. His friends occupied the shores of the other fjords, which were called by their names. Herjulf and his son Bjarni were in the fjord nearest to Cape Farewell, called Herjulf's fjord. Ketil was in Ketil's fjord, the next to the north, Rafn occupied the Rafn's fjord, Helgi Thorbrandsen was in Alpte fjord, and so on with Einar, Hafgrim, Arnlang, and other bold Vikings.

Erik and his followers still held the ancient faith, and for twenty more years Odin and Thor presided over the fortunes of Greenland. But it was a time of transition; news of the "white Christ" had reached Iceland, and the masterful Kings of Norway, Olaf the Saint and Olaf Tryggvason, were introducing the new creed by force.

The first important event in the new colony was the voyage of Leif, the son of Erik, to Norway in 999. He was driven out of his course to the Hebrides, where he passed the summer and became enamoured of a girl of rare intelligence named Thorgunna. She had a son, Thorgils, by him, and eventually brought him to Greenland to take his place as the son of Leif. But Thorgunna remained at her own home when Leif left the Hebrides and sailed away to the court of the King of Norway at Nidaros (Trondhjem). He was well received by Olaf Tryggvason, who ordered him to become a Christian, and to return to Greenland and proclaim Christianity to the settlers.

Leif took leave of the King, and again put to sea. He encountered bad weather, and was tossed about for many days and driven out of his course. At length he came to a new land where there were currants and self-sown corn, and also trees called *mausar*[12]. He had reached the eastern coast of Newfoundland. Leif wintered at this land, which he called Vinland. In the spring he shaped a course for Greenland, and saved some people off a wreck in mid-ocean on his way. One of the shipwrecked men may have been Bjarni the son of Herjulf, which perhaps accounts for the confused story in the Flatey book, about Bjarni being the discoverer. Leif arrived safely in his father's homestead and introduced Christianity[13].

Old Erik was unwilling to forsake the faith of his father. But his wife did so, and built a church near the homestead, called Thorhilda's Church, where those who embraced Christianity could come to offer their prayers. Settlers began to arrive in Greenland who were nominally Christians, though imbued with the deeply-rooted ideas of the old faiths. The change was gradual.

Among the first Christian settlers were one Thorbjörn and his beautiful daughter Gudrid. This Thorbjörn received with his wife Hallveig an estate in Iceland called Langarbrekke or "the warm spring's slope," on the southern side and near the outer end of the Cape called Snowfellsness. The wife died, and Thorbjörn's motherless child was fostered and brought up by Halldis and her husband, Orm of Arnastopi or the eagle's crag, a short distance to the north-east of Langarbrekke.

Gudrid, the foster child of Orm and Halldis, acted such a prominent part in the history of the Greenland colony and the discovery of America, that her story cannot be passed over. Though converted to Christianity Halldis had stored the child's mind with all the lore of the Asgård mythology. For various reasons her father Thorbjörn resolved to join his friend Erik the Red in Greenland, though he was blessed with many friends in Iceland. He therefore sold his land and bought a ship, which was fitted out in Hraunhavn, or the lava haven. Thirty persons formed the crew, including Orm and Halldis, who both died during the voyage. At length, on the verge of

winter, the ship reached Herjulfsfjord, the most southern of the Greenland settlements, where Thorbjörn and his daughter were hospitably received by a settler named Thorkel, and passed a winter in his house.

When the summer arrived Thorbjörn got his ship ready, and sailed away with Gudrid until they came to Brattahlid. They were received with open arms by Red Erik and his family, and Erik gave Thorbjörn land on Stokkaness, where a good farmstead was established. Gudrid was married to Thorstein, the eldest son of Erik the Red, and they went to live at a farm called Lysefjord. But Thorstein died, and was soon followed by Thorbjörn. So Gudrid became a great heiress, and Erik took her to his home at Brattahlid, and treated her as his own daughter.

It was the union of the young widow with Thorfin Karlsefni, a young Icelandic chief of noble lineage, descended from the renowned Ragnar Lodbrog, which led to the discovery of America. One summer Karlsefni fitted out his ship in Iceland, taking with him a follower named Snorri Thorbrandsson and a crew of 40 men. At the same time two men named Bjarni and Thorhall fitted out another ship. The two ships put to sea together, with the intention of sailing to Greenland. They arrived at Brattahlid in the autumn and began to do a goodly trade with Red Erik. Thorfin Karlsefni and his comrades were invited to pass the winter there, and before the winter was over he and Gudrid were united in marriage.

Then there was mooted the project that Vinland, discovered some years before by Leif, should be explored and settled. Thorfin Karlsefni and his friend Snorri fitted out their ship for the adventurous voyage and Bjarni Grimolfson and Thorhall also joined with their ship. Thorhall had long served Red Erik as his huntsman. He was a man of great strength and gigantic stature. Erik's third son Thorwald accompanied him. There was a third ship, the one in which Thorbjörn and Gudrid had arrived in Greenland. Freidis, the natural daughter of Erik, a proud and cruel woman, embarked in it with her husband Thorward. Gudrid accompanied her husband.

This fleet of three *knorrs*—vessels such as the one found at Gokstad—sailed for the land we now call America. Karlsefni first steered northwards along the West Bygd to get clear of the southern ice, and then stood across the strait to the barren coast on the western side for two days. Karlsefni landed in his boat, and finding large flat stones (*hellur*) on the beach, called that country *Helluland*. Sailing southward they next came to a country where there were great woods and it was named *Markland* or the forest land (Labrador). Then they sailed for many days, rounding a cape where they found the keel of a ship and so named it *Keel-ness*. The long coast-line on the starboard side received the name of *Furdustrandir* or Wonder Strand. At length Karlsefni anchored in a bay where they found berries and self-sown wheat. It was the Vinland of Leif. There was a strong current, so they called an island in the bay *Straumsey* and the bay *Straumfjord*. They landed their goods, and the live-stock included cattle. Here Thorhall the hunter appears to have mutinied, and to have sailed away in one of the ships with nine men. The story says that he reached Ireland, where he and his companions were maltreated and enslaved. After the winter Karlsefni sailed southward and came to a small land-locked bay, called *Hop*. Here he built huts on the banks of a lake.

Karlsefni had discovered America. His first land was what is now called Baffin Land, his next the coast of Labrador, and the Vinland of Leif is the east coast of Newfoundland. The Norsemen gave the name of *Skrælings* to the natives they met with. They had several encounters with them, in one of which Thorwald, the son of Erik, was killed by a "one footer" (*Einfœtingr*).

The furthest southern point reached by Karlsefni is a question of great interest. In the Flatey book Leif is made to say that on the shortest day the sun was above the horizon from *Eyktarstad* to *Dagmalastad*. We thus obtain rough data for ascertaining the latitude of Vinland. The Icelanders ascertained the various times of the day by selecting conspicuous marks round their houses, and

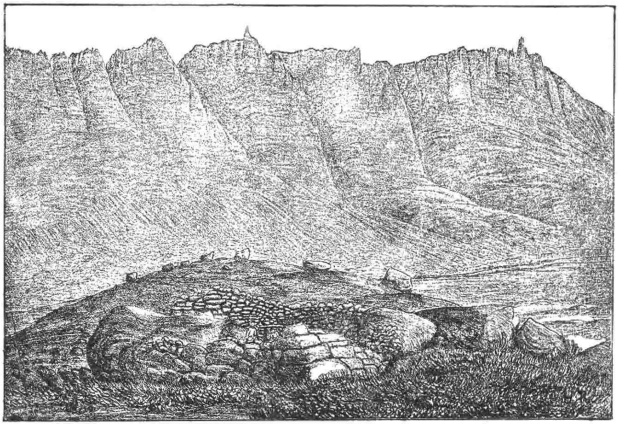
noting the course of the sun with relation to them. Names were given to the positions the sun occupied at certain times of the day, and the Norsemen were thus, from long practice, very accurate in assigning the points of the compass at which the sun rose or set. The *Eyktarstad* is clearly defined in an ancient Icelandic book called *Kristinretter*. If the S.W. octant be divided into thirds, the S.W. point being in the centre, it is *Eyktarstad* when the sun has traversed two-thirds. This gives the amplitude of the sun, when it set on the shortest day at Vinland, W. 37 degrees 30′ S. The sun's declination in A.D. 1005 was 23 degrees 34′ 30″ N. With these data we find the latitude of the point of observation on Vinland to have been a little south of 49 degrees S., which would be in Bona Vista Bay, on the east coast of Newfoundland[14].

Karlsefni passed three winters in Vinland and here, in the year 1007, his wife Gudrid bore him a son who was named Snorri. From this American-born child was descended the Lagman Hauk, the author of the Hauk book, and many Danish families, including that of Thorwaldsen, the famous sculptor. After the third winter Karlsefni and his followers sailed away from Vinland on their return.

The ship of Bjarni was driven out to sea in a gale, and all perished except one boat's crew which is said to have reached Dublin. When the ship began to sink it was found that the boat would only hold half the crew. So they cast lots, and it fell to the lot of Bjarni to go in the boat. When the lucky ones were all in the boat, an Icelandic youth, who was left in the ship, cried out "Dost thou intend, Bjarni, to forsake me?" "It must be even so," answered Bjarni. "Not such was the promise thou gavest my father," replied the youth. "So be it, it shall not rest thus," answered Bjarni. "Do thou come hither and I will go to the ship, for I can see thou art eager for thy life." So he went on board again and the youth got into the boat.

Karlsefni and Gudrid, with their little son, arrived safely in Greenland, and remained at Brattahlid during the following winter, with Erik and his son Leif. Then they sailed to Iceland and lived to a good old age at Reynistadr in the north, a little south of Skaga-fjord. Their son Snorri succeeded them, and, as has been already said, was the ancestor of many great people in Iceland and Denmark[15].

In the fulness of time old Erik the Red died at Brattahlid, and was succeeded by his son Leif. He died in 1021 A.D. Then Thorgils, Leif's son by Thorgunna of the Hebrides, took his place as owner of Brattahlid and chief of the Greenland settlers. Later, in the same century, we hear of Skald Helga being Lagmand of Greenland. The colony throve and was prosperous. Settlements, called the West Bygd, were formed to the northward as far as the island of Disco. Several churches were built of stone at the settlements on the deep fjords of the East Bygd. There was an Augustinian monastery of St Olaus at the head of Ketil-fjord, and churches of St Nicholas and of Hoalsey in Hoalseyfjord. Ruins of the latter are still standing at a place now called Kakortak, near Julianshaab. The walls are of large and partly-hewn stones, with four rectangular window openings and two doorways. The chief entrance was at the west end, with a large window above it. There are small niches in the interior walls. The church is 51 feet long by 25, the walls 4 feet thick, and their height 22 feet[16]. Opposite to Brattahlid, up Einarsfjord, was the cathedral church of Gardar, the see of a bishopric. The first bishop of Greenland, named Adalbert, was consecrated in 1055 A.D.



Ruins in Kingoa-dal, S. Greenland.

The 11th century was a period of activity for the Greenland colony. There was communication between Iceland and Norway and the colony, and we are told that Thorgrim Troble, the head man in Einarsfjord, went to Norway and even to England, bringing back beautiful clothes. In the next century, 1121, Bishop Erik is said to have made a voyage to Vinland, and in 1124 Bishop Arnold was consecrated by the Archbishop of Lund, and arrived at Gardar. The Greenland settlers had cattle, horses, and sheep, which were all stalled during the winter. The churches and the foundations of the houses were of stone, but timber was in great demand forhouses and outhouses. There must have been voyages to cut wood in Markland and on the Wonder Strands, to supplement the supply of drift wood[17]. We have few notices of these voyages, however. The ancient annals of Greenland are scanty. But we may be quite sure that, with stalwart arm and poetic brain, these Norsemen did what they had to do with all their might. Our chief concern is with the Arctic discoveries away to the north of the West Bygd. The most northern station for a long time was in Disco Bay, at a place called Greipar. The name for the most northern district was Nordsetur. The fisheries were carried on with great activity. It is certain that, later, there was a station at a place now called Kingiktorsuak in 72° 55′ N., for the following runic inscription was found there in 1834:—

ERLING SIGVASSON AND BJARNE TORTARSON AND EINDRID ODSSON ON THE SEVENTH DAY BEFORE THE DAY OF VICTORY[18] ERECTED THESE STONES MCXXXV.

Thence these gallant explorers, or others, pushed still further north through the ice floes, and formed a station which was probably in what is now called Wolstenholme Sound, a little north of Cape York. It was called Kroksfjordar Heidi or “The heights of the winding fjord.”

Thirty years after the bold adventurers Erling, Bjarni, and Eindrid had set up their stones in 72° 55′ N., an Arctic expedition started from Kroksfjord, of which an account is given by a priest in Greenland named Hallder, in a letter to his friend Arnold, who had also been in Greenland but was then, in 1266, court chaplain to Magnus Lagaboeter, King of Norway. The notice of the letter in the Hauk book is so important with reference to the Arctic discoveries of the Norsemen, that we must consider it *verbatim*.

"This account was written by Priest Hallder from Greenland to the Priest Arnold who was then King Magnus Lagaboeter's chaplain. He was in the ship that brought Bishop Olaf to Greenland[19], and they suffered shipwreck off Iceland, and found in the sea some planks which had been hewn with small adzes, and among them there was one in which tools still remained. This summer came people who had travelled further north than any one until that time of whom accounts had been reported. They found no signs but of Skrællings who had once resided at the Kroksfjord, and the people thought it might be the shortest way. Therefore the priests sent a ship north of the farthest inhabitable district that had yet been reached. They sailed away from Kroksfjord, and they were out of sight of land. Then there came a south wind with thick weather, and they let the ship go before the wind. The storm ceased and it again became light and they saw many islands, and different kinds of game, both seals and whales, and great numbers of bears. They came right into the bay, and the whole coast came in sight, as well as the south coast with glaciers, and south of them there were also glaciers as far as they could see. There were signs that Skrællingers had, in bygone times, lived in these places; but they could not land because of the bears. They sailed back for three days and found relics of Skrællingers. Then they came to some islands south of Snaefell. They sailed thence south to Kroksfjord, a long day's rowing. On Jacob's mass day[20] it froze at night, but the sun shone both day and night, and was not higher at noon than in the south, *so that if a man lay across a six-oared boat, stretched out under the gunwale, the shadow from the side nearest the sun fell on his face, but at midnight the sun was as high as it is at home in the settlement when it is in the N.W.* They then sailed home to Gardar."

The day of the summer solstice is implied as the time of this observation. Proceeding upon this assumption Professor Rafn[21] calculated that, in the 13th century, on the 25th of July, the sun's declination was 17° 54′ N., and the inclination of the ecliptic 23° 32′. Gardar was in 60° 55′ N. At the summer solstice, the height of the sun there, when in the N.W., was 3° 40′, equivalent to the midnight altitude of the sun on St James's day (July 25th) in latitude 75° 46′, which is the latitude of Cape York.

The Norse explorers, starting from Kroksfjord (Wolstenholme Sound) sailed into the north water of Baffin's Bay. They then went northwards from about 76° for three *doeg*, 108 miles each *doeg*. This brought them some distance up Smith Sound, beyond 80°. They saw many islands and glaciers and then returned southward for three *doeg*, coming to some islands, possibly the Cary Islands. Thence a long day's pull brought them to Kroksfjord. Seven hundred years afterwards, a lofty cairn, built by unknown hands, was found on Washington Irving Island in Smith Sound.

It is not to be supposed that this was the only voyage of the kind that was undertaken by the Norsemen because it is the only one of which any record has reached us. These enterprises must surely have constantly succeeded one another, with a view to discovering fresh fishing grounds. They must have been more or less continuous for two centuries at least.

At its most flourishing time the Norse colony in Greenland numbered about 2000 souls in 280 homesteads. There were 12 churches in the East Bygd (the ruins of five have been found), and four in the West Bygd, and one monastery. But at the end of the 13th century the prosperity of the colony began to wane. Its existence depended upon annual intercourse with Norway, and communication began to be more and more irregular. There is a list of Bishops, but latterly few appear to have visited their See. In 1341 a bailiff of the bishopric named Ivar Bardsen was sent to Greenland to report upon the state of affairs. He found the West Bygd deserted. Ivar Bardsen made a valuable report, describing the topography of the East Bygd settlements in detail, and giving 54 place names[22]. In 1347 a Greenland ship arrived in Iceland with 18 men on board. She had been to

Markland to cut wood, and had been driven out of her course by a storm[23]. In the same year King Magnus of Norway and Queen Blanche left 100 marks to Gardar Cathedral. But two years later the Black Death decimated the Norwegians, and soon afterwards all intercourse with Greenland ceased. Norway was a province of Denmark for more than four centuries.

The fate of the Greenland colony has been variously explained; by a change in the climate, by the Black Death, or by the attacks of an army of Eskimos. But the climate is exactly the same now as it was then, the Black Death broke out in Norway after intercourse ceased, and the Eskimos had always been living with the Norsemen, having been in Greenland many centuries before the Norsemen came. Moreover, the Eskimos could not assemble and attack in large numbers[24].

The disappearance of the colony after a lapse of two centuries is fully accounted for by the neglect of the Norwegians to send ships. The colony could not exist without that help. Those settlers who remained gradually died off, the survivors merging in the Eskimo population.

The vestiges confirm the narratives of the Sagas. There are the stone church at Kakortak, the foundations of churches and homesteads, the bones of oxen and goats in the refuse heaps. Two grave-stones have also been found. One marked the place where the body of Hroaldr Kolgrimsson rested. It was found in 1831, two miles north of Frederiksthal. The other is a stone with a runic inscription, found nine miles from Julianshaab in 1830:—

"Vigdis, daughter of Magnus, rests here.
May God gladden her soul[25]."

The history of the first period of Arctic discovery was thus closed in mystery. Vigdis, daughter of Greenland, seems to speak to us across the centuries. Her people achieved a great work:—the coast of Finmarken to the White Sea discovered; then Iceland, and finally the whole west coast of Greenland from Cape Farewell to Smith Sound, Baffin Land, Labrador, and Newfoundland. We see in the qualities of these Norsemen all that is required for the completion of the great work—energy, indomitable perseverance, and dauntless courage combined with practical enthusiasm. Such qualities were needed and were not wanting to achieve the glorious work done by the Norsemen. Such qualities were needed and have not been wanting in the English race—which received a large strain of Norman blood, and produced the chief Arctic explorers of modern times—to complete what was so well begun in those far-off days of old.

CHAPTER VII

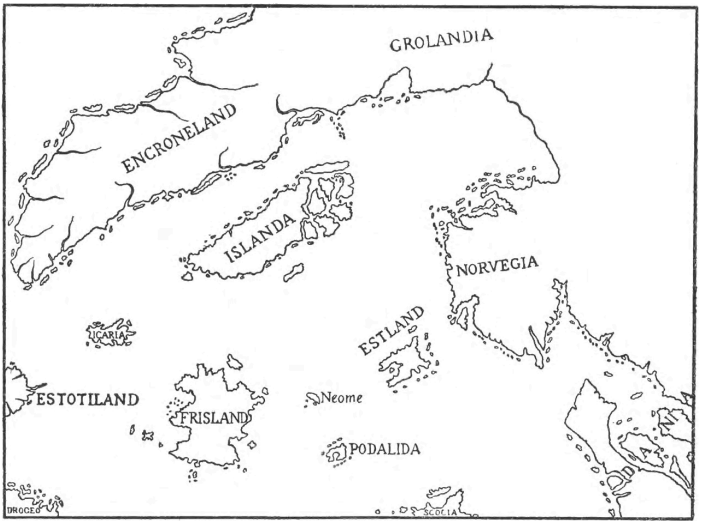
NICHOLAS OF LYNN. ZENO. MEDIEVAL NAUTICAL INSTRUMENTS

THERE was dwelling in Oxford, when Chaucer was young, a scholar known as courteous Nicholas. He lodged with an old carpenter who had married a very young wife. He had a room to himself, and was devoted to the study of astrology and mathematics. On shelves at his bed head he had several books, including the *Almagest* of Ptolemy, as well as an astrolabe, and *angrim* stones used in numeration.

The poet Chaucer and the scholar Nicholas had tastes in common. Both loved music and both studied what was then known of the sphere and the means of fixing positions. Chaucer wrote a treatise on the astrolabe addressed to his little son Lowys in 1391 and called it "brede and milke for children." In this treatise Chaucer mentions Nicholas with great respect. We shall not be far wrong either in assuming Nicholas the scholar to have been a friend of Chaucer, or in identifying him with the Carmelite monk Nicholas of Lynn, who would take his place as England's first Arctic explorer if his work had not been lost—a loss which is almost a national calamity.

In 1360 Nicholas of Lynn undertook an expedition to Norway and the isles beyond towards the pole, beginning from 54° N. and fixing the latitudes with an astrolabe. Hakluyt quotes Gerard Mercator as writing that an English monk and mathematician of Oxford had been in Norway and the islands in the north, describing all those places and determining their latitudes by an astrolabe. He is said to have written a work on his expedition entitled *Inventio Fortunata*, which is lost; and another work is attributed to him, *De Mundi Revolutione*. Dr Dee wrote that Nicholas made five voyages into the northern parts, and left an account of his discoveries.

Dr Nansen is the first writer I know who treats Nicholas of Lynn seriously. He shows that the work of Nicholas was known to Las Casas, who had read it, and also to Martin Behaim, who on his globe places isles all round the pole which are not shown on any older map and, Nansen thinks, are evidently taken from Nicholas of Lynn. The maps of Claudius Clavus, one of them quite recently brought to light, and other medieval maps, also probably derived their information from our forgotten Nicholas. One would give a good deal to know which were the northern islands that he visited. Evidently his work had an influence on the productions of the cartographers through the next century.



The Zeni map.

We owe much to the cartographers, and it is deeply interesting to watch their gradual acquisition of fresh knowledge, and their treatment of uncertain and disputed points. But there have been cartographers of a different kind who have invented and knowingly led students and navigators astray. If such men gain a hearing, the injury they do may endure for a century or more. Such a man was Niccolo Zeno.

This Niccolo Zeno, of a noble Venetian family, published what professed to be an account of the voyage of two of his ancestors in the far north in the service of a northern chief named Zichmni. Niccolo himself lived in the 16th century (1515–1565) and the voyages of his ancestors were supposed to have been made in the 14th century. The narrative was accompanied by an extraordinary map covered with names. It showed Greenland brought round to join Norway, Iceland, a large island called Friesland between Iceland and Greenland, lands to the west near America called Estotiland and Drogeo, and another large island in the Atlantic called Icaria. Niccolo Zeno was accepted as an authority by Mercator in his map of the world (1569) and by Ortelius (1570) and the narrative found a place in Ramusio (1574). Meanwhile the false information continued to mislead travellers and navigators. On the first English globe by Molyneux in 1572 Zeno's Friesland and Drogeo are shown. As late as 1631 Luke Fox has "Frisland" on his polar card. The false information held its ground for a hundred years.

Among modern writers there were differences of opinion. In 1784, J. Reinhold Foster fully accepted all Zeno's story as true, and identified Zichmni with Sinclair, Earl of Orkney. Maltebrun accepted the story, and Humboldt was inclined to accept it. Lelewel accepted it. Mr Major gave whole-hearted credence to Zeno's statements, and wrote a standard work on the subject (1873). Desimoni (1878) claimed that Major had settled the question.

There were other writers who were more or less sceptical. Washington Irving rejected the story. Crantz and Graah, eminent Danish travellers and writers, were doubtful, and more or less incredulous. Admiral Zarhtmann of Copenhagen rejected both narrative and map, as did the learned Danish writer Steenstrup.

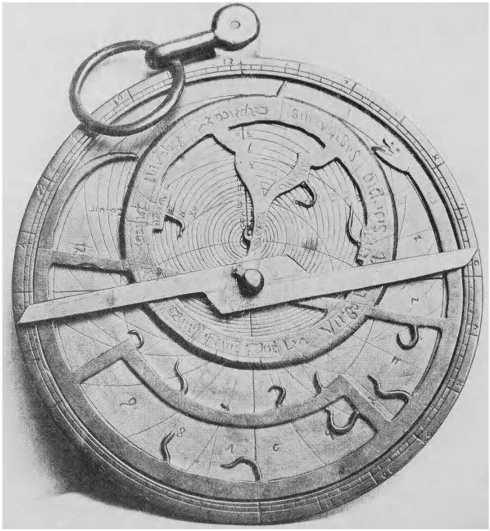
All this was before the discovery of medieval maps which exposed the whole imposition. These were, especially, the large map of Olaus Magnus (Venice 1539), found in the Munich library in 1886, and the Zamoiski map (1467), discovered at Warsaw in 1888; also a map of North Europe and Greenland in the MS. Ptolemy at Florence, and the edition of Ptolemy published at Ulm in 1482—the earliest printed map showing Greenland.

Most of the names on the Zeno map were supposed to be original; due to their discoveries, and not existent on any earlier map. The discovery of these earlier medieval maps, however, has disposed of that delusion. Of the 19 Zeno names on Iceland, 12 are in the Zamoiski map, 3 in the Florence map, and the others in that of Olaus Magnus. On the Cantino map in 1502 appears Frisland, placed due north of Scotland. It is a clerical error in copying Stillanda from the Cosa map. This is the way Zeno got hold of the name Frislanda. The whole was concocted by Niccolo Zeno and his publisher Marcoloni in 1558, from materials on maps then existing.

The Zeno imposture was first studied by Professor Storm, in the light of the Zamoiski and Olaus Magnus maps, and he exposed the falsities of the narrative, and the imposture of the map. The whole subject was discussed in an exhaustive work by Mr F. W. Lucas, from which the above details have been taken[26]. The mischief done by the Zeno forgery, while it lasted, was very serious; causing confusion in the work of cartographers as well as mistakes in the reports of navigators.

* * * * *

In the period of the beginning of English Arctic exploration, the instrument mainly used for finding the latitude was the astrolabe. The cross-staff had been invented, but was not in general use, nor was the quadrant with a plumb-line, though it had been used by Columbus. The astrolabe was a circular metal ring with inlet plates and discs. These plates were fitted to drop into an inner depression of the ring, the principal one being called the *rete*. It consisted of a circular plate marked with zodiacs sub-divided into degrees, with narrow branching limbs having smaller tongues terminating in points, each denoting the position of a star. The plates, or “tables” as Chaucer calls them, were differently marked for places having different latitudes. Within all these scales of *Umbra recta* and *Umbra versa* there is a division into 12 parts for taking and computing heights and distances by an approximate method. The *alidada* is a straight-edge across the ring moveable with two sights, and a pin ties them all together.



Astrolabe in Gonville and Caius College,
Cambridge (*early 14th century*)

The *alidada* is for taking the altitude of the sun, and the *rete* adjusted to this altitude shows the hour of the day. To take an observation the right thumb is put into the ring of the astrolabe, and the left side is turned against the light of the sun. The *alidada* or rule is moved up and down until the rays of the sun shine through both sights. Then the number of degrees the *alidada* is raised from the little cross placed to show the east line is the altitude of the sun, read off on the outer ring. The Spaniards constructed their astrolabes small and heavy, to prevent them from being blown about, not much over five inches in diameter yet weighing 4 lbs. The diameter of the English astrolabes was six or seven inches, sometimes more.

This instrument, invented by Hipparchus and developed by Ptolemy, was in use until the days of Elizabeth. It has a peculiar interest for those who are fond of studying the history of maritime discovery, but it is by no means simple in construction and it is necessary to examine the astrolabe itself to understand it and its uses[27].

Besides the astrolabe our earliest Arctic navigators were supplied with large blank globes on which they puzzled out the navigation problems, an armillary sphere, a great chart with all that was known or conjectured on it, smaller navigation charts, compasses and hourglasses, and the regiment of Medina, translated from the Spanish at the instance of the Arctic navigator Burrough. With such slight and rather unreliable help our brave seamen of the 16th century, in great peril and difficulty, found their way over the trackless ocean, a way now made easy for their descendants.

CHAPTER VIII

FIRST ENGLISH VOYAGES TO THE NORTH-EAST. WILLOUGHBY. CHANCELLOR. BURROUGH. PET

MANY reasons led English seamen to turn northward. East and west were occupied by Portugal and by Spain, and our own adventurers, rather later in the field, sought the discovery of routes to Cathay and the Spice Islands by northern ways. Our seamen had long traded with Norway and Iceland. The more northern voyages received hearty encouragement from our Plantagenet kings, who granted charters in 1404, 1432, and 1463 for trade with the Scandinavian nations. Richard III specially favoured the Iceland voyages. William of Worcester, in his chronicle, tells us of the enterprises of William Canynge of Bristol, who sent his ships not only to the Mediterranean and the Baltic, but so far as Iceland, where one of his vessels of 160 tons was lost. Ships also went northward from Lynn and other ports, and before long the commercial ventures led to voyages of discovery. It must always be remembered that the notices of voyages to be met with in the 15th century chronicles, few and far between, represented but a small fraction of English maritime activity and of the voyages actually undertaken. England was preparing silently, but actively and strenuously, for her supremacy of the sea, and for her great work in the Arctic regions.

Land was reported beyond the ocean to the westward of Bristol, and as early as July 1480 we are told by William of Worcester that a seaman named Thylde—the most scientific seaman, it is added, in all England—led an expedition in search of the unknown land, and was absent for 64 days. Others followed in his wake. At last the crew of the Bristol ship *Matthew* did actually discover Newfoundland, or rather re-discover it, for it was the Vinland of the Norsemen. This was in 1496, and in the following years there were other voyages from Bristol to the new land. Nine years afterwards the Company of Merchant Adventurers received their charter, and English Arctic enterprise was not very long in starting under the auspices of that famous Company.

Mr Robert Thorne, a merchant of London who long resided at Seville, and whose father had been an adventurer to the new land, was one of those who urged the importance of northern exploration. In a letter to the English Ambassador at Madrid, and in another to Henry VIII, he counselled the discovery of routes to China and the Spice Islands by the north. He pointed out that from the situation of this realm of England it was nearest and aptest of all others for the prosecution of such a discovery, which would win perpetual glory for the King and infinite profit for his subjects. After reaching the Pole, he said, the discoverers can decline to which part they list.

Such words were as seed falling on fertile soil. Arctic enterprise needed stimulus, however, and received it from two young princes of great promise, both alas! cut off in their prime—Edward VI and Prince Henry of Wales. King Edward took a warm and personal interest in the maritime prosperity of his country, and in the science of navigation. His friend and companion, Henry Sidney[28], was imbued with the same feeling. Under their auspices the first Arctic expedition was organised and despatched by the Company of Merchant Adventurers to undertake a voyage to Cathay by the north-east. The whole subject was considered with the greatest care as regards the management and discipline, the ships, the merchandise to be taken, and the provisions.

The most important matter of all was the selection of good commanders. Sir Hugh Willoughby, a most valiant gentleman and well born, very earnestly requested that he might be chosen to

command the expedition. Sir Hugh was a younger son of Sir Henry Willoughby, Knight Banneret of Wollaton, who died in 1528, and whose altar tomb is in Wollaton church[29]. Sir Henry left three sons John, Edward, and Hugh, and Edward's grandson was the builder of the present fine old mansion at Wollaton, near Nottingham. Hugh was connected, by his father's marriages, with two names afterwards known in Arctic history, Markham and Egerton. He himself married Joan, daughter of Sir Nicholas Strelly, a Nottinghamshire neighbour. His portrait, now at Wollaton, of which there is a replica in the Painted Hall at Greenwich, is that of a tall and handsome man. He was to be Captain-General of the expedition on board a ship of 120 tons called the *Bona Esperanza*, with a crew of 36 officers and men[30]; the second ship was the *Edward Bonaventure* of 160 tons, with a crew of 51 officers and men; and the third was the *Bona Confidentia* of 90 tons, with 28 officers and men. Sir Hugh had a relation with him, named Gabriel Willoughby, among the merchants.

As second in command, Richard Chancellor was selected from among many applicants, on the recommendation of King Edward's friend, Sir Henry Sidney, who made a speech to the Merchant Adventurers, commending an enterprise which, he said, would prove profitable and honourable to our country. Chancellor had been in the service of Sidney, who reminded the merchants that while they found the means but remained at home, Chancellor hazarded his life amongst the perils of the sea. He concluded by saying, "If it fall so happily out that he return again, it is your part and duty liberally to reward him." Chancellor was in the *Edward Bonaventure* as chief pilot of the fleet, and he had with him Stephen Borough as master of the ship, his brother William Borough, and Arthur Pet, all destined later to become famous as Arctic navigators. The master of the *Bona Confidentia* was Cornelius Durforth, whose young son sailed with him as a seaman. King Edward VI addressed a "letter missive," in several languages, to the potentates inhabiting the north-east parts of the world toward the mighty empire of Cathay, commending the right valiant and worthy Sir Hugh Willoughby to their good offices.

The three ships left Ratcliffe on May 10th, 1553, and started with the ebb. They were towed by their boats, the sailors being dressed in sky-coloured cloth, and passing Greenwich there was a great crowd on the shore, and the courtiers stood at the windows of the palace, the ships saluting. But, alas! the young King who had taken great interest in the expedition, receiving news of it from his friend Henry Sidney, was on his deathbed. There was a detention at Harwich owing to some of the provisions being bad, but on the 23rd of June the little squadron stood out to sea from Orfordness.

It was not until the 14th of July that Halgoland was sighted, the home of Ohthere, the first Arctic navigator. They visited Udröst, on the Arctic Circle and had friendly intercourse with the people of the Lofoten Islands. They also touched at Senjen, but off the coast of Finmarken, Chancellor, in the *Edward Bonaventure*, parted company in a gale of wind. Sir Hugh Willoughby, with his own ship and the *Bona Confidentia*, searched for the port of Vardö, which he called "Wardhouse," the rendezvous. But strong breezes obliged him to shape a course to the eastward, and on the 14th of August he came in sight of land in 72° N. He hoisted out the boat, but could not reach the coast owing to the water being shoal. Sir Hugh had discovered Novaya Zemlya, at the part now called the "Goose Coast," It was known to the adventurers of those days as "Willoughby's Land," but was shown on some maps as a separate island[31]. Sir Hugh continued to work up along the coast for three days, but the *Bona Confidentia* was leaking badly, and it was decided to seek a harbour in Finmarken in order to repair her. After beating about for some days Sir Hugh finally brought the two vessels into a haven at the mouth of the river Arzina, near Kegor on the coast of Lapland. Here he determined to winter, as animals were seen both on land and sea, but no human dwellers could be found.

The gallant explorer and all his companions perished before the spring's arrival, though some survived into January. The ship was found by some Russian fishermen, and Mr Killingworth, the Company's agent in Russia, sent a ship to bring the property home. Sir Hugh Willoughby's journal and his will, with other papers, were recovered. Milton, in his history of Muscovia, says that the ship was also despatched on her return, "but being unstaunch as is supposed, she sunk by the way with her dead, and them also that brought them." Milton was, however, mistaken. The ships returned safely to England under the command of John Buckland, with the body of Sir Hugh Willoughby and his effects. Like La Perouse and Franklin, Sir Hugh Willoughby, England's first Arctic explorer, perished in the midst of his discoveries—a glorious close to his honourable career.

Chancellor, in the *Edward Bonaventure*, after parting from the other two vessels, proceeded to Vardö, where he waited for seven days. He then continued the voyage, entered the White Sea, and obtained supplies and information from the Russians at Kholmogori, afterwards called Archangel. He was told that the country was ruled by a king named Ivan Vasilivitch, and eventually it was arranged that he should make a journey to Moscow, where he was well received, travelling back to his ship, and making the return voyage to England. He had discovered Russia, and an important trade between the two countries was begun. It would be difficult to over-estimate the commercial importance of our first Arctic expedition.

The Muscovy Company received a charter of incorporation in February 1555, and in June Richard Chancellor was sent on a second voyage with two ships, the *Edward Bonaventure* and the *Philip and Mary*. George Killingworth accompanied him as the Company's agent. Chancellor again visited Moscow, and rejoined the *Edward Bonaventure* at Kholmogori with a Russian Ambassador, in July 1556. In November she arrived off Pitsligo, near Aberdeen, where she was driven on the rocks during a heavy gale. Chancellor perished in an attempt to reach the shore in a boat, but the Russian Ambassador was safely landed, and honourably received in London. The narrative of Chancellor's first voyage was written in Latin by Edward Adam, the learned young schoolmaster to King Edward's pages, who received his information from Chancellor himself. It is given in English by Hakluyt.

The first Arctic expedition thus opened the trade to Russia, a great service, the first of many which Polar exploration has done to this country. But we must leave the Company's agents actively engaged in the establishment of that trade to follow the course of discovery. Of the crew of Chancellor's ship, we hear again of at least six. The two merchants John Hasse and Richard Johnson were useful agents whose reports are given by Hakluyt. John Buckland, the master's mate, commanded the ship which went to recover the journal and effects of his chief, Sir Hugh Willoughby. Stephen and William Burrough and Arthur Pet continued the work of discovery, and the two former became very distinguished naval officers.

Stephen Burrough is the third name on our Arctic roll of honour, following Willoughby and Chancellor. He was born at Borough in the parish of Northam near Bideford in Devonshire, in 1525, and was Master of the *Edward Bonaventure* under Chancellor at the age of 28. His brother William was eleven years younger, and served as a sailor boy under Stephen. In 1556 a pinnace called the *Searchthrift* was fitted out by the Muscovy Company for discovery, and Stephen Burrough was entrusted with the command. His brother William went with him. On the 27th of April the *Searchthrift* was at Gravesend, and was visited by the managers of the Company and several ladies, who after a collation on board, distributed liberal presents to the men, and gave a banquet followed by dancing at the Christopher Inn. On the 29th they left Gravesend, and by the end of May the *Searchthrift* was off the well-known headland to which Burrough gave the name North Cape.

Thence the explorers sailed along the Murman coast, as the Russians call the northern shore of the Kola Peninsula. It consists of high and precipitous granite cliffs with some harbours towards the western end. At the river Kola the English voyagers met with a number of Russian boats called *lodias*, chiefly belonging to Kholmogori (Archangel), with 20 oars and a crew of 24 men each. They were engaged in walrus and salmon fishing. The Russian captains were extremely friendly, presenting Burrough with loaves of bread, oatmeal, and fish, and piloting him along the coast. Crossing the entrance to the White Sea, Burrough sighted Kolguev Island, the mouth of the Petchora, and Kaninnoss, learning the names from his Russian friends. By the middle of July the *Searchthrift* sighted land right ahead, with distant mountains to the north. This, he learnt, was called Waigatz, and the northern land Novaya Zemlya. Part of its western coast, further to the north, had, as we have seen, already been discovered by Sir Hugh Willoughby.

Stephen Burrough discovered the strait, 25 miles wide, between Waigatz and Novaya Zemlya, which rightfully bears his name. The limit of knowledge was then the mouth of the Obi, but Burrough, pestered by ice, fogs, and gales of wind, was unable to penetrate into the Kara Sea. He landed on Waigatz, an island 70 miles long by 20 to 25 broad, consisting of a limestone ridge on the east side, and a lower shaley ridge to the west, with a swampy plain covered with small lakes between. The climate is extremely severe in the winter, but in the short summer the ground is covered with wild flowers. There are acres of flowering plants a foot high, including a delicate pink-blossomed crucifer, a yellow poppy, and a sort of lousewort (*Melampyrum sylvaticum*) of many colours, from glorious yellows to rich pinks. Buttercups carpet wide areas, and one water-loving species floats on the meres and tarns like a miniature water-lily, filling the air with its fragrance. There are stunted willows a foot high but no other wood-forming plant. Birds are numerous, and the peregrine falcon and the rough-legged buzzard nest on the cliffs of the island.

The approach of winter obliged our explorers to give up their attempt for that year, and on the 11th September Burrough brought the *Searchthrift* to Kholmogori, intending to renew his efforts in the following year. But the orders of the Company were that he should shape a homeward course, and in the autumn of 1557 he returned to the Thames.

Both the brothers, Stephen and William, became distinguished officers, showing what an admirable training Arctic service is for the navy, both in its executive and scientific branches. Stephen Burrough induced Richard Eden to translate the *Arte de Navegar* of Martin Cortes, then the best book on navigation, thus securing the means whereby our seamen could obtain instruction. In 1563 he became Chief Pilot in the Medway, with the duty of instructing and examining officers in the art of navigation. He died in July, 1584, and was buried at Chatham. His brother William continued to serve the Muscovy Company in voyages to the White Sea, and in 1570 he commanded a fleet bound to Narva in the Baltic. Both brothers were very attentive in observing the variation of the compass during the voyage to Waigatz, and in 1581 William Burrough published his *Discourse of the Variation of the Needle*. He became Comptroller of the Navy in 1583, and commanded the fleet which conveyed the Earl of Leicester from Harwich to Flushing in 1585. He constructed charts and prepared sailing directions, besides serving with Drake at Cadiz, and under Lord Howard against the Spanish Armada. His chart of the mouth of the Thames was the best until the first trigonometrical survey was made by Murdoch Mackenzie in 1790[32]. He died in 1599. For such valuable services as these, the Arctic expeditions which trained the Burroughs to observe and to act promptly and judiciously are doubtless not a little to be thanked.

For more than 20 years after the return of the *Searchthrift* the northern voyages were devoted to the promotion of Russian trade and not to discovery, but in 1580 Sir George Barne, a prominent citizen of London, with his colleague, Sir Rowland Hayward, resolved to fit out a small expedition

with the object of continuing the discoveries made by Stephen Burrough. They equipped two small vessels, the *George* of London, 40 tons, and the *William* of London, 20 tons. Arthur Pet of Ratcliffe, who had been a seaman in the *Edward Bonaventure*, received command of the *George* with a crew of nine men and a boy, including Hugh Smith, an intelligent person who wrote an account of the voyage. The *William* was entrusted to Charles Jackman of Poplar, with a crew of five men and a boy. Nicholas Chancellor, perhaps one of the two sons of Richard, who caused him so much anxiety when he sailed into the unknown with Sir Hugh Willoughby, sailed with Pet as merchant. They were supplied with letters from the Queen. Sailing directions were drawn up by William Burrough, with instructions for observing; a paper of advice was written for them by Dr Dee, and a note on the commercial aspects of the enterprise by Richard Hakluyt. Under these excellent auspices the two tiny little vessels set out on the voyage to Cathay by the north-east.

Leaving Harwich on the 30th May, 1580, the two boats rounded the North Cape, and arrived at Vardö on the 23rd June. When they put to sea again the *William* was obliged to stop at Kegor for repairs, while the *George* continued her easterly course until she came in sight of the coast of Novaya Zemlya. Here she was beset in the ice, and, having been extricated with some difficulty, she reached the Bay of Petchora, and sighted Waigatz on the 18th July. Six days afterwards the *William* joined company again; but her stern post was broken, her rudder was hanging loose, and she would not steer. The combined crews set to work to remedy the damage by passing hawsers round the stern of the *William* and hauling them taut at a capstan, and they were again able to steer her.

Captain Pet discovered the strait between Waigatz and the mainland, and the two boats passed through it and made several attempts to bore through the ice, sometimes entering the pack, and occasionally making slight progress by sailing along lanes of water left between the grounded ice and the shore. In August, when they found it impossible to penetrate the ice, they gave up the attempt. Passing the shoals of Kolguev Island, the *William* again parted company in a fog on the 22nd August. Captain Pet brought the little *George* safely back into the Thames on the 25th of September. Jackman was less fortunate. The *William* wintered in the Trondhjem fjord, sailed in company with a Danish vessel bound for Iceland in the spring, but was never heard of more. The fearless audacity of these gallant seamen in attempting to achieve the north-east passage in such frail vessels is worthy of admiration, for they were well aware of the dangers and obstacles.

The moral effect of our earliest Arctic voyages was far-reaching and enduring. They excited a spirit of emulation in our seamen, and aroused a desire for honourable distinction in northern enterprise and discovery which was deep and lasting. The immediate and practical effect was the opening of a lucrative trade with Russia.

CHAPTER IX

BARENTSZ. LINSCHOTEN. DE VEER

In the struggle for independence against Spain in the height of her power, the Dutch nation saw the necessity for making every effort to increase her commerce in order to obtain the sinews of war, and it thus came about that, while in the fight for freedom England and Holland were close allies and friends, it was inevitable that in matters of trade there should be rivalry.

It was not long before the Dutch, seeing the great success of England's trade with Russia by the White Sea, began to follow so promising a lead. In 1565 a ship from Enkhuizen arrived at a spot on the coast of Russian Lapland to which the name of Kola was given, and formed a settlement. In the next year two merchants from Antwerp, starting from Kola, reached the mouth of the Onega, and made a journey to Moscow. Next, a trustworthy person was found to make a voyage to Kholmogori to learn the Russian language and if possible to establish commercial relations.

The name of the person selected was Oliver Brunel, a native of Brussels. He was the founder of the White Sea trade of the Dutch, and their first Arctic navigator. Brunel made a remarkable journey in the country of the Samoyeds, crossing the river Petchora and reaching the banks of the Obi. He was successful in acting as an agent for Russian merchants, and in 1578 a Dutch ship anchored for the first time at the mouth of the Dwina. It was quickly followed by another ship owned by Balthazar de Moucheron, and thus the Dutch trade with the White Sea was established.



WILLEM BARENTSZ.

(Originally a vignette in a chart published in Amsterdam between 1613 and 1615[33].)

It was Balthazar de Moucheron, an eminent merchant of Middelburg, who conceived the project of imitating the English adventurers, and sending two vessels to discover a north-east route to China. One was the *Swan* of Keer in Walcheren, commanded by Cornells Nai of Enkhuizen, the other the *Mercury* of Enkhuizen under Brant Tetgales. They were to attempt a passage by the Waigat. The merchants of Amsterdam fitted out a vessel also named the *Mercury* but, acting under the advice of the cosmographer Plancius, they adopted another route, and resolved to attempt a passage round the northern end of Novaya Zemlya. The commander of this second *Mercury* was Willem Barentsz, a native of the island of Terschelling, an accomplished seaman and pilot. He had translated the sailing directions of Ivar Bardsen the Greenlander[34], and the journal of Arthur Pet; showing the close attention he had paid to the former history of northern enterprise. Barentsz understood the science of navigation, and was an excellent observer.

The three vessels, with Cornelis Nai as Admiral, sailed from the Texel on the 4th June, 1594. On the 29th Barentsz parted company to pursue his more northern route, while Nai and Tetgales shaped a course for Waigatz. It was agreed that, if they had to return, they were to wait for each other until September at Kildin, on the coast of Lapland.

Barentsz came in sight of Novaya Zemlya in 73° 25′ N. on July 4th, and, proceeding northwards along the coast, passed Cape Nassau in 76° 20′ N. on the 10th. Here the land turns nearly due east, with many glaciers, and hills rising to 2000 feet behind them. Off the coast are the two Orange Islands, each about half a mile long, with precipitous sides and flat summits about 100

feet above the sea. Hitherto Barentsz had been in a fairly open sea, but on rounding Cape Nassau he was stopped by floes of ice. He persevered in an attempt to pass through them for some days, but on the 3rd of August he was obliged to begin the homeward voyage. Between Cape Nassau and the Orange Islands Barentsz had put his ship about no less than 81 times, and had sailed over 1546 miles including all the tacks. On the 15th of August he reached Matthew Island on the south coast of Novaya Zemlya, where he met Nai and Tetgales. They had passed through Pet Strait, and had gone for a short distance into the Kara Sea. All three vessels returned to Holland in September. The narrative of his first voyage was written by Barentsz himself.



Novaya Zemlya, showing entrances to Kara Sea.

A well-known traveller and writer, Jan Huygen van Linschoten, sailed with Tetgales in the Enkhuizen ship. Linschoten was born at Haarlem in 1563. At the age of 16 he joined his brothers, who were merchants at Seville. He went thence to Lisbon, and obtaining a place in the suite of the Archbishop of Goa sailed for India in 1583. He remained at Goa until 1589, when he took ship at Cochin to return with his friend Dirk Gerritz, who had been 26 years in the East and had been to China and Japan as gunner of a Portuguese ship. Dirk Gerritz wrote notes upon China and India, and in 1598 he was pilot in the first Dutch voyage through the Straits of Magellan. Linschoten stopped on his homeward voyage at Terceira, one of the Azores, for more than two years, which enabled him to give a full account of the memorable fight of the *Revenge*. At length he got back to Holland in September 1592 and wrote his *Itinerary*, which was published in 1596. He was an indefatigable collector of information of all kinds, and his book of travels is most fascinating[35]. But, while busily engaged upon it, Linschoten's attention was diverted by the project of de Moucheron for the discovery of the North-east Passage, and he sailed with Tetgales as supercargo[36].

It was Linschoten's sanguine report expressing a full conviction that the northern route to the Indies was discovered which induced the Dutch merchants to undertake a second voyage on a larger scale. Seven vessels were fitted out, two in Zeeland, two from Enkhuizen, two from Amsterdam, and one from Rotterdam. The *Griffin* and *Swan* from Zeeland were again under Cornelis Nai, the *Hope* of Enkhuizen was commanded by Tetgales, and Barentsz had the *Greyhound* of Amsterdam and was chief pilot. Linschoten, Jacob van Heemskerk, and Jan Cornells Rijp were the supercargos. Linschoten was also a Commissioner on behalf of Prince Maurice of Orange and the States General.

The ships assembled at the Texel and sailed on the 2nd July, 1595. On the 19th August they reached the entrance of Pet Strait which was closed with ice, "most frightful to behold," writes Linschoten. Parties were sent across Waigatz Island to report on the state of the ice in the Kara Sea. Barentsz himself crossed to the mainland to get information from the Samoyeds, and several efforts were made to pass through the ice, but all in vain. The crews began to murmur. The attempt was accordingly abandoned and the fleet returned to Holland in October[37].

The total failure of this voyage caused great disappointment, and the States General decided that no further attempt should be made at the public expense. Barentsz, however, supported by Plancius, persisted in the opinion that a passage might be effected round the north of Novaya Zemlya, so the merchants of Amsterdam were induced to fit out one more expedition. It consisted of two vessels, one commanded by Jacob van Heemskerk, the other by Jan Cornells Rijp. Barentsz went with Heemskerk as chief pilot.

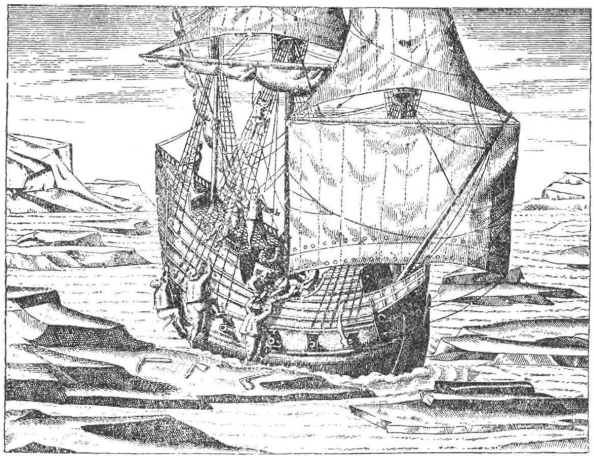
On the 9th June, 1596, the two ships came to a small steep island north of the Finmarken coast which received the name of Bear Island[38]. It appears that the plan was to keep away from Waigatz Island, where failure had attended the second voyage, and instead to shape a northerly course.



A wonder in the heavens, and how we caught a bear.

The Finmarken coast is separated from Bear Island by a sea 280 miles wide with a depth of 300 fathoms. A wild cheerless waste presents itself on the north-western half, covered with lakes and marshes, while the south-eastern part is mountainous. Mount Misery rises to 1760 feet in height. The formations are of carboniferous limestones and sandstones with rich coal beds on the north coast. Bear Island may be considered as the southernmost headland of the submarine plateau out of which Spitsbergen and Franz Josef Land rise.

Only 105 miles to the north is the South or Look-out Cape of Spitsbergen. The Dutch explorers, on leaving Bear Island, continued on a northerly course from the 13th to the 19th June. But no part of Spitsbergen was sighted until they reached its north-western point in 79° 49′ N. A marvellous fight with a bear is recounted by Gerrit de Veer, and two landings on the coast to get ballast and birds' eggs. There was another landing on the 23rd to observe the variation of the compass. Then, as the ice stopped the way northward, a southerly course was shaped on June 28th. The land was supposed to be a part of Greenland. By the 1st July they were again at Bear Island.



How our ship stuck fast in the ice.

There was much dispute between Barentsz and Rijp as to the course, and it ended in Rijp returning with his ship to Holland. Heemskerk, under the guidance of Barentsz, then made for Novaya Zemlya, and coasted along to the northward, until he doubled Cape Nassau, and passed the furthest point reached by Barentsz on his first Voyage. Here the ship was beset and, after fruitless attempts to extricate themselves from the ice by tacking about in various directions, Heemskerk and Barentsz found themselves on the west side of a bay which was named Ice Haven. Here "they were forced, in great cold, poverty, misery, and grief to stay all the winter." This was on the 26th August. The heavy pack ice drifted into the bay, gave the ship several severe nips, and firmly wedged her between grounded masses of pack ice. But the ice was seen to be in motion in the offing until Christmas.

The crew consisted of 17 souls all told. Fortunately there was a large supply of driftwood, and with this, eked out by planks from the ship, they built a house, 32 feet long by 20 broad, into which they removed all their provisions and valuables. A chimney was fixed in the centre of the roof, a Dutch clock was set up and made to strike the hours, bed-places were fixed along the walls, and a wine cask was converted into a bath. Snowstorms and gales of wind prevailed throughout the winter, which had the good effect of drifting snow round the house as high as the roof and thus raising the temperature within.

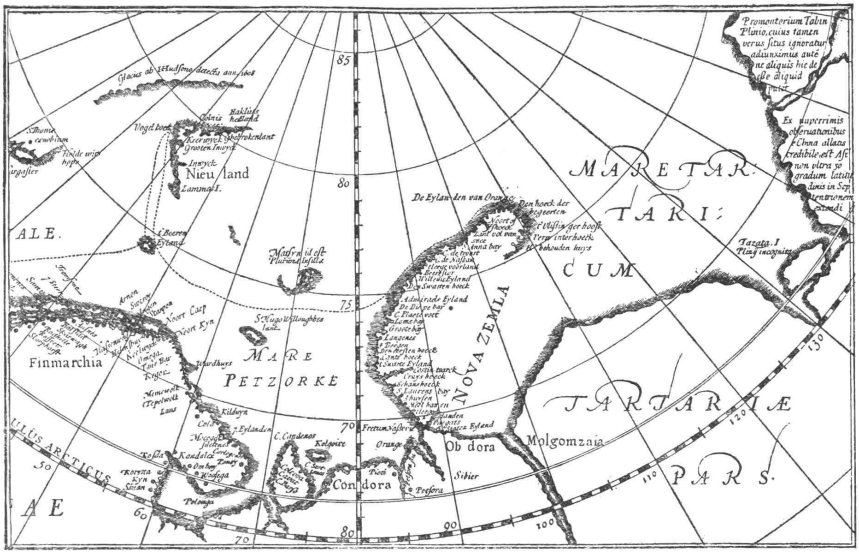
They entered upon the year 1597 "with great cold, danger, and disease"; but strove to keep up their spirits by mild festivity on Twelfth-night, their meal consisting of a little wine and pancakes of meal and oil. Foxes were caught in traps, and occasionally a bear was shot, but sickness began to appear from want of exercise and unwholesome food. The little ship's boy died, Barentsz himself had long been ill, and a man named Claas Adrianszoon was also in an almost hopeless state.

When the summer came and open water appeared it was found that the ship was too much damaged by the ice to be seaworthy, so it was resolved to retreat in the boat and the *schuit*[39]. Barentsz wrote a paper giving an account of their proceedings, which was placed in the chimney. They then dragged down the remaining provisions and merchants' goods to the boats, and loaded them. Willem Barentsz, who was unable to walk, was brought down to the boats on a sledge. Claas Adrianszoon was conveyed in the same manner; and the forlorn people divided themselves between the two boats, each of which took one of the sick men. They all signed a letter stating their reason for abandoning the ship, except four who either could not write or were too ill to sign.

"So committing themselves to the will and mercy of God, with a west-north-west wind, and on indifferent open water, they set sail and put to sea," on the 13th of June, 1597. They reached the Orange Islands, and landed at Point Desire to melt snow and fill their beakers, and to get birds' eggs for the sick. Here Captain Heemskerk fell into the water and nearly lost his life; but he was rescued, and dried his clothes at the fire of driftwood they had made to melt the snow. From the Orange Islands they sailed about 20 miles to Ice Point. The boats being close together the captain hailed Willem Barentsz to know how he did. Barentsz replied "I am well, mate, and I hope to be able to run before we come to Wardhaus." Gerrit de Veer, the mate, was in the same boat with Barentsz. "Gerrit," he said, "if we are near the Ice Point [the northernmost point of Novaya Zemlya] just lift me up again. I must see that point once more."

On the 17th June the boats were beset by the ice, "it came so fast upon us that it made our hair stand upright on our heads, it was so fearful to behold." The boats were hauled up on the ice and repaired. The two sick men were laid on the floe. Barentsz seemed better, and had some discussion with Gerrit de Veer about the chart. Then he said "Gerrit, give me to drink." He had no sooner swallowed the water than he was taken with a sudden spasm and died. Claas Adrianszoon died soon afterwards. On the 22nd they got the boats into open water and again made sail.

With much labour, and frequent difficulties with the ice, the two boats made their way southwards along the coast of Novaya Zemlya until, on the 28th July, they fell in with two Russian *lodias*. By this time they were all suffering, more or less, from scurvy. The Russians sailed away towards Waigatz Island. The Dutchmen though very sick, and scarcely able to pull their oars, also managed to reach the island where, to their great joy, they found plenty of scurvy grass, which cured them. They had heard of its healing virtues in Holland, and they now ate the leaves in handfuls.



Part of Hondius's Map of 1611, showing Barentsz's Discoveries.

At length the weary voyagers reached Kola in Lapland, where they found a Dutch ship commanded by the very same Jan Cornelis Rijp who had parted company with them in the previous year. On the 30th of August he came and welcomed them with great joy as if they had risen from death to life again. He brought a barrel of beer, wine, spirits, bread, meat, salmon, and sugar to comfort and relieve them. At Kola they left the two boats in which they had sailed over 600 miles "whereat the inhabitants could not sufficiently wonder." On the 17th September the homeward voyage was commenced in the ship of Jan Cornelis Rijp. Still very weak, but rapidly recovering, they reached Amsterdam on the 1st of November, 1597, in the same clothes they wore in Novaya Zemlya, and were received by Prince Maurice.

The narrative of this remarkable voyage was simply but well written by Gerrit de Veer, the mate, and faithful companion of Barentsz in his last two voyages[40].

Willem Barentsz deservedly holds a high place in the roll of Arctic worthies. He was a good sailor, and an accomplished pilot and navigator. As an observer he was careful and remarkably accurate. But he possessed still higher qualities. He was resolute and persevering, and, while taking all possible precautions, he was ready to run some risk in order to secure success. He knew well that to be over cautious was to secure nothing, and that some slight dash of recklessness was the very essence of achievement. Hence his deeds exceeded those of all others in that 16th century. He was trusted by his men, and anxiety was mingled with their sorrow at the loss of their "chief guide and only pilot."

For 278 years the winter quarters of Barentsz remained unvisited. The north-east point of Novaya Zemlya was never again rounded until the spell was broken by the Norwegian, Captain Elling Carlsen, who reached the Ice Haven of Barentsz on September 7th, 1871[41]. He saw the house standing at the head of the bay, with large puncheons standing round it, and found the interior exactly as represented in the old drawing which illustrates the narrative of Gerrit de Veer. There was the row of standing bed-places, the Dutch clock, the halberd and muskets, the great kettles and cooking-pans over the fireplace, the instruments, and the books that had beguiled the weary hours

of that long night. One book was a translation of the Spanish work of Medina on navigation, another a chronicle of Holland, another a Dutch translation of Mendoza's History of China. There was also a Dutch version of Arthur Pet's journal. Implements and utensils of all kinds too there were, down to the flute and the small shoes of the poor little ship's boy who died during the winter[42].



Relics from Barentsz's hut. (*National Museum, Amsterdam*)



The exact manner of the house wherein we wintered.

Queen Elizabeth took great interest in the northern voyages of her own subjects and of her Dutch allies. We find Sir Francis Vere, her General in the Netherlands, sending home a full account of the first voyage of Barentsz on 7th October 1594[43], and adopting Linschoten's sanguine views of the ultimate commercial success of the enterprise, which was to be renewed in the following year.

This letter was the consequence of an order from the Queen to keep her fully informed respecting the maritime, and more especially the Arctic, undertakings of the Dutch.

CHAPTER X

SIR MARTIN FROBISHER

It was more than 20 years after the expedition of Willoughby to the north-east that the efforts towards the north-west were commenced. Their inception was due to Martin Frobisher, one of the greatest of the Elizabethan seamen.

Born at Altofts, in the parish of Normanton in Yorkshire, about 1535, Martin was a nephew of Francis Frobisher, who had been Mayor of Doncaster. His father, Bernard Frobisher, died in Martin's infancy, and his mother sent the boy, being one of several children, to the care of her brother, Sir John Yorke, in London. Martin is described as "a youth of great spirit and bold courage, and natural hardiness of body." His uncle seems to have found him more than he could manage, so he sent him to sea. Martin's first voyage was to the coast of Guinea in 1554, and for many years he continued to make voyages to Africa and to the Levant, becoming a thorough sailor, but without much book learning. Yet he was deeply impressed with the importance of Arctic discovery very early in his career. His great ambition was to lead an expedition and to discover the strait which must, he thought, lead into the ocean discovered by Magellan on the north side of America, as Magellan's Strait leads into it on the south.

Frobisher saw service in Ireland, and it has been suggested with much probability that he there became acquainted with Sir Henry Sidney, the Lord Deputy. This was the friend of the young King, Edward VI, who on the part of his sovereign, took an active interest in the expedition of Sir Hugh Willoughby, and obtained the appointment of Richard Chancellor as second in command. Sidney would naturally take an equal interest in the project of Frobisher, would encourage his enthusiasm, and exert his influence to enable him to realise his ardent longing. So it was that Sidney's brother-in-law, Ambrose Dudley, Earl of Warwick, took the matter in hand, brought it before Queen Elizabeth, and secured her approval.

The discourse of Sir Humphrey Gilbert to prove a passage to Cataya and the East Indies was printed in 1576, but it had been written some years before, and its powerful advocacy was no small help to the persuasions of Frobisher. It is divided into ten chapters. The first is to prove the existence of a passage from authority, in the second is the proof from reason, and the third shows that America must be an island. The next four chapters discuss the traditions that the passage had been sailed through[44], and the eighth contests the reasons given by Anthony Jenkinson for preferring a north-east passage. In the ninth it is argued that a north-west route will be more commodious for traffic, and in the tenth the manifold advantages of the discovery are set forth. At the close of his discourse Sir Humphrey exclaims: "He is not worthy to live at all who for fear or danger of death shunneth his country's service or his own honor, since death is inevitable, and the fame of virtue immortal."

The advocacy of Sir Humphrey Gilbert and the support of the Queen's ministers and courtiers enabled Frobisher to make progress in collecting funds. A difficulty was raised by the Muscovy Company, represented by Mr Michael Lock, who maintained that the voyage was contrary to the Company's privileges. But the Privy Council ordered the Company either to make the attempt itself, or to grant a licence to Frobisher to do so, and the latter alternative was preferred. Moreover Frobisher won over Michael Lock to his side, a most important ally.



Sir Martin Frobisher

Lock's father was an Alderman of London, and Michael was born in 1532. The father, Sir William Lock, was a mercer, and was also Agent-beyond-the-seas in divers affairs for Henry VIII. After keeping his son at school until he was 13, he sent him to France and Flanders to learn the language. Michael afterwards passed through nearly all the countries of Christendom, had command of a large ship in the Levant trade for three years, and then settled in London as a merchant. He was an ardent geographer, and had made a large collection of books, maps, and instruments. He became an enthusiastic partner of Frobisher, and they together began to sell shares in the venture, and succeeded in raising £875 for the projected voyage. This sum was quite inadequate, but Lock patriotically came forward and guaranteed the rest on his own personal security.

Two small vessels, the *Michael* of 25 tons, and the *Gabriel* of 20 tons, were fitted out in the Thames, with a small pinnace of 7 tons to be used in going ahead to sound and look out, and to explore bays and inlets. Michael Lock's maps and charts were diligently examined and discussed, and frequent councils were held at which Frobisher and Lock were assisted by Stephen Burrough, Sir Humphrey Gilbert, and the learned Dr Dee. The master and mate of the *Gabriel*, Christopher Hall and James Best, also received instructions from Dr Dee in the use of instruments and in computation. At length all was ready. On June 17th, 1576, the little squadron anchored off Greenwich Palace, and fired a salute. The Queen stood at an open window and waved her hand, also sending the adventurers a gracious message that she had "good liking of their doings." Proceeding down the river the crew received the Sacrament at Gravesend, and on the 18th Harwich was left astern and the voyage began.

Passing the Shetland Islands on June 26th a furious gale was encountered and the little pinnace foundered with the loss of four men. The *Michael*, commanded by one Owen Gryffyn, deserted soon afterwards and returned with a report that the *Gabriel* was lost. Frobisher held resolutely on his way and sighted the south coast of Greenland, which was supposed to be a (fabulous) land shown on the fanciful Zeno chart with which he was supplied and called Frieslanda. The little *Gabriel* continued her westward course with 18 men all told, amidst drifting icebergs and dense fogs. Another gale sprang up with a fearful sea, coming on so suddenly that there was no time to shorten sail. Her canvas pressed the ship down until she was on her beam ends, and the men were seized with despairing panic. The captain rushed up with an axe in his hand, ran along the channels on the weather side, and cast off the foretack, relieving her of pressure from the foresail. He then ran aft and cut away the mizzen mast. The ship slowly began to right herself, and was got before the wind. Seeing this the affrighted crew made a rush to cut away the main shrouds, thinking further relief from pressure would complete what their captain had done. But Frobisher drove them back, ordering them to desist. As it was, the mainmast was sprung, and had to be fished.

On the 28th July high land was sighted, receiving the name of Queen Elizabeth's Foreland. But the ice was floating in masses, and a huge iceberg split up close to the little craft as she drifted past. A landing was effected on an island, which was named after Christopher Hall, the master. The men brought back grass and flowers, and a piece of black stone which was destined to have a malign influence on Frobisher's project of discovery. He sailed up a channel with land on either side, which received the name of Frobisher's Strait, and succeeded in establishing apparently friendly traffic with the Eskimos. But the traffic ended in a catastrophe. The boat, with five men, went away and, contrary to orders, pulled out of sight of the ship to barter for skins. Neither men nor boat were ever heard of again. It was a great calamity, for there was no other boat and the men were a serious loss. Frobisher succeeded in capturing one savage, with his kayak, but this was poor consolation. On the 26th August the return voyage was commenced and by the 9th October the *Gabriel* was once more in the Thames.

Owing to the false report of the *Michael*, Frobisher and his people had been given up for lost. They had a hearty welcome and the gallant leader was well received at court. All would have proceeded satisfactorily for the resumption of the work of discovery, if it had not been for the black stone. Michael Lock got hold of it, forgetting that "all that glisters is not gold." He took it to the Assay Master of the Tower who pronounced it to be iron pyrites. Then he went to another assayer named Wheeler, who made the same report. Next he appealed to an Italian named Aquello, who was more complaisant. He produced a little gold dust. When he was asked how he had found gold where the other assayers declared there was none, his cynical reply was "*Bisogno sap ere adulare la natura*."

Lock then spread the report that there were rich gold mines in Frobisher Strait. There was great excitement. A gold-mining company was formed called the "Cathay Company," and a charter was granted on the 17th March, 1577. The Queen took shares to the amount of £1000, and lent one of her ships, the *Aid* of 200 tons. She named the newly discovered land "Meta Incognita." The subscriptions came in rather slowly, but Lock guaranteed the balance, and became Governor of the Company.

Frobisher took command of the second expedition on May 25th, 1577. It consisted of three vessels. The *Aid*, the Queen's vessel, was Frobisher's flag-ship, with George Best as his lieutenant, Christopher Hall as master, and 30 gentlemen volunteers and soldiers. The *Gabriel* of 20 tons was commanded by Edward Fenton and had a crew of 18 men, with William Smyth as master. Gilbert Yorke, possibly a cousin of Frobisher, had the *Michael* of about 25 tons, with a crew of 16 men.

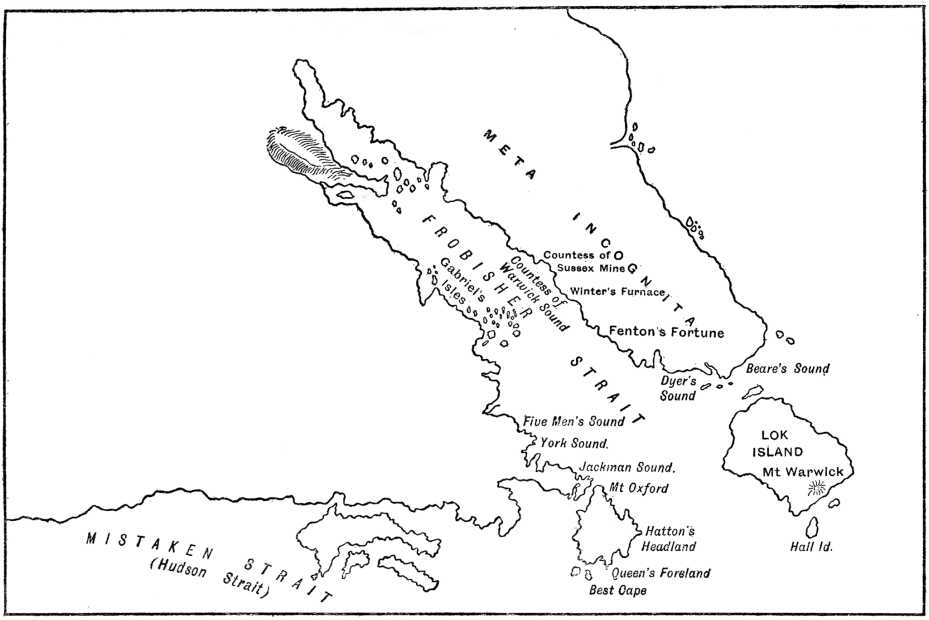
They sailed from Blackwall on the 26th May, and next day the Vicar of Gravesend came on board the *Aid* and administered the Sacrament to officers and men.

On July 7th land, which was believed to be the Frieslanda of Zeno, was sighted, and an attempt was made to cross or get through the ice and land, but it proved impracticable. This was of course Greenland. Sailing onwards the *Michael* lost her topmasts in a gale but succeeded in regaining her consorts, and a few days afterwards the land discovered during the first voyage was reached. The object of the expedition was to load the ships with the black micaceous stones which were supposed to be gold ore, and had nothing to do with Arctic discovery. The gallant admiral, however, thought far more of rescuing the men who were believed to have been captured by the Eskimos on his former voyage than of the imaginary gold ore. He tried every means, attempted negotiation with the savages, and made searches, but all in vain. Some of their clothes were found in the Eskimo tents, and there can be little doubt that they were murdered. The ships returned with their cargoes of black stones, and the voyagers received just praise from the Queen. Her Majesty "rejoiced at their great forwardness in this so dangerous toiling and faithful attempt, especially she praised so good order of government, so good agreement, every man so ready in his calling to do whatsoever the General should command." Elizabeth had rightly formed a very high opinion of the ability and capacity of Martin Frobisher.

The worthless character of the stones was not yet exposed and the feeling was stronger than ever for further supplies. There was to be a colony formed at the Countess of Warwick's Sound. A timber house was embarked, and miners were engaged from Cornwall. There were many gentlemen volunteers, and no less than 15 vessels were engaged:—

Aid	(Admiral)	Martin Frobisher
Thomas Allin	(Vice Admiral)	Yorke
Judith	(Lieut.-Gen.)	Fenton
Ann Frances		Best
Hopewell		Carew
Bear		Philpot
Thomas (of Ipswich)		Tanfield
Emanuel (of Exeter)		Courtenay
Emanuel (Busse) (of Bridgewater)		Newton
Francis (of Foy)		Moyles
Moon		Upcot
Salomon (of Weymouth)		Randal
Dennis		Kendal
Gabriel		Harvey
Michael		Kinnersley

The Queen received the captains at Greenwich, and threw a gold chain round the neck of "her loving friend Martin Frobisher." The fleet sailed from Dover on May 31st, 1578, and shaped a course down channel. The Admiral had issued an order prohibiting swearing or card-playing, and ordering that there was to be Divine service daily in every ship. Most of the ships were chartered, and the Admiral had not the same control over them as if they had been Queen's ships, which increased his difficulties.



Frobisher's Discoveries.

After crossing the North Atlantic Frobisher again sighted Greenland, still supposed to be the Frieslanda of the Zeno map, and once more attempted to land. This time he was successful. Taking the pinnace, and accompanied by Fenton and Christopher Hall, he forced his way through the pack ice, and reached a bay where there were Eskimos in their kayaks and a summer encampment of tents. He intended to continue his discoveries but a dense fog came on, and he was obliged to return and attend to the needs of the fleet. Frobisher was thus the first to land in Greenland since the colony was abandoned to its fate by the Norwegians.

During eight days the ships were crossing the ice-laden strait, making for the land of the false gold ore which had been visited during the two previous voyages. They were in much danger, encountering furious gales of wind, amidst icebergs and drifting packs. One day there was a violent concussion on board the *Salomon*, as if she had run stem on to an iceberg; and a whale rose under her bows. She was brought up all standing, and soon afterwards the whale was seen dead, floating on the surface. Another vessel lost her topmasts in a gale, but at last land was in sight and they were off Frobisher's Strait. The entrance, however, was blocked by the pack. The Queen's Foreland and Lock's Island, names given in the previous voyages, could be seen over the wide extent of ice.

Frobisher attempted to force his way through. Sending the pinnace ahead to seek out leads, he entered the pack in the *Aid*, with the other vessels following in line. There were numerous icebergs, and some vessels, going very slow, ran against them, but without receiving much damage. At last the *Aid* was stopped by a floe of no great width, and men were sent in boats to attempt to cut through it. Up to this time the weather had been fine, but suddenly a gale of wind sprang up, closed the pack between the ships and the open sea, and placed them in great danger. Several were closely beset, others severely nipped. The *Dennis* was forced against an iceberg and sank, the crew being saved by the boats sent to cut the floe. Every contrivance was resorted to that they could devise to save the rest of the fleet. The loss of the *Dennis* was very serious, as she carried half the prepared

timber for the house or fort for the proposed colony. The great peril lasted for 13 hours, during which time the men, expecting death every moment, worked like true English seamen. Next morning the wind veered round and drifted away the pack between the ships and the open sea. This was on the 3rd July. On the 9th another effort was made to reach the land. A very strong current was noted to the south-west "the noise of the stream being like the waterfall of London Bridge," The largest iceberg, which they called "Salomon's Porch" was measured and found to be 330 feet high.

They were at the entrance of what is now known as Hudson's Strait, too far to the south. Frobisher suspected this, but a wide opening leading westward was before him, and he cared much more for discovery than for the supposed gold ore. After all, discovery was included in his instructions. Christopher Hall was strong against the attractive openings being Frobisher's former strait, and words ran high. The Admiral lost his temper and was in a great rage. Hall was mutinous and would not keep company. The *Aid* entered the newly-discovered strait, followed by six or seven other vessels with like-minded loyal captains. Frobisher went on to the westward for six or seven days, meeting with natives on shore with whom he bartered, and noting much animal life. He had discovered what is now called Hudson's Strait. The great explorer longed to push on, but there was his duty to the Cathay Company, his duty to bring home shiploads of worthless stones. So, on the first fine day, Frobisher had to observe for latitude, and of course found himself 60 miles too far south[45].

His duty obliged him to give up his discoveries and return to the sordid work of loading the ships with black stones. On the 28th July the *Aid* was forced through the pack into the Countess of Warwick's Sound, other ships following, and the miners set to work collecting their rubbish. The first part of the voyage was completed, and many dangers had been overcome, difficulties encountered, and experience in ice navigation gained. A solemn service of thanksgiving was held. The chaplain was Master Wolfall, a patriotic clergyman who had given up a good living to serve his country in a dangerous enterprise. He now preached an eloquent sermon of thanksgiving and encouragement, shortly afterwards administering the Sacrament to the crews on shore.

Autumn was approaching. The *Thomas* of Ipswich had already deserted. As half the timber intended for the fort was lost in the *Dennis* it was resolved that the idea of a colony must be abandoned. The ships were accordingly loaded and began the return voyage. Before their arrival, however, it had at last been discovered that the stones were worthless. The bubble burst, the shareholders had to pay, and Frobisher for a time was reduced to poverty. But the great Queen knew his worth, and did not lose sight of him.

Frobisher had many good and loyal comrades in his Arctic voyages. First and foremost was George Best, who wrote the narrative of the voyage; next Christopher Hall, a fine seaman but not equally loyal; Edward Fenton, who afterwards served against the Spanish Armada; Gilbert Yorke, who did good service afterwards in the West Indies, his Arctic service standing him in good stead; and Charles Jackman, pilot of the *Aid*, an excellent and loyal officer who lost his life, as already recorded, in the North-east Passage enterprise with Arthur Pet.

The provisions supplied for Frobisher's voyages were sufficient if they were good of their kind. They consisted of biscuit (16 tons for five months for 115 men), meal 30 tons, beer, wine, salt beef and pork, peas, stock-fish, butter, cheese, oatmeal, rice (a small quantity), raisins, almonds, and liquorice, sea coal 30 tons, wood 14 tons, and charcoal. The whole was in 240 barrels of 4 bushels. The ration was 1 lb. per man per diem, and a gallon of beer[46].

The *Emanuel*, busse, of Bridgewater, of which Newton was captain, reported that on his voyage home in 57° 30′ he sailed for three days along a high and well-wooded coast. The master, James

Leach, and T. Wiars, a passenger, corroborated the statement. The island, known as the "Land of Busse" was shown by Plancius and on the Molyneux globe. Hall expected to see it in 1605, and subsequently said that he did see it in 1606. Seller placed it with defined shape, and names of points, harbours, and mountains. Several captains in the 17th century reported that they had seen it. Fifty years after the last time it was alleged to have been sighted in 1671, it was reported to have been submerged, and it then became the "*sunken land of Busse*." Lieut. Pickerskill, in the *Lion* in 1776, sought for it, and struck a bank in 57° N. with 330 fathoms. Sir John Ross found no bottom in 180 fathoms. There never was any such island. If the people on board the busse ever saw anything, it was a part of the south coast of Greenland. They can have taken no observations, and were trusting to badly-kept dead reckoning[47].

Sir Martin Frobisher was one of our great Arctic heroes. He was imbued with enthusiasm for discovery in the interests of his country. Of dauntless courage, great capacity for work, and the gift of endearing men to him by his noble qualities, he was also quick tempered, but as quickly appeased. His Arctic training and experience were helpful in his after career of great services to the country in the West Indies, in the Channel, and in the defeat of the Spanish Armada, when he was knighted. In 1594 Frobisher was called away from his home in Yorkshire to command the Channel Fleet, and, with a land force under Sir John Norris, to drive the Spaniards out of the fort of Crozon near Brest. During the siege Frobisher, while leading on his men, was mortally wounded; but Crozon was taken by storm. The Admiral was taken on board the *Vanguard*, his flag-ship. The Queen sent him a letter in her own handwriting. The wound need not have been mortal, but the surgeon who extracted the ball left the wadding behind, and the neglect was fatal. The great seaman and explorer died on November 22nd, 1594. Queen Elizabeth, whose extraordinary insight into character was one great element in the success of her reign, put complete trust in Frobisher, and from 1589 she employed no other admiral during his lifetime. Frobisher had unswerving faith in his religion, and devoted loyalty to his Queen. In the dangers of storm and ice, as under the fire of his country's enemies, he ever combined presence of mind, forethought, and prudence, with heroic bravery and dash when the moment for action came. Among the Elizabethan worthies Sir Martin Frobisher justly takes his place in the first rank[48].

CHAPTER XI

JOHN DAVIS

A SUBSTANTIAL yeoman in the days of the great Queen possessed a small freehold called Sandridge on the banks of the Dart, in the parish of Stoke Gabriel. This yeoman had two sons, John Davis the future Arctic navigator, and his brother Edward, the former born in 1550. The Dart, in this part of its course, widens out, and has all the appearance of a lake surrounded by wooded hills, the leafy boughs touching the water at high tide. The view is closed in by the richly wooded heights of Greenway Court, which was the home of Humphrey and Adrian Gilbert and their half brother Walter Raleigh. All these boys were fast friends. The Gilbert and Davis boys often met, and made excursions together. Young Davis also had other friends. A mile beyond the neighbouring village of Dittisham was the manor house of Bozomzele, where dwelt Sir John Fulford, his wife, Lady Dorothy, daughter of the Earl of Bath, and several children about the same age as young Davis. Here he was always welcome, and one of his Bozomzele playfellows, Faith Fulford, later became his wife.

John Davis was not in the same social position as his life-long friends Adrian Gilbert and Walter Raleigh or the Fulfords, but he certainly received a classical education, probably at Totnes grammar school. He went to sea at an early age and was away from home for about 14 years. He returned, at the age of 28, an experienced seaman, skilled in the scientific branch of his profession, and recognised as a captain of known valour and conduct, in whom merchants were willing to repose trust and confidence. He had succeeded to the property at Sandridge, and on September 29th, 1582, he married Faith Fulford.

Young Davis, master of his friend Sir Humphrey Gilbert's *Discourse on a North-west Passage to Cathay*, was deeply interested in an enterprise which would so greatly benefit his country, and was filled with a desire to undertake the leading of such an expedition. His friend Adrian Gilbert—at this time a neighbour, having rented the manor house of Stoke Gabriel—was equally enthusiastic. The two friends rode up to London together, and Gilbert introduced Davis to Dr Dee, the famous alchemist and mathematician at Mortlake, and to the great statesman Sir Francis Walsingham. The four experts examined all available sources of information, and consulted together. The great difficulty was to ascertain the position of Sir Martin Frobisher's discoveries, which could not be reconciled with the Zeno map. Still, the main object of finding a passage was most important, and a successful appeal was made to the merchants of London. Sir Walter Raleigh entered into the plans of the friend of his boyhood with characteristic ardour, and he induced the Queen to grant a charter for the discovery to John Davis, Adrian Gilbert, and himself. Raleigh recommended his associates to the good offices of Master William Sanderson, a wealthy merchant and one of the most enlightened adventurers of his time, who resolved to give liberal support to the expedition. He superintended the preparations, and his relative, John Janes, went out as supercargo. In the spring of 1585 Davis was busily engaged in fitting out at Dartmouth. He had two small vessels, the *Sunshine* of London of 50 tons, and the *Moonshine*, built at Dartmouth, of only 35 tons. Davis and Janes were in the *Sunshine* with the master, William Eston, a master's mate, gunner, boatswain, carpenter, eleven seamen, four musicians to please the natives, and a boy. The *Moonshine* was commanded by William Bruton, with John Ellis as master.

On the 7th June, 1585, the two ships left Dartmouth harbour. With Eston the master, Davis made a careful survey of the provisions and a calculation of the time they would last. They consisted of salt meat and cod, biscuit and peas, butter and cheese, with beer. The clothing was entirely woollen. As contrary winds detained the ships for several days at the Scilly Islands, Davis employed his time in visiting every island of the group, plotting and describing every isle and rock, and making a regular survey for the use of navigators.

A fair wind at last sprang up and took them northward over the Atlantic, where one or two porpoises were harpooned, and a number of whales seen. It was on the 20th July, 1588, that Greenland, the country of the old Norse colony, was sighted, and Davis named it the "Land of Desolation": for "the irksome noise of the ice and the loathsome view of the shore bred strange conceits among us." This was on the east side. Davis considered that he was well to the westward of the Frieslanda of Zeno, and in the channel between Labrador and Greenland as shown on Mercator's map, so, after rounding the southern point, he steered north and on the 29th sighted land in 64° 15′ N. The wind being strong from the north he anchored in a fjord, which was named Gilbert Sound. It is the Godthaab of the Danes[49].

On the Greenland coast the numerous small granite islands scattered in great numbers at the entrances of the deep fjords, are well clothed with moss, grasses, and wild flowers in the summer, and embosomed in a deep blue sea on which bergs and pack-ice float here and there, and become distorted on the horizon by refraction. Nowhere does nature present a more lovely scene.

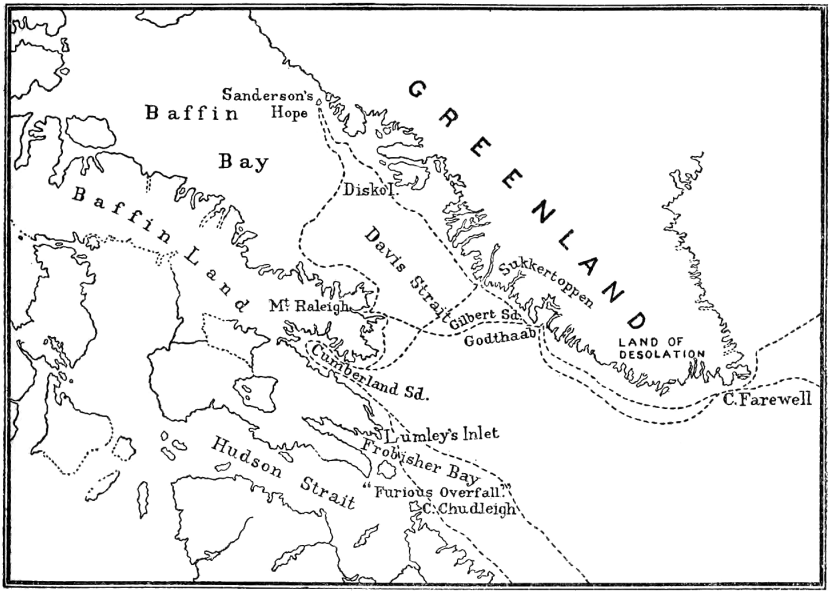
Davis, with Janes and Eston, landed on a small island and had his first interview with the Eskimos. He was followed by the captain of the *Moonshine* with the four musicians, and a good understanding was soon established. Next day many kayaks were darting round the ships, and there was perfect confidence. Five kayaks and some native clothing were purchased. On the 1st of August Gilbert Sound was left and, shaping a W.N.W. course, the opposite shore was sighted in 66° 40′ N., anchorage being found in a bay which Davis called after his old school—Totnes Road. He then discovered and examined the entrance to Cumberland Gulf. He was very observant of the fauna and flora, the bears, five of which were killed, the seals, and the numerous birds, and he described *Ranunculus glacialis* and *Papaver alpinum*. The men had complained of the insufficiency of the food in such a climate, and a new dietary was framed. Every mess of five men was to receive 4 lb. of biscuit daily, 12 quarts of beer, 6 stock-fish, and an extra gill of peas on salt meat days.

From various indications, Davis was inclined to believe that Cumberland Gulf was a strait, but a northwesterly gale had driven the ships from the land, and on August 26th he determined to begin the homeward voyage. He considered that his discoveries had materially increased the amount of knowledge which must be collected before the passage was likely to be found.

Davis was warmly welcomed by his steadfast friend Adrian Gilbert, and he addressed a hopeful letter to Sir Francis Walsingham. He then went up to London, and gave a personal account to the Secretary of State and to Master Sanderson.

For the second expedition, which was immediately decided upon, the merchants of Devonshire subscribed liberally. The little fleet was composed of four ships, the *Mermaid* of 120 tons, the *Sunshine*, the *Moonshine*, and the *North Star*, a pinnace of 10 tons. Davis himself was in the *Mermaid* with his friend Janes, and Henry Morgan, a servant of Master Sanderson, joined the expedition as purser. Davis had resolved to divide his fleet. The *Sunshine* under Captain Pope, with the pinnace, was to seek for a passage on the east side of Greenland as far as 80° N., and they parted company on the 7th of June. The *Mermaid* and *Moonshine* sighted the southern extremity of Greenland on the 15th, but Davis was unable to land owing to the pack-ice extending for several leagues off the shore. He therefore gave it the name of Cape Farewell, and once more entered the

strait which will bear his name for all time. Encountering very severe weather it was not until the 29th that anchorage was found near Gilbert Sound, where the Eskimos received their old friends with joyous welcome. Davis put together a small pinnace which had been brought out in pieces, and explored some of the fjords and inlets, also making long excursions inland to observe the character and products of Greenland. Athletic sports and football matches were then organised. In long jumping the English beat the natives, but in wrestling matches the strangers found their match. A vocabulary was collected of the Eskimo language, and Davis wrote a very graphic account of these interesting people.



The Voyages of John Davis.

The season was very unfavourable, there was much heavy pack, the ships were nearly beset after leaving Gilbert Sound, and the crews became despondent. Davis therefore made for the land again and reached it in 66° 30′ N., at a place now known as Old Sukkertoppen. Here it was resolved that the *Mermaid* should return home, while Davis in the *Moonshine* continued the work of discovery with volunteers. On the 15th of August he crossed the strait, encountering much foul weather, in spite of which the gallant explorer surveyed the west coast of Davis Strait from the 67th to the 57th parallel. He found such enormous quantities of birds breeding on the cliffs that he was led to suppose that there must be a similar abundance of fish in the sea. He therefore hove the ship to, and in a short time the men caught a hundred cod. “The hook was no sooner over the side than presently a fish was taken.” After examining the coast of Labrador, and the north coast of Newfoundland, where there was a serious encounter with the Micmac Indians, Davis shaped his course for England on the 11th September, finally arriving at Dartmouth in October, 1586. Meanwhile the *Sunshine* and pinnace had reached Iceland, whence there was an attempt to approach the east coast of Greenland, but the ice was too closely packed, and Captain Pope sailed round Cape Farewell to Gilbert Sound, returning to England on the 6th October. The account of this voyage was written by Henry Morgan.

Davis had lost faith in Cumberland Gulf as a strait, but he had discovered another great opening to the south which he thought might be one, not knowing that Frobisher had already discovered and sailed up it for six days. He also had good grounds for the belief that these tentative expeditions could be made to pay their expenses by bringing home cargoes of fish. He therefore resolved to continue the enterprise although the west country merchants had lost heart. For a short time he enjoyed the pleasures of home at Sandridge, discussing the prospects with his neighbour and life-long friend Adrian Gilbert. The two friends rode up to London together, were encouraged by the Lord Treasurer and Sir Francis Walsingham, and obtained the necessary funds from Master Sanderson and other patriotic merchants. The new Arctic fleet consisted of the *Elizabeth* of Dartmouth, the *Sunshine*, the *Ellen*, a clinker-built pinnace, and another small pinnace taken out in pieces. The *Moonshine* was worn out. Davis had resolved to try and make the expedition pay its expenses by fishing. He was a most popular commander, and men who had once served with him always wanted to serve again. John Janes, the nephew of Master Sanderson, again accompanied him, and he appointed a native of his own parish of Stoke Gabriel, named John Churchward, as pilot of the *Ellen*.

At midnight on the 19th May the three little vessels *Sunshine*, *Elizabeth*, and *Ellen* sailed out of Dartmouth harbour before a fresh gale from the north-east. The *Sunshine* sprang a leak which could only be kept under by 500 strokes of the pump during each watch, and the *Ellen* was such a bad sailer that she had to be towed. On the 16th June, in spite of these drawbacks, the three vessels came to anchor in Gilbert Sound. Davis was so anxious that the expedition should pay its expenses that he determined to despatch both the *Sunshine* and the *Elizabeth* to the fishery, and to continue his voyage of discovery in the little pinnace *Ellen* of barely 20 tons. Then John Churchward reported that the *Ellen* had sprung a leak and that it required 300 strokes of the pump every watch to keep her clear of water. In this wretched little craft the explorers were to hazard their lives. All felt the crisis to be serious. Some hesitated. John Davis considered the matter, and his decision was worthy of him. He told his people that it would be better to end their lives with credit than to return with infamy and disgrace. The crew accepted his words as final and resolved to live and die together.

At midnight therefore on the 21st June all sailed from Gilbert Sound, the two barks for the fishing voyage, and Davis in the pinnace to continue the work of discovery. Proceeding northward along the west coast of Greenland, to which he gave the name of the London Coast, Davis took an observation on the 30th which showed the pinnace to be in 72° 12′ N. A lofty perpendicular cliff, in reality one of several small islands off the coast, was named after the friend and chief promoter of the expedition "Sanderson his Hope," for here it was that there seemed to be the chiefest hope of a passage. Sanderson his Hope rises to the height of 850 feet above the sea, perpendicular save for narrow ledges on which myriads of looms and kittiwakes rear their young.

Davis was now obliged to alter course to the west owing to a strong northerly wind, and ran for 40 leagues in that direction without sighting land. Throughout the voyage he paid close attention to the phenomena of terrestrial magnetism, and did his best to increase the data for studying the properties of the magnet during all his voyages. The observations for variation at London have been continuous since 1580, and Davis had studied the work of another Arctic navigator, William Burrough, whose *Discourse of the Compass and Magnetic Needle* appeared in 1581, followed in 1585 by Robert Norman's *New Attractive*.

While engaged in these observations, Davis found the progress of the little *Ellen* suddenly checked by broad floes stretching across her path. This was the famous "middle pack" drifting towards the Atlantic, sometimes extending for 200 miles, with an average thickness of eight feet. A lane of water was followed for some distance but it proved deceptive, and the *Ellen* was lucky in

being able to escape from it without being beset. Davis then coasted along the southern edge of the pack and succeeded in reaching the western side of the Strait. By midnight of the 19th July the *Ellen* was off the entrance of Cumberland Gulf. Sailing along the coast they sighted Frobisher Strait and "Meta Incognita" without knowing that they were Frobisher's discoveries, for the map-makers had placed them on the other side, in Greenland. The *Ellen* also crossed the entrance of the great strait which Frobisher had discovered, and Davis named the point on the south side Cape Chidley, after an old friend in Devonshire. The confused current which Frobisher likened to the waterfall then existent at London Bridge, appears to have been called by Davis "the furious overfall" as shown on the Molyneux globe and the "new map" of 1599. Davis in his log and Janes in his narrative describe it as "a mighty overfall, with divers circular motions like whirlpools in such sort as forcible streams pass through the arches of bridges." The rendezvous of the fishing vessels was in 54° N. on the coast of Labrador, where the *Ellen* waited until the 15th August, and then shaped a course for England, arriving at Dartmouth on the 15th September, 1587. The logs of the *Sunshine* and *Elizabeth* have not been preserved, but we may hope that their cargoes remunerated Master Sanderson and the other subscribers, and paid the expenses of the expedition[50].

The discoveries of Davis were most important. He converted the Arctic regions from a confused myth into a defined area. He not only described and mapped the extensive tracts explored by himself, but he clearly pointed out the work cut out for his successors. He lighted Hudson into his strait, as Luke Fox truly said. He lighted Baffin into his bay. He lighted Hans Egede to the scene of his Greenland labours. He did more. His true-hearted devotion to the cause of Arctic discovery, his patient scientific research, his loyalty to his employers, his dauntless courage and enthusiasm, his care for the welfare of his men, form an example which has been a beacon light to the best Arctic explorers for all time.

When Davis returned from his last Arctic voyage, England was threatened by the Spanish Armada and there could be no thought but for her defence. Our Arctic navigator was also an expert pilot of the Channel, and had constructed a chart with soundings, mainly from his own surveys. His ability and zeal were well known, but he could only obtain the command of a small vessel of 20 tons called the *Black Dog* to act as tender to the Lord Admiral. She served throughout the war. Davis afterwards commanded the *Drake* to unite with the squadron of the Earl of Cumberland and prey upon Spanish commerce, joining him between Flores and Fayal in the Azores. These war services had the satisfactory result of enriching Davis with prize money and enabling him to undertake an expedition having geographical discovery for its main object.

The admirable character of the subsequent services of John Davis was due in great measure to the influence of his Arctic training and experience, but the plan of the present work makes it impossible to recount those services in detail. In joining the second expedition of Cavendish to the South Sea, the object of Davis was to discover the passage thither by the north, entering on the west side. In an evil hour Davis consented to unite forces with Cavendish, and commanded the *Desire* of 120 tons, contributing a large sum to the expedition. The terrible story of the dangers and sufferings in the Straits of Magellan and how through them all Davis diligently surveyed and prepared sailing directions, and the disastrous voyage home, are all graphically described by his friend Janes. This failure of the venture on which all the hopes of Davis had been set was heart-breaking. All his money was lost. To add to his affliction he returned to Sandridge only to find that his wife had deserted him, and that his three little boys were motherless.

Davis's energy was in no way weakened by his sorrows and misfortunes. For two years he lived in retirement at Sandridge, busily engaged on his two works, *The Seaman's Secrets* and the *World's Hydrographical Description*. The first was dedicated to his old Admiral, Lord Howard of

Effingham, on the 20th August, 1594. It was a book of instruction intended for sailors, a work on practical navigation, treating exclusively on "those things that are needfully required in a sufficient seaman." "I distrust not," he wrote, "but that all honest-minded seamen and pilots of reputation will gratefully accept this book, only in regard of my friendly good-will towards them, for it is not only in respect of my pains, but of my love that I would receive favourable courtesy[51]." But Davis's work was by no means limited to promoting the safety of English ships by his surveys and charts, and greatly assisting their navigation by the publication of his *Seaman's Secrets*. He did much towards the improvement of instruments for observing for latitude. The Davis quadrant was the forerunner of the plan of taking angles by reflection and was a great improvement on the cross-staff. It came into general use, and held its own until the invention of Hadley's quadrant in 1731. There was even one in use on board the *Royal George* when she sank at Spithead[52]. Davis's other work, *The World's Hydrographical Description* is a learned disquisition on the discovery of a north-west passage to Cathay, and on the advantages to be derived from Arctic exploration.

Davis's career as a seaman and explorer did not terminate until many years later when, on December 27th, 1605, he was murdered by Japanese pirates off the coast of Malacca. As chief pilot of the first Dutch expedition to the East Indies in 1598, and again in the service of the East India Company under Sir James Lancaster, he did good work in eastern waters. But his Arctic explorations were over. As a consummate pilot, a scientific seaman, and a great discoverer he takes rank among the foremost sea worthies of the glorious reign of Queen Elizabeth[53].

CHAPTER XII

THE MERCHANT ADVENTURERS AND RICHARD HAKLUYT

THE merchant adventurers who supplied the funds for Arctic expeditions, often at considerable sacrifice, and generally from patriotic motives, deserve niches in the temple of fame as much as the actual explorers. One could not have existed without the other.

Among the earliest was Master William Sanderson, the promoter and supporter of the three voyages of Davis. This man was one of the most liberal and enlightened adventurers of his time. He was a merchant of great wealth, a member of the Fishmongers' Company, and was married to a niece of Sir Walter Raleigh. Before embarking on the venture proposed by Davis and Gilbert he carefully studied the subject in all its bearings; and, with other information, a discourse on the voyages to the north-east was prepared for him by Mr Henry Lane. When fully convinced, Master Sanderson most liberally provided the largest share of the funds, and superintended all the preparations.

Geography owes Sanderson another large debt of gratitude. The cost of the first English globes, constructed by Emery Molyneux, was defrayed by him. These two globes, celestial and terrestrial, which are still to be seen in the Library of the Middle Temple, are each two feet in diameter, and are beautifully executed. They were completed in 1592, and received additions in 1603. Such was the importance attached to them that they formed the subject of special treatises by Hues and Hood, and were elaborately described by Blundeville. The discoveries of Davis, who probably assisted Molyneux, are shown in detail. The arms of Sanderson, with his quarterings, are painted on one of the globes with an inscription.

A still greater promoter of Arctic enterprise was Sir Thomas Smith. Descended from a long line of yeomen in Wiltshire, his father was Thomas Smith of Ostenhanger in Kent, better known as "Customer" Smith, having been for many years one of the farmers of the Queen's Customs. He succeeded his father as Customer to Queen Elizabeth and became a wealthy and successful London merchant, inheriting from his father the manor of Bidborough, and an estate in the parish of Sutton-at-Hone in Kent, called Brooke Place, where he built a large house. It was his great merit to have furthered maritime enterprise and discovery throughout a long life, not mainly for the sake of gain, but for the honour of his country.

Sir Thomas Smith was an active member of the Muscovy Company, and was among those adventurers who despatched the first ships to Spitsbergen. He also took a leading part in the foundation of the East India Company, and was elected its first Governor in 1600. He was knighted by James I at the Tower on May 13th, 1603, and in the following year was sent as Ambassador to Muscovy by way of Archangel. At Moscow he obtained special privileges for English merchants from Boris Godenoff. He returned in the following year, and was afterwards employed, on several occasions, in affairs of state connected with commerce.

Sir Thomas Smith was re-elected Governor of the East India Company in 1607, and again in 1609, when for his great services, and for having procured the first and second charters, the Company offered the sum of £500 for his acceptance, but he declined to take more than half the sum. The East India Company flourished under his wise and energetic administration, and in 1610

the largest merchant ship that had ever been built was launched in the presence of the King, and named *Trade's Increase*. At the same time the King placed a gold chain round the neck of the Governor of the Company, with his Majesty's portrait attached.

While thus developing the trade with India, Smith was ever mindful of Arctic discovery. As a manager of the Muscovy Company he sent Jonas Poole to Spitsbergen, and induced the East India Company to send Captain Weymouth in search of a passage to Cathay. In 1612 he became the first Governor of a new Company called the "North West Company," formed with the special object of finding the passage to Cathay. Sir Thomas gathered round him as colleagues Sir Dudley Digges, Sir Francis Jones, Sir John Wolstenholme, Sir William Cockayne, Sir James Lancaster, Richard Wyche, Ralph Freeman, and William Stone, all names well known in Arctic geography.

In 1615 Sir Thomas Smith was once more re-elected Governor of the East India Company. The enterprises of these Companies received his unceasing and laborious attention. Again in 1618 and again in 1620 he was re-elected. At length in July 1621, he was allowed to retire, after serving the East India Company for 20 years. He resigned from weakness and old age, after having created and fully established the prosperity of a famous body which, in after years, was destined to found a great Empire.

Sir Thomas Smith fostered and encouraged the scientific branch of a seaman's profession, and lectures on navigation were delivered at his house by Dr Hood, and by Edward Wright, of Gonville and Caius College, Cambridge, the introducer and adapter of Mercator's projection. At the same time he was careful to ensure the safety of the journals of voyages sent out under his auspices by furnishing materials to Hakluyt and afterwards to Purchas. He was the perfect model of an enlightened and patriotic merchant adventurer. This great man died on the 4th September, 1625, and there is a monument to his memory in the south aisle of the church at Sutton-at-Hone, with a long inscription[54].

One of the most active among the colleagues of Sir Thomas Smith in the encouragement of Arctic enterprise was Sir Dudley Digges. He came of a scientific family. His grandfather Leonard Digges was an accomplished mathematician, architect, and surveyor, to whom we owe the invention of the theodolite[55]. His father Thomas Digges, one of the most eminent mathematicians of his time, was Muster Master to the Queen's Army in the Netherlands and prepared exhaustive reports on fortifications with plans[56]. Dudley Digges was born in 1583, and was educated at Oxford under Dr Abbot, afterwards Archbishop of Canterbury. He took his degree, studied at the Inns of Court, travelled on the continent, and was knighted on his return. He married Mary, daughter of Sir Thomas Kempe and heiress of Chilham near Canterbury, where he built a stately mansion and had ten children[57].

In 1615 Sir Dudley Digges published a very able reply to an attack on the East India Company, in which he gave an interesting account of their ships, and of the progress of their trade. From that time he was intimately connected with the projects of Sir Thomas Smith, who was a relation of his wife. Sir Dudley was sent on an embassy to Russia in 1618 and an account of this voyage to Archangel is preserved in manuscript at Oxford. It gives, among other things, an account of the Samoyeds, of the vegetation round Archangel, and of the Russian boats and sailing vessels. Sir Dudley was also employed in a negotiation at the Hague.

Sir Dudley was returned to Parliament in 1621 and again in 1626 for the County of Kent. He was a liberal politician and was one of the chief instigators of the charges against the Duke of Buckingham, for which he was committed to the Tower by Charles I. When released he continued to uphold the rights of the people, and in 1628 boldly protested against the King's command to the

Speaker that no member should speak against the government. In April 1636 he was made Master of the Rolls. He died on March 18th, 1639, at the age of 56, and was buried in Chilham church; one "whose death the wisest men reckon among the public calamities of these times." He was a learned lawyer, an able diplomatist and a great promoter of Arctic discovery.

Alderman Sir Francis Jones was another active colleague of Sir Thomas Smith in the encouragement of maritime enterprise. He was of a Shropshire family, citizen and haberdasher of London, Alderman of Aldgate Ward and Lord Mayor. He was also one of the farmers of Customs and was knighted on March 12th, 1617. Sir Francis resided at Welford, where he died in 1622.

The father of Sir John Wolstenholme, the patron of Baffin, also named John, was a native of Derbyshire. He came to London and, after making a fortune, established himself at Stanmore Magna near Harrow. His son was born in 1562, and became an active promoter of voyages for the discovery of a passage to Cathay. He was knighted at Whitehall, built the church at Stanmore at his sole expense, and dying at the age of 77 in November 1639 was buried at Stanmore, where there is a handsome monument to his memory.

Alderman William Cockayne was Governor of the Eastland Company and the London planters in Ulster, and it was under his direction that the City of Londonderry was founded. He became Lord Mayor and was knighted in 1616. He was also a Director of the East India Company, and a warm supporter of Arctic voyages.

Sir James Lancaster was a native of Basingstoke. He commanded the first English voyage to the East Indies, and also the first voyage of the East India Company. After his return in 1603 he was knighted, and served as a Director of the East India Company. Sir James was wealthy and lived in something more than comfort at his house in St Mary Axe, actively promoting voyages of discovery. He died in June 1618, and left a large sum to found a school at Basingstoke[58].

Richard Bell was another London merchant who embarked in various enterprises having discovery as their object. He was a member of the East India Company, also of the North-west Passage Company, and in 1618 he is mentioned as having fitted out two ships for the discovery of some island in the West Indies. He died before 1622. One of the branches of Gilbert Sound was named Bell's river by Hall.

Quite as important to posterity as the liberality and patriotism of the merchant adventurers were the labours of Richard Hakluyt. Without his indefatigable diligence much valuable help would have been lost to the explorers and many precious documents would have been lost to us.

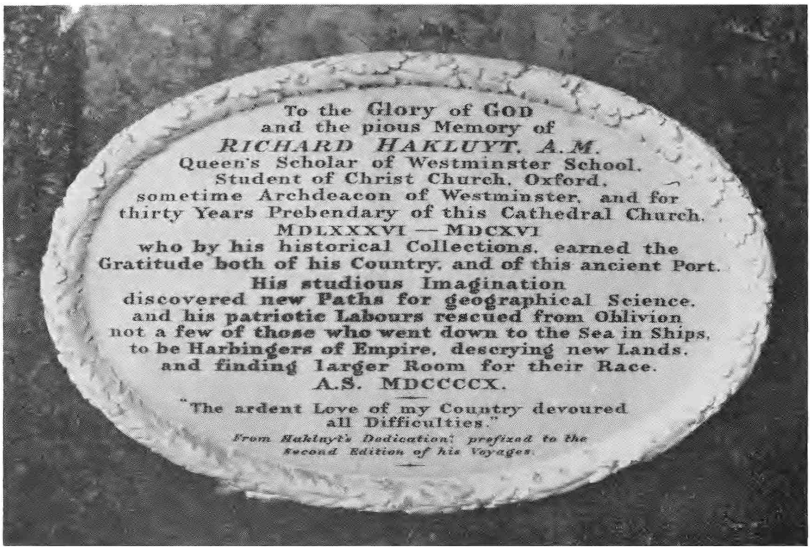
Born of a good Herefordshire family in 1553, we first hear of Hakluyt at Westminster School, "that fruitful nursery," as he called it. His thoughts were early turned to geographical studies. It was his hap, he tells us, to visit a cousin and namesake, who was a gentleman of the Middle Temple, on whose table he found some books on cosmography and a map of the world. The curiosity and interest of the boy were aroused. His cousin began by giving explanatory answers to his eager questions, giving him a regular lecture on the divisions of the earth, and ending with a disquisition on the commodities and requirements of each country. From the map he took him to the Bible and made him read the 23rd and 24th verses of the 107th Psalm, "They that go down to the sea in ships and occupy their business in great waters."

This geographical discourse made so deep an impression on the boy that he never forgot it. He was then told, he says, "things that were of high and rare delight to his young nature." He made a resolution from which he never swerved, that he would continue to study that subject of geography, the doors of which had been so happily opened to him.

In 1570 Hakluyt became a student of Christ Church, Oxford. The study of geography had completely fascinated him. He did not neglect his regular work and took his degree in due course, but as soon as his time was his own he devoured every narrative of adventure that he could get hold of, and mastered six languages in order to be able to read them. He soon began to see two great failings of his country, and set himself to work with patriotic zeal to remedy them. The first was the ignorance of our seamen as regards the scientific part of their profession. The second was the absence of records, and the way in which important voyages and travels were allowed to fall into oblivion. He strove during a long life, with great ability and untiring perseverance, to remedy these defects.

Hakluyt's first public service was the delivery of lectures on the construction and use of maps, spheres, and nautical instruments, "to the singular pleasure and general contentment of his auditory," as he tells us. He constantly urged on the attention of those in authority the importance of establishing a permanent lectureship on navigation in the port of London. He looked upon the loss of journals, narratives, and similar documents as a great national calamity, and he devoted his life to the application of a remedy. His first book, published in 1582, was entitled *Divers Voyages touching the Discoveries of America*. It was the first impetus to colonisation. Virtually, Raleigh and Hakluyt were the founders of those colonies which eventually formed the United States.

Hakluyt entered holy orders, and went to Paris for five years 1583–1588, as chaplain to the English Embassy, during which time he worked assiduously at the object of his life. Returning to England he was made a Canon of Bristol Cathedral and rector of Wetheringsett in Suffolk. His *Principall Navigations*, a folio volume, was published in 1589, as soon as he returned from Paris. In 1598 the first volume of his more complete work appeared, the two others following in the two succeeding years, and later several other books were brought out under his auspices.



Memorial Tablet to Richard Hakluyt in Bristol Cathedral

The great work of Hakluyt, the *Principall Navigations* in three folio volumes, is a monument of useful labour. Nothing could stop or daunt him when there was a chance of obtaining new information. He rode 200 miles to have an interview with the last survivor of Hore's expedition to

America in 1536. He saved many journals and narratives from destruction, and the deeds they record from oblivion. His work gave a stimulus to colonial and maritime enterprise, and it even inspired our literature. Shakespeare and Milton owe much to Hakluyt. He supplied information and lists of commodities of various countries and commercial instructions to the East India Company and to others engaged in similar enterprises. As the years passed on, to quote his own quaint language, he "continued to wade still further and further in the sweet studie of the historie of cosmographie," and he achieved his great task, which was, in his own words "to incorporate into one body the torn and scattered limbs of our ancient and late navigations by sea." He declared geography and chronology to be the sun and moon, the right eye and the left, of all history.

When Hakluyt died, on the 23rd November, 1616, he was Archdeacon of Westminster and had reached his sixty-fourth year. He left a large collection of materials which came into the hands of the Rev. Samuel Purchas, who, in due course, published *Hakluytus Posthumus* or *Purchas his Pilgrimes*, an invaluable work, though marred by injudicious curtailments and omissions. To the student of Arctic history the works of Hakluyt are indispensable. In them are to be found the journals and narratives, or all that could be saved of them, between the date of the earliest English voyages, and that of Hakluyt's death.

CHAPTER XIII

GREENLAND VOYAGE OF HALL AND BAFFIN

THE Norse colony in Greenland had been abandoned to its fate for more than two centuries. The annual *knorr* or ship had ceased to be sent, and during that long period the Norwegians had shown no sign of conscience, and remained careless and indifferent. At last a king of Denmark and Norway arose who was not so callous. Christian IV was the noblest and most patriotic Sovereign of the House of Oldenburg. He resolved to send an expedition to succour the lost colony or to ascertain its fate, the re-discovery of Greenland by Davis having become known to him.

Three ships were fitted out. The *Trost*[59] (Consolation) built by Davis Balfour, shipbuilder to the Danes from 1597 to 1634, was commanded by John Cunningham, a captain in the Danish navy, and the mate was James Hall of Hull, who is said to have been to Greenland before. The second ship, *Den Röd Löve*, parted company and returned. The third was the *Katten*, a pinnace, in charge of another Englishman named John Knight.

The expedition sailed from Copenhagen on the 2nd May, 1605, and sighted Greenland on the 30th. The *Trost* and pinnace sailed on until they came to in the neighbourhood of a cliff which was named Mount Cunningham[60] between headlands which were named Anne and Sophia[61] after the Queen and Queen Dowager of Denmark. This was in the neighbourhood of the modern settlement of Holsteinborg. Hall went on in the pinnace with Knight as far as 69° N. The *Trost* had anchored in King Christian's Fjord[62] on the 12th June. The Danes kidnapped five natives, and the *Trost* and *Katten* returned safely to Elsinore on the 10th August. Hall was appointed a mate in the Danish Navy, but the thoughts of the Danes had been diverted from the lost colony to the hope of material gain, mistaking the glittering lumps of mica for silver ore. A new expedition was fitted out in 1606 under Goolske Lindenow, with Hall again as pilot and mate. It consisted of the same three vessels and two others, the *Ornen* and *Gilliflower*. This was a mere search for imaginary silver ore, but in 1607 the *Trost* went again to try to find Eriksfjord, but did nothing without Hall. Again several Eskimos were kidnapped with their kayaks and brought back to Denmark. In a race at Elsinore these men easily beat the Danish boats, but they did not long survive captivity.

Christian IV then gave up his attempts to find the lost colony, and James Hall returned to England, eager to embark once more on discoveries in the direction of Greenland, and full of projects respecting silver ore and other mineral wealth[63]. He had with him a faithful young follower, a Scarborough lad named William Huntriss, who had accompanied him in all his voyages, and was so proficient a navigator that King Christian had granted him a special allowance.

Hall succeeded in persuading four great merchant adventurers to aid him in a voyage of discovery to Greenland in 1612. His partners were Sir Thomas Smith, Sir James Lancaster, Sir William Cockayne, and Master Richard Bell. Two small vessels were fitted out at Hull, the *Patience* (140 tons) and *Heartsease* (60 tons).

That great seaman and scientific observer William Baffin first appears in history as pilot on board Hall's ship, the *Patience*, an experienced seaman in the prime of life. I have been baffled in all my attempts to discover even a single fact respecting his birth-place and early history. Every parish register in London and the suburbs was searched, and only six persons of the name of Baffin

were found[64]. We find that a daughter of a William Baffin was baptised in the church of St Thomas the Apostle, in Vintry Ward within the City of London, in 1609, three years before Baffin joined Hall's expedition. This Ward includes Queenhithe, a landing-place frequented by sailors, and a likely locality for a seaman to take up his abode while on shore. We know that Baffin had a wife, for she gave a good deal of trouble to the East India Company after his death. Susan may have been his daughter. But Baffin himself, though probably a Londoner, must have been constantly at sea, and probably raised himself, by his good conduct and talent, from a very humble position. There is no indication of the name at Hull.

If Baffin was not a Hull man, he probably was not known to Captain Hall. It may, therefore, be conjectured that one of the merchant adventurers associated with Hall in the voyage, perhaps Sir Thomas Smith, knowing Baffin's worth and ability, recommended him as chief pilot of the *Patience*. Andrew Barker was Master of the *Heartsease*, William Huntriss mate, and John Gatonby, quartermaster[65]. All were Yorkshiremen. The expedition finally left the Humber and made sail for Greenland on the 22nd April, 1612.

The real interest attaching to the expedition is the record of Baffin's observations and the fact that it was his first Arctic voyage.

Cape Farewell was sighted on the 14th May. Gatonby, on board the *Heartsease*, named a green and inviting-looking promontory Cape Comfort, and on the 26th the two vessels anchored in 64° 15′ N. at the mouth of a fjord which was named the Harbour of Hope. It was the Gilbert Sound of Davis, the modern Godthaab. Hall proceeded to explore the fjord in a boat, and named two of its arms Bell and Lancaster rivers after two of the merchant adventurers. A cliff or hill received the name of Huntcliff from its resemblance to Huntcliff Foot near Redcar on the Yorkshire coast. Leaving the *Patience* in Gilbert Sound, Hall went on northwards to explore in the *Heartsease* with Baffin, going as far as Christian Fjord in 66° 25′ N. and Cunningham Fjord in 67° 25′. They then went south again to Rommel's Fjord in 66° 54′ N., the modern Holsteinborg. On the 27th June the two vessels were together in Cockayne Sound[66], the modern Sukkertoppen, in 65° 25′ N.

The Eskimos were in a very dangerous mood. Five had been kidnapped with their kayaks by the Danes when Hall was with them, and one had been killed. The relations, who recognised Hall, were sullen and revengeful. The poor captives had tried to return in their kayaks, had even put to sea in them to cross the ocean, but were followed and brought back. They were overwhelmed with grief. One wept whenever he saw a mother with her child, reminding him of his own wife and child. They all soon died of home sickness. As they never returned, their friends sought for opportunities for vengeance. They had already killed one sailor, when on the 22nd July Hall came to land in his boat where there was a party of Eskimos. One of them came within four yards and shot a dart at Hall, hitting him in the right side. The wound was mortal and he died the next day. On his death Andrew Barker succeeded him as Commander of the expedition, and Huntriss was appointed Captain of the *Heartsease*.

Baffin had been most diligent with his observations. Like Davis he paid special attention to terrestrial magnetism, taking frequent observations for variation, and his latitudes were fairly accurate. He was also constantly thinking out the means of finding the longitude. One attempt by moon's culmination was ingenious, and shows his mastery of the subject and inventive faculty. Mr Coles[67] says, "It is most surprising that Baffin should have obtained even such an approximation as he did, and his method of observing with two plumb lines is both original and ingenious."

Baffin, in the portion of his narrative that has been preserved, gives a description of the country and of the animals he saw. He describes the Eskimo *kayak* and *umiak*, and in his walks on shore and

climbs up the mountain sides he notices several plants. He mentions the dwarf birch and willow four feet high, the crowberry (*Empetrum nigrum*), the angelica, sorrel, scurvy grass, orpine, and a yellow-flowered stone-crop.

The *Patience* and *Heartsease* put to sea on their return voyage on the 4th August, and beat up against a foul wind. Baffin was now on board the *Heartsease*, which parted company with the *Patience* in a gale on September 4th. On the 15th she arrived in Yarmouth Roads and Captain Huntriss took her on to the Thames, entering the river on the 19th. He caused the flag to be hoisted half mast, in token of the death of his beloved Commander James Hall, and the ship was brought up to St Katherine's Pool. On September 17th, 1612, Barker brought the *Patience* into Hull Roads[68].

William Baffin, under the auspices of Sir Thomas Smith, then entered the service of the Muscovy Company and made two voyages to Spitsbergen[69].

CHAPTER XIV

EARLY SPITSBERGEN VOYAGES

THE greatest English navigator in the Spitsbergen quadrant during the first century of the renewal of Arctic discovery was Henry Hudson. Scarcely anything is known of the personal history of this famous sailor previous to the last four years of his life, during which his four voyages were undertaken.

Hudson was a servant of the Muscovy Company, he had a house in London, was married and had children. His selection is a proof that he was an experienced seaman. It has been conjectured that he was a grandson of another Henry Hudson who died when he was an Alderman of London in 1555[70]. There is also some reason for the belief that Thomas Hudson, a merchant of London who had a house at Mortlake and was a promoter of the voyage of John Davis, was his uncle and guardian[71].

Our first introduction to him is sufficiently striking. After morning service on the 19th April, 1607, a party of sailors might have been seen to issue from the door of St Ethelburga's church in Bishopsgate Street, where they had partaken of the Holy Communion with the parishioners, and to wend their way to the river side. At the head of the little procession was the master, Henry Hudson, with his little son John by his side, followed by William Collins the mate, John Colman the boatswain, and James Young, most vigilant of look-out men. Then came the men, John Cooke, James Benbery, James Scrutton, John Playse, Thomas Baxter, Richard Day, and James Knight. These eleven men and a boy formed the crew of the little *Hopewell* of 80 tons, waiting for them at Ratcliffe, for in four days she was to sail on her great enterprise. The intention was to find the passage to Cathay by sailing due north from Spitsbergen, instead of north-west.

Hudson had studied the accounts of the voyages of Stephen Burrough, Arthur Pet, and William Barentsz. He was led to the conclusion that the attempts to the eastward had offered small hope of success, so he reverted to the advice of Master Thorne to shape a course northward and make boldly for the Pole itself. It was then thought that ice did not form on the open sea, but only on the coast in bays and inlets.

On the 1st May, 1607, the *Hopewell* sailed from Gravesend, was off the Shetlands on the 26th, and on 13th June was in sight of very high land. James Young was the first to report it, so it received the name of Cape Young. Soon a coast-line was visible extending for 9 leagues. It was the east coast of Greenland. Hudson always calls it Groneland, while the name of Greenland (or Newland) is given to Spitsbergen in accordance with the belief of Barentsz. He got the first name from the misleading Zeno map[72].

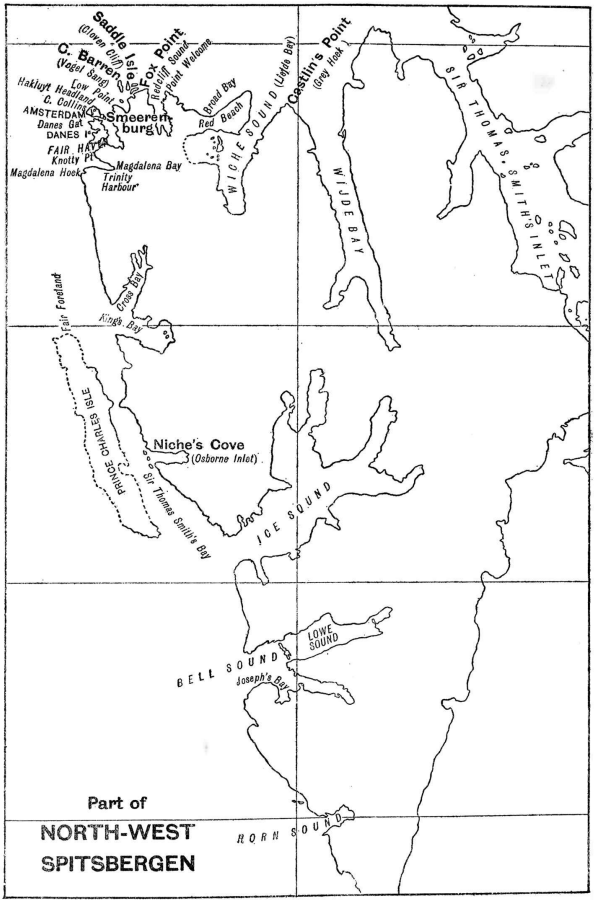
Behind Cape Young a high mountain, like a round castle, received the name of the Mount of God's Mercy. On the 22nd, Hudson found himself in 72° 38′ N., and high land was again sighted in 73° N., which received the name of Hold-with-Hope.

Hold-with-Hope is a little to the south of the Pendulum Islands, visited by Clavering 200 years afterwards, and is a position which does credit to the skill and perseverance of Hudson and his companions. His conclusion was that he was too far to the westward, so he resolved to follow the edge of the ice to the north-east, seeking for an opening. This course brought the little *Hopewell* to

78° N., and in sight of the Newland or Greenland of Barentsz, afterwards named Spitsbergen. This was on June 27th, when Hudson supposed himself to be near the "Vogel Hoek" (Bird Cape) of Barentsz.

Unfortunately Hudson's own journal is lost. We have only the journal of one of the men named John Playse. It was no doubt copied from the Master's log, but in such a way that it is not possible to make out the *Hopewell's* track by it. After encountering some severe weather, she seems to have passed down the strait between the foreland and the mainland of Spitsbergen, doubled the southern point, and then shaped a northerly course until the 80th parallel was reached. On the 12th July, William Collins the mate saw the land, called Newland by the Hollanders, bearing S.S.W. 12 leagues distant, but Hudson continued to stand to the north. He found that a green-coloured sea was most free from ice and that an azure blue sea was an icy sea. At noon on the 14th the land was approached where there was a bay with very high and rugged mountains at the head of it, and high land at the entrance, with an island which received the name of Cape Collins after the mate. The bay was named Whale Bay. Here Colman and Collins with two other men landed, reporting many footprints of animals, deer-antlers, and much drift-wood. A cape to the north-west of Cape Collins received the name of Hakluyt's Headland. Hudson again stood along the edge of the ice which closed in upon the land to the eastward. Eventually he came to the conclusion that there was no passage to the north on those meridians, and he resolved to steer southward. He thus discovered the whole western coast of Spitsbergen. He examined the inlet afterwards named Bell Sound, rounded the most southern point of the land, and traced the coast for some distance to the east of it.

This western coast of Spitsbergen, first made known by Henry Hudson, is well described by Scoresby. He tells us how its cliffs rise by steep acclivities from the very margin of the ocean to a stupendous height, the masses of purest snow contrasting with the protruding dark-coloured rocks. The valleys, opening towards the coast, terminate inland with a transverse line of ice-field showing an unbroken surface for many leagues in extent. On the southern part of the coast there are isolated mountains with conical or ridged summits, occasionally terminating in sharp peaks. Further north the mountains are more disposed in chains than in the south, with an inferior range running parallel with the shore, whence ridges project into the sea, and terminate in mural precipices.



Part of NORTH-WEST SPITSBERGEN

“There is indeed a kind of majesty not to be conveyed in words in the extraordinary accumulations of snow and ice in the valleys, and in the peaks rising above the ordinary elevation of the clouds and terminating in crests of everlasting snow. Approaching the shore under shelter of the impenetrable density of a summer fog, sometimes the mist disperses like the drawing of a curtain, when the strong contrast of light and shade, heightened by a cloudless atmosphere and powerful sun, bursts on the senses in a brilliant exhibition resembling the production of magic.”

But these beautiful scenes were not the only attraction. Around them they noted the vast flocks of birds, the numerous seals and walrus, and the great abundance of whales. Hudson had discovered a source of wealth which served to enrich two countries in the ensuing centuries.

In the end of July, Hudson decided on bearing up for his return to England. He passed Cherry or Bear Island on the 1st August, and a few days afterwards another important discovery was made. A lofty peak was seen, rising out of the sea to a height of 5836 feet. It is on an island about 30 miles long by 10 broad, in 71° N., and is now known to be the lofty termination of a submarine volcanic range running out N.E. from Iceland. Hudson gave the island the name of Hudson’s Touches[73]. The north-eastern cape was named Young’s Foreland, doubtless because the peak was first sighted by

that sharp-eyed look-out man James Young; and another cape, almost exactly in 71° N., was named Point Hudson. This island has since, without any justification, been called Jan Mayen.

After leaving Hudson's Touches the little *Hopewell* put into the Faroes on the 15th August, and on the same day in September she arrived in the Thames. It is not recorded whether Hudson again took his crew to St Ethelburga's church to offer up a thanksgiving, but it is more than probable. Thus ended this memorable voyage.

Hudson had tried the route recommended by Master Robert Thorne and had found it to be impracticable, but his employers were willing to send forth another expedition under his command. He therefore decided to try the north-east plan, conceiving that if he could once either get round the north end of Novaya Zemlya, or through Burrough or Pet Straits, and round Cape Tabin, which is shown on the old charts as the northern point of Asia, the rest of the voyage to China would offer no difficulties. This, then, was his plan for a second voyage. He had a third way in his mind, for the Dutch on their latest charts had shown Kostin Shar as a strait through Novaya Zemlya.

The little *Hopewell* was again fitted out and sailed on the 22nd April, 1608, with a crew of 14 in all, including Hudson's little son[74]. On the 3rd June the North Cape was sighted and on the 12th, in 75° 30′ N., the ice was encountered, and the ship's head was turned to the east. Having examined the edge of the ice for a long distance the *Hopewell* was in sight of the Novaya Zemlya coast in 72° 25′ N., on the 26th July, at the place called Swarte Klip by the Dutch. Juet and Cooke, the mate and the boatswain, went on shore with two men, and reported having seen antlers and traces of deer, many streams of water, and long grass. In the evening Stacey the carpenter and Ladley the other mate landed and saw much driftwood and a great number of birds. They brought some moss and wild flowers on board. Many walrus were seen in 71° 15′, but none were killed.

When the compact character of the ice-floes between Spitsbergen and Novaya Zemlya deprived Hudson of all hope by a northerly course, his intention was to pass by the Waigat and the mouth of the river Obi to Cape Tabin, the supposed northern point of Asia. But now a hope was conceived that the quantity of walrus might defray the expense of the expedition, and also that there might be a better passage to the east side of Novaya Zemlya by way of Kostin Shar, as the bay in which he was had been named—the Dutch believing it to be a strait. On the 2nd July the boat was sent on shore with the mate, and brought back four dozen birds, half a boat-full of drift-wood, and a report of many reindeer. But a careful examination showed that the Kostin Shar was only a deep bay and not a strait, to Hudson's great disappointment. On the 6th, all hope was abandoned of finding a passage by the north-east.

Hudson then resolved to ascertain whether "Willoughby Land" was in the position in which it was placed on his chart, because if so he considered it would be a good place for walrus. So he shaped a westerly course. But no such land was seen, for in reality "Willoughby Land" was the very land of Novaya Zemlya which they had been visiting. On the 18th July the North Cape was again sighted; and the *Hopewell* arrived at Gravesend on the 26th August, 1608. Hudson tells us that having found the routes by the north pole and the north-east impracticable, he had resolved to try the north-west the same year, taking the route of Lumley's Inlet and the "Furious Overfall" mentioned by Davis. But the season was far spent and he felt it to be his duty to his employers to return.

Hudson's next voyage was in the service of the Dutch in 1609, when he discovered the river which bears his name, and it was not until 1610 that he was enabled to undertake the enterprise he had in his heart, an attempt by way of the "Furious Overfall" of John Davis. But that sad episode belongs to another part of the Arctic story.

Of the great commercial as well as geographical importance of the two first voyages of Hudson there can be no question. They led the way to the famous Spitsbergen whale fishery. In 1609 the Muscovy Company sent Captain Jonas Poole to complete the work of Hudson, and he carefully examined the whole of the west coast of Spitsbergen, naming Bell Sound, Ice Sound, and several other positions. He wrote interesting journals which are given in Purchas, and he had a prosperous career before him. But unfortunately he was "miserably and basely murdered between Radcliffe and London," after his return in 1611.

The reports of Hudson and Poole made it manifest that there was great wealth to be derived from the fishery in the seas round the New Land. In 1612 the Muscovy Company obtained a Charter from James I excluding all others from the fishery, English or foreign, so that henceforward it would be a question which had the strongest fleet. Christian IV thereupon put in a claim on the ground first that the country was Greenland, and then that it was part of Norway. The Dutch obtained a Charter, similar to that of the Muscovy Company, from Prince Maurice. Dunkirk privateers and Biscayners also began to arrive at the fishery. The grand work of discovery, though never quite lost sight of by the English, was practically put aside, and the sordid greed of wealth-seekers was substituted.

The first appearance of the Dutch was in 1612, when a ship arrived at the fishery piloted by an Englishman named Bonner. In that year also, Captain Marmaduke, one of the most able and dashing sailors on the Spitsbergen side in those days, with a crew from his native town of Hull, boldly pushed forward to make discoveries, and we are told by Fotherby, a reliable authority, that he reached 82° N.

The country was called "King James his Newland" by the Muscovy Company, and Greenland by the Dutch and Danes and also for long by the English.

In 1613 the Muscovy Company fitted out a large fleet under the command of Benjamin Joseph, an experienced seaman. The Admiral or leading ship was the *Tiger* of 200 tons, with Joseph in command and William Baffin as pilot. The *Matthew* of 250 tons was Vice-Admiral, and Captain Marmaduke appears to have commanded her, with Fotherby as pilot. Thomas Edge, who afterwards did such good service as a discoverer as well as a whaling captain, was also in the fleet. The Rear-Admiral was the *Gamaliel* of 200 tons, the fourth ship was the *John and Francis* of 180 tons, and the fifth the *Annula* of 140 tons. There was also a pinnace of 60 tons called the *Richard and Barnard*. The fleet left the Thames on the 13th May, and by the 1st June, all the ships being in company, they were off Prince Charles's Island on the west coast of Spitsbergen, anchoring in Sir Thomas Smith's Bay between Prince Charles's Island and the mainland of Spitsbergen. On the 4th June they killed their first whale.

At first the English were quite ignorant of the art of whale-killing, and this, the most important part of the business, was left to two dozen Basques who were shipped for the voyages and ordered "to be used very kindly and friendly, being strangers, and leaving their own country to do us service."

In the middle ages a whale frequented the Bay of Biscay (*Balaena Biscayensis*) rather smaller than the right whale, but differing very little in other respects. It is now extinct. The fishermen of Biscay and Guipuzcoa had been engaged in pursuing this whale from time immemorial, and the dangerous occupation had trained a most expert and daring race of sailors along those coasts. They did not use ships in their whaling. There were *atalayas* or watch-towers on the heights above the little fishing towns, whence signals were made that a whale was in the offing, and instantly the boats started in pursuit. The King and the Church shared the profits. Fernando III of Castile and Leon in about 1220 decreed that "*si mactaveris aliquam ballenam dabis mihi unam tiram a capite*

usque ad caudam sicut forma est." The churches received part of the whalebone, and in the church at Lequeitio there is a most interesting record of whales caught, with occasional notes of happenings, extending over a century. A whale figures in the coat-of-arms of St Jean de Luz, Fuenterrabia, Guetaria, and Motrico. When the Muscovy Company began to send fleets to Spitsbergen, it was the custom to enter one or two boats' crews of Basques from St Jean de Luz or San Sebastian to attack and kill the whales, while the rest of the crews got the gear ready on shore for boiling down. But it was not long before the English had learnt their lesson from the Basques and become expert harpooneers.

Captain Joseph found as many as 17 foreign ships on the Spitsbergen coast. All submitted to his superior force, some were ordered away, and a few were allowed to fish on the condition of surrendering half their catch to the English ships.

Baffin showed the same diligence in observing for latitude and magnetism (dip and variation) as in his voyage to Greenland, and he records a very interesting observation for ascertaining the sun's refraction[75]. Whatever may be thought of the accuracy of these original observations, the activity of Baffin's brain and his constant efforts on every opportunity to improve the art of navigation are most remarkable.

Captain Joseph's fleet returned with full cargoes in September[76]. We have two narratives of the voyage of 1613, one by Baffin himself and the other by Fotherby[77].

In 1614 there was a different story, for the Dutch were the strongest. They were in great force under Antoine Monier, their fleet consisting of 14 ships protected by three or four men-of-war. The English fleet was much weaker. Captain Joseph was again in command with nine ships and two pinnaces. He was on board the *Thomasine* with Baffin and Fotherby, and again the gallant Marmaduke was with them, in the *Heartsease*. Sailing from Tilbury on the 4th May, 1614, and running through loose pack on the 20th, it suddenly closed and they were beset for some days, eventually reaching the coast. Sailing northwards as far as Hakluyt Headland they sighted the formidable Dutch fleet, which was avoided, and the *Thomasine* proceeded to Fairhaven, where a snug anchorage was found in 79° 34′, and named by Fotherby Trinity Harbour.

The interest of the voyage of 1614 consists in the expeditions of discovery made by Baffin and Fotherby to the north and east in shallops or open boats. In three or four expeditions they made their way round Hakluyt Headland to the eastward, a coast which Captain Marmaduke had already discovered in 1612. The royal arms were set up in several prominent places. The explorers were at Cape Barren (Vogelsang) Saddle Island (Cloven Cliff) Redcliffe Bay, Point Welcome, and Wyche's Sound, which was thoroughly explored down to Point Deceit at the farthest end. They walked over Red Beach, where they were joined by Captain Marmaduke, who discovered it. Passing onwards they rounded Cape Desire, and discovered the great channel which was named Sir Thomas Smith's Inlet (Hinlopen Strait). These extensive discoveries in open boats reflect great credit on the three able and adventurous explorers. The *Thomasine* returned to Wapping on October 4th, with full cargo and all in good health[78].

There were bickerings and occasional collisions between English and Dutch in the succeeding summers. The English fleets were led by Thomas Edge, one ship being nominally for discovery. At last there was a sort of agreement that the Dutch and Danes should have the north-west corner from Fairhaven to Hakluyt Headland, and the north coast—much the best stations for whales; while the English were to have the west coast bays from Fair Foreland, the northern point of Prince Charles Island, to the south point of Spitsbergen.

The Dutch fishery brought great wealth to Holland. A station, called Smeerenburg, was founded at the south-eastern end of Amsterdam Island, which for many years had all the appearance of a large town, with warehouses, blubber-boiling sheds, dwelling huts, and even a church. Smeerenburg began to decline from 1644, when the whales retreated from the coast and were only taken at sea. But, until 1770, the Dutch fishery throve.

Captain Edge was mindful of discovery as well as of the main business of whaling. He explored to the south and east, and sighted Wyche Land[79] far to the east. Indeed he and his predecessors completed the whole outline of the Spitsbergen archipelago, except North-East Land, some gaps being filled in by the Dutch. As the voyages of English and Dutch were contemporaneous, it is not always clear to which nation the discovery of each portion of coast should be attributed, though it is certain that places discovered and named by the English now have Dutch names on the charts[80].

In 1630 an English crew wintered in Spitsbergen for the first time, in a hut in Bell Sound, and all survived and were taken home in the following summer. In 1634 some Hollanders were left to winter at Smeerenburg but they all died.

The archipelago of Spitsbergen, thus discovered by English and Dutch in the early part of the 17th century, is 250 miles in length, from 76° 35′ N., to 80° 35′ N., with a width of 200 miles. It is a wild region of barren mountains and glaciers, with some splendid scenery. It is fairly well stocked with animal life both on land and in its seas; bears, foxes, hares and birds on land; whales, walrus, seals, and fish in its seas. Other discoveries connected with the Spitsbergen group, especially as regards its internal physiography and geology, were reserved for later times.

CHAPTER XV

EARLY VOYAGES TO HUDSON'S BAY
Knight—Hudson—Button and the North-West Company

Sir Thomas Smith was urgent in his efforts to induce the Directors of the East India Company to take up the question of a northern passage to Cathay, but they were lacking in enthusiasm. At last, in July 1601, the question appeared on the Minutes. It was not until January 1602, however, that the Directors were induced to pass a resolution that "this Company has an express interest in a voyage to discover a north-west passage" and that ships were to be got ready with all expedition.

Two vessels, the *Discovery* and *Godspeed*, were fitted out and provisioned for 16 months. The command was given to Captain Weymouth, who sailed from Ratcliffe on the 2nd May, 1602. But there was a mutiny headed by the Chaplain, a Mr Cartwright[81], and Weymouth was forced to return. At first the Directors resolved to make another attempt, with Weymouth in command of one ship, but most of the Directors were lukewarm, and on January 26th, 1603, it was resolved that the voyage should be given up.

Sir Thomas Smith, in spite of the obstruction of his colleagues, continued to press the Arctic question on their notice, and at last succeeded in obtaining grants in aid. In this way an expedition was fitted out under the command of John Knight, an able and experienced seaman who had commanded the little pinnace *Katten* in the first Danish expedition to Greenland in 1605, and after whom Captain Hall had named the Knight Islands[82]. He now had the *Hopewell* of 40 tons with Edward Gorrell as his mate, and sailed from Gravesend under the auspices of the Muscovy Company on the 18th April, 1606. Leaving the Orkneys on the 12th May, the first ice was sighted on the 3rd June and after a dangerous collision with an iceberg, the *Hopewell* reached the coast of Labrador near the position of Nain in 56° 48′ N. Here Knight's journal ends abruptly on June 26th[83].

It is from another source that we learn the remainder of the story. The *Hopewell* seems to have got as far as the entrance to Hudson's Strait, and was anchored in a bay. Captain Knight, his brother, the mate Gorrell, and three men landed on an island six miles from the ship. They were well armed and carried instruments to make a survey. It was in the forenoon. The boat was to wait for them, with two men, the trumpeter and one Oliver Brunel. The Captain's party walked over a hill and were never seen or heard of again. Presently a crowd of natives came over the hill and tried to seize the boat, but the two men shoved her off. Search was useless, and the survivors were in great distress, for the *Hopewell* had damaged her rudder and had sprung a serious leak. The crew constructed a temporary rudder with the pintles made of iron bands off the Captain's chest. For the leak they took the main bonnet, thrummed it with oakum and passed it over the place. Worn out with watching and hard work, they at length reached Dartmouth in September 1606. This sequel of the sad story was written in the Captain's journal book by Oliver Brunel, one of the boat keepers[84].

Four years elapsed before Sir Thomas Smith could get his colleagues together to enter upon the risk of another expedition. But in 1610, together with his patriotic friends Sir Dudley Digges, Sir James Lancaster, Sir Francis Jones, and Sir John Wolstenholme, he arranged another voyage of discovery. Several noblemen and others also joined in the venture.

That renowned sailor Henry Hudson had returned from the discovery of the river which bears his name, and was at once selected to command the new expedition. His ship was the *Discovery* of 55 tons. Hudson, as the event proved, was unwise in his selection of men to serve in the expedition[85]. He took Juet, a treacherous rascal, as mate, whose character he ought to have known, as he had been in his second and third expeditions. Once more he took his young son Jack, who had just reached the age of 17. Out of a complement of 23 there were not more than half a dozen men who could be depended on, when the time for testing them came. The object of the expedition was to seek a passage by the wide opening pointed out by Davis, where a "furious overfall" is marked on the Molyneux globe.

Sailing from Greenhithe on the 22nd April, 1610, the *Discovery* made a prosperous voyage to Iceland, where there were the first signs of insubordination; Green, who appears to have been a man of thoroughly bad character, having assaulted and beaten the surgeon. Hudson made sail from Iceland and shaped a course direct for the opening indicated by Davis. He then navigated his ship down the strait which bears his name, with little or no obstruction from ice, until the entrance to the great bay was reached—the Mediterranean of America as it has been called—which was ever afterwards to be known as Hudson's Bay. The island on the south side of the entrance was named Digges and it was observed that myriads of birds were breeding there. Hudson's journal unfortunately comes to an end on the 3rd of August, the day the *Discovery* arrived off Cape Digges. The story is continued by Habakuk Prickett, whose narrative, that of an unscrupulous time-server, is open to suspicion, besides being confused and unsatisfactory. During the three months following the arrival off Cape Digges, it is not clear what Hudson was doing, or what course he took.

Hudson must certainly have discovered all the east coast of Hudson's Bay, for in November he found himself obliged to winter in the south-eastern part, now called James Bay. There were fir trees on shore, yielding plenty of fuel, and some game to eke out the stock of provisions on board. The ship was frozen in. A spirit of mutiny and discontent appeared during the long and dreary nights, which was fostered by one or two designing villains. The mate Juet had been disrated for misconduct and the vindictive old man was ripe for mischief. Green was only too glad to join in any mutinous conspiracy, and William Wilson, who had superseded Clements as boatswain, was not behindhand in disloyalty. It is probable that at first the conspiracy was confined to these three. There were privations during the winter, and John Williams, the gunner, fell ill and died. The provisions had run very low, but Hudson hoped to obtain a sufficient supply for the return voyage by salting down birds at Cape Digges. On the 18th of June, 1611, the *Discovery* broke out of winter quarters, and a course was shaped for Hudson's Strait.

Meanwhile the conspirators, who had been joined by three of the seamen, Thomas, Pierce, and Moter, matured their diabolical plan. They thought, or pretended to think, that there would not be enough food to take them to England, and they conceived the infamous scheme of turning the sick and weak adrift in a boat, to reduce the number of mouths. As they knew that Hudson and the few loyal men would not consent to this, they included them among their intended victims. The murderers had kept their secret well, and there was no suspicion of the plot. Prickett must be included among the criminals. He says that Green and Wilson came to his bunk three days after the ship left winter quarters, assuring him that the course they proposed to take was unavoidable. He asserts that he entreated them to desist, but he never gave information to his Captain, and was evidently a time-serving rascal. Being a servant of Sir Dudley Digges the conspirators spared him to tell lies for them on their return.

The day was fixed and the mutineers passed the greater part of the night in whispered talk, arranging details, and going to Mathews the cook and others to gain them over. Staffe, the

carpenter, slept on the poop. In the morning they were on deck, standing at the hatchway, waiting for the Captain to come up. Hudson was entirely without suspicion. He got up as usual, and, stepping on the deck, was seized by Thomas and Bennet Mathews the cook, while W. Wilson tied his hands behind his back. The unfortunate captain struggled and called for help and Staffe the carpenter and two other loyal men ran to his assistance, only to be overpowered by the mutineers, who had got possession of the ship. The shallop, an open boat, was then hauled up alongside. The poor sick men were pulled out of their berths, and forced into the boat, including Mr Woodhouse. Hudson when he saw what was intended, as a last hope called upon Prickett to remonstrate with the mutineers, but the rascal kept in his berth, shamming illness, and said not a word. Staffe, the carpenter, would have been allowed to remain, but he declared that he would rather die with true men than live as the associate of cowards. He got into the boat with his chest. Then young Hudson, who had been his father's companion in all his voyages, was dragged out of his berth and forced into the boat. Arnold Ladley, another good man and true, went into the boat rather than remain with such infamous wretches, giving his candid opinion of them as he went over the side. John King, another loyal man, also got into the boat; Captain Hudson followed. The shallop was cast adrift with nine men crowded into her, one fowling-piece, some powder and shot, an iron pot, and a little meal.

One of the sick alone deserved his fate, a man named Michael Butt. He had readily agreed to the captain and his son being cast adrift, and so thought he was safe. But Mathews the cook declared that his chum, Sylvanus Bond, should not go, so Butt, kicking and struggling, cursing and swearing, was forced into the boat in Bond's place.

The ship stood clear of the ice, and then hove to while the mutineers ransacked the captain's cabin. This aroused a hope in the minds of the forlorn men in the boat that the villains had relented. They pulled with all their might and soon came close to the ship again. But they were doomed to cruel disappointment. As they came alongside, the mainsail was let run, yards braced to the wind, and topsails hoisted. The murderers fled as if from an enemy. Hudson and his doomed companions were never heard of more.

"Hudson's unburied bones for ever sleep
In the dim silence of the caverned deep;
Left on the wide and lonely wave to die
He fix'd in scorn his proudly mournful eye,
Where the light breath of the invisible gale
Seem'd to dissolve the fast-receding sail."

Thirteen remained on board, with different degrees of guilt. Juet, Green, W. Wilson, Moter, Pierce, Thomas and Mathews were criminals of the worst type. Bylot, who was made captain, and Prickett were criminal consenting parties through cowardice. Francis Clements was equally criminal. Bond the cooper, and Edward Wilson the surgeon were less guilty, and the boy Sims was probably not to blame.

On the 29th July, 1611, the *Discovery* hove to off Cape Digges and the five ringleaders went on shore unarmed. They were met by a party of Eskimos. Two were bartering for venison, two were picking sorrel, one was boat-keeper. Suddenly the savages attacked them. All were mortally wounded as they were tumbling into the boat. Green was killed outright; the others lingered for a few days, but all died. Never was retribution so quick, sudden, and complete.

Bylot took charge and there were seven other survivors, Clements, Prickett, Mathews, Bond, E. Wilson, Moter and the boy Sims. They shot about 300 birds off Cape Digges, and put themselves on an allowance of half a bird a day and a little meal; Mathews the cook keeping the birds' bones and frying them in candle-grease. Bylot after clearing Hudson Strait shaped a course for Ireland. The last bird was in the steep tub when they sighted Dursey Island and anchored in Bere Haven. Bylot and Prickett hurried up to London to report. They must have told some uncommonly clever lies, for no proceedings were taken and both were employed again.

Henry Hudson was a great seaman and an enthusiastic discoverer. His two well-conducted voyages in the Spitsbergen quadrant led to most important results and his discovery of the Hudson River was equally memorable in its consequences. In his last fatal voyage he discovered Hudson's Bay. He was a great and a good man, though not quite on the same plane with Davis and Baffin. A younger son of Hudson received employment from the East India Company on the ground that "his father had perished in the service of his country."

Sir Thomas Smith and his colleagues had continued their efforts for the supply of funds for Arctic discovery during the absence of Hudson, and they bore fruit. The promoters sued to be incorporated as a Company to be called "The Governor and Company of the Merchants of London, Discoverers of the North-west Passage." The Common Seal had on one side the royal arms with the Company's title round it, on the other three ostrich feathers, having *Jurat ire per altum* across and *Tibi serviat ultima thule* round them. Sir Thomas Smith was appointed the first Governor. With him were Sir Dudley Digges, Sir Francis Jones, Sir James Lancaster, Sir John Wolstenholme, Sir E. Mansell, Sir W. Cockayne, and Richard Wyche as Directors; Sir A. Dawes, Richard Hakluyt, the Earls of Salisbury, Southampton, Nottingham, and other nobles and a long list of others, were venturers. The date of the Charter was July 26th, 1612. Young Prince Henry of Wales took a deep interest in the undertaking as is shown by the ostrich feathers on the obverse of the seal; and, in consultation with his friend Sir Walter Raleigh, he drafted and signed the instructions for the first voyage. He was our Prince Henry the Navigator[86].

The object of the first voyage of the Company was to follow up the work left incomplete by Hudson. Two vessels were selected, fitted out, and supplied with provisions for 18 months. An officer of tried valour and experience named Thomas Button was entrusted with the command, and the undertaking was under the special patronage of Prince Henry. Thomas Button was the son of Miles Button of Duffryn in Glamorganshire, whose family had been seated there for seven generations. Thomas was born at Duffryn and went to sea in 1592. He was in the West Indies with Captain Newport in 1603, and commanded a king's ship in 1609. Button's ship for the expedition to Hudson's Bay was the *Resolution*, the second ship being the *Discovery* under Captain Ingram. A relation named Gibbons, and a friend named Hawkridge accompanied him, while Bylot and Prickett, whose lies had prevented their cowardly acquiescence in the mutiny against Hudson from being found out, were both on board the *Resolution*.

The expedition reached Cape Digges without encountering any difficulties from ice in Hudson Strait, and remained there three weeks in order to put a pinnace together that had been taken out in pieces. Button then entered Hudson's Bay and proceeded westward, discovering the southern coast of Southampton Island and the off-lying islets, to one of which he gave the name of Mansell Island after his relation Admiral Sir Edward Mansell, to another "Cary's Swan's Nest," to a third "Hopes Checked," because there his expectation of making progress received a check. Bad weather came on, and late in August Button sought refuge in a small creek on the western side of Hudson's Bay, which was named Port Nelson after the master of the *Resolution*, who died and was buried there. Button was thus the discoverer of the western side of Hudson's Bay as Hudson was of the eastern

side. Button determined to winter at Port Nelson, and at once set his people to work to procure as much game as possible. They got in a large supply of ptarmigan, but the winter was very severe and, although they had fresh food, the health of the men suffered from the intense cold. It is interesting to find how important the amusement of the crews and the occupation of their minds during the Arctic winters was considered from the very first. We have seen how Barentsz arranged a Twelfth-night entertainment. Button kept the men's minds employed by requiring them to answer questions respecting the expedition and its objects, and by thus interesting them in the work on which they were engaged.



Sir Thomas Button

In June, 1613, the ice broke up, and the ship left winter quarters and reached Cape Digges. In returning by Hudson Strait it was discovered that the land on which Cape Chidley is situated is an island, and the ships passed through the strait which is thus formed. The expedition returned to England in the autumn of 1613. Button's relation, Captain Gibbons, started on another expedition in 1614, with Bylot as his mate in the *Discovery*. Before he could enter Hudson Strait he was driven by the ice into a bay on the coast of Labrador where he remained for 20 weeks and then returned home. The crew called the bay "Gibbons his Hole."

Button's journal was never published, and we are indebted to Luke Foxe, a later explorer, for all the information that has reached us respecting his voyage. In 1618 he was in command on the coast of Ireland. He was Rear Admiral in the fleet of Sir Edward Mansell, which was sent against the Algerine pirates in 1620, and in 1623 he was again employed in suppressing piracy. He became

Admiral Sir Thomas Button, married Mary, daughter of Sir Walter Rice of Dynevor and, dying in April 1634, left a son who succeeded him at Duffryn.

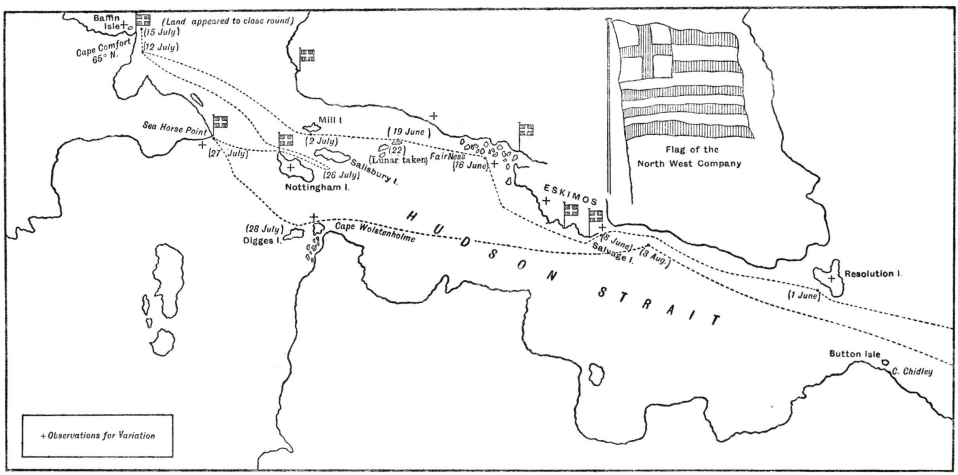
The expedition of Sir Thomas Button to Hudson's Bay was ably conducted, and resulted in considerable additions to geographical knowledge.

CHAPTER XVI

WILLIAM BAFFIN

WHEN Baffin was to the fore, good scientific work was certain to be done. He had shown this in his first polar voyage to Greenland, distinguished by the longitude observation by moon's culmination; he had shown it by his observation for sun's refraction, and by others during his two voyages to Spitsbergen. Now the North West Company was so fortunate as to secure his services.

It is strange that Bylot should have been appointed Master of the *Discovery* in her fourth projected voyage to seek for the passage by Hudson Strait. No doubt he told a plausible story, or Prickett told it for him, yet his character still bore the taint of Hudson's murder. The old seaman had been in three Arctic voyages, and was obliging and friendly when all went well, but there was nothing heroic about him. Baffin, who was only rated as mate and associate of the master, did all the work, directed the courses, took the observations, kept the tabulated log, and wrote the journal. He was on excellent terms with Bylot throughout, and said of him simply that "he was a man well experienced that wayes." The *Discovery*, though only 55 tons, carried a complement of 14 men and two boys.



Baffin's map of Hudson Strait.

Sir John Wolstenholme and Mr Allwyn Cary, the ship's husband, came on board at St Katherine's on the 15th March to see that all was well, give promises of rewards, and wish the explorers God speed. On the 23rd the ship was at the Downs and proceeded down Channel. But they were met by a furious gale and sought shelter at the Scilly Islands and again at Padstow. At last the *Discovery* got away on her voyage, and on the 6th May the land near Cape Farewell was sighted. Two days afterwards the ship was amongst icebergs and Baffin calculated the height of one and found it to be 240 feet. As the coast on the opposite side of Davis Strait was approached the *Discovery's* course was checked by a line of closely-packed ice. The boldest course is usually the wisest, and on this occasion the ship's bows were put straight at the obstacle and she forced her way

into it. For six days the explorers were working their way through the ice and drifting slowly to the south. At last the pack became looser, they got clear, and soon afterwards sighted Resolution Island on the north side of the entrance to Hudson Strait. They anchored on the west side of that island and Baffin landed. On the 18th they were off islands on the north side of the strait, where dogs and Eskimo tents were seen, so they anchored and Baffin again went on shore. In one of the tents he found a leather bag containing little images of men, and one with a woman and child at her back. He took them, and put some useful articles in the tent in exchange, the people having fled. The place was named Salvage Island.

Proceeding westward along the north shore of the Strait, Baffin paid close attention to the tides and currents with a view to ascertain the direction of the passage, if it existed. Sighting Nottingham and Salisbury Islands the *Discovery* came to a small new island which, owing to the noise caused by the grinding of the ice, received the name of Mill Island.

It was on the 22nd June that Baffin took his memorable lunar observation for longitude. "While we were fast enclosed with ice, and the weather fair and clear, I saw both the sun and moon very clear. So I fitted my instruments to take both the almicanter and azimuth of the sun, and also of the moon." He then describes a complete lunar observation. Not having an instrument with which he could measure so large an angle, he resorted to the method of measuring the distance, which was 104°, by the difference of azimuth[87]. The almicanters are small circles parallel to the horizon, and therefore the observed altitudes.

This method of finding the longitude was first suggested by John Werner of Nuremberg in 1514, and again by Gemma Frisius in 1545. But Baffin's observation is the first recorded attempt to take a lunar at sea. Baffin obtained the time of the moon being on the meridian at London from Searle's ephemeris, and at Wittenberg from that of Origanus[88]. He took another observation for longitude by the method previously adopted by him in Cockayne Sound. Sir Edward Parry, when passing up the strait in 1821, was much interested in these very remarkable observations by Baffin. Sir Edward had seen the account in Purchas but not the manuscript, where the result given is still more accurate. As regards the study and practice of nautical astronomy, Baffin was undoubtedly a genius.

Having completed the survey of the north side of the Hudson Strait, the *Discovery* stood over to the eastern coast of Southampton Island, reaching a point which was given the name of Cape Comfort. Here the various signs were again watched for any evidence of a passage by the ice-laden sea to the north-west. Baffin's conclusion that there is no passage by what is now called Frozen Strait was based on the increased quantity of ice, the water becoming less deep, and the sight of land bearing N.E. by E., circumstances which led him to suppose that he was at the entrance of a wide bay. He, therefore, relinquished the enterprise so far as this route was concerned. Sir Edward Parry felt a warm sympathy for the efforts of his distinguished predecessor, and in 1821 he named an island Baffin Island near Cape Comfort, "out of respect to the memory of that able and enterprising navigator." He also named a headland on Southampton Island Cape Bylot, as being probably the westernmost point seen from the *Discovery* in that July of 1615.

On the 29th July the *Discovery* was anchored off Cape Digges, and the men succeeded in killing 70 birds "which are called willocks" (looms), for there are such numbers that "in few places else the like is to be seen."

Nothing remarkable took place during the voyage home, and the *Discovery* arrived safely at Plymouth all well, and without the loss of man or boy. It was a well-conducted expedition, made memorable by Baffin's scientific observations. We have the tabulated log kept by Baffin during the

voyage, his report and journal, and the manuscript chart drawn by himself. Besides numerous observations for latitude and 27 for variation of the compass, he took the first lunar ever observed at sea.

Baffin's report to the Merchant Adventurers was that he considered a passage by way of Hudson Strait to be doubtful, but he was of opinion that there was a passage and that it must be by Davis Strait. Accepting the opinion of so high an authority, the five leading adventurers, Sir Thomas Smith, Sir Dudley Digges, Sir Francis Jones, Sir John Wolstenholme, and Sir James Lancaster patriotically resolved to send an expedition by way of Davis Strait. The *Discovery* was once more got ready, with Mr Allwyn Cary, who had fitted her out for her former voyage, as ship's husband. Old Bylot was again Master and this time Baffin's rating was that of pilot. Seventeen men formed the crew.

On the 26th March, 1616, the little *Discovery* left Gravesend on her fifth polar voyage. She encountered strong westerly gales and sought shelter in Dartmouth for 11 days, and for a day in Plymouth, but at last she got fairly on her voyage. The first land that was sighted was the coast of Greenland at Cockayne Sound, but Baffin did not stop, pressing onwards until he reached Hare Island to the north of Disco in 70° 26′ N. On the last day of April, Hope Sanderson, the furthest point of Davis, was reached, and next day the progress of the *Discovery* was checked by heavy floes. Anchorage was found near some islands whence the native men fled, but some girls were left behind and received help from the explorers, so Baffin gave the name of "Women Islands" to the group. One of the islands is now the Danish station of Upernavik in 72° 48′ N. Kingitok, the most northern station, is in 72° 55′ N.

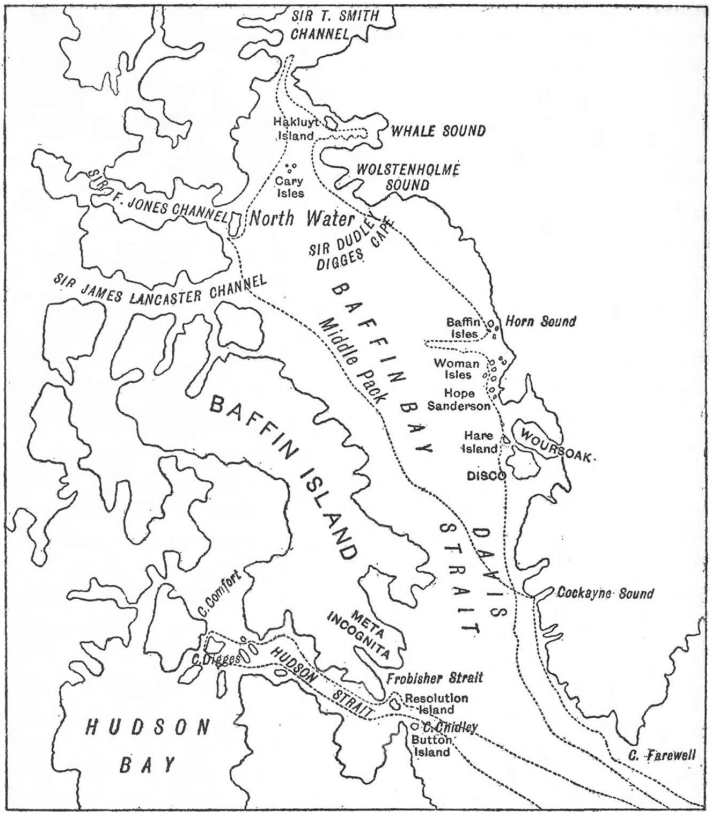
Baffin, knowing nothing of the ice movements, attempted to force his way through the middle pack, a very risky and perilous course to take. As the ship was forced onwards between the floes, they got closer and closer "until we could see no place to put in the ship's head." Then the able navigator wisely stood in towards the shore, and anchored off Cape Shackleton among many islands in 73° 45′. Here Eskimos came in their kayaks to barter, with seal-skins and the horns of narwhals, and the place was accordingly named Horn Sound. They stayed there for six days, making sail again on the 18th of May. Fortunately 1616 was a remarkably open year and the *Discovery* sailed across Melville Bay in two days. Two hundred and thirty-four years afterwards it took the writer forty days.

Baffin was now in the open water to the north of the bay, formed by the drifting of ice to the south. Many narwhals were noticed, and on the 2nd July the ship was off a headland in 76° 35′ N. which received the name of "Sir Dudley Digges his Cape." They then passed a sound with several bays and inlets, and an island forming two entrances, which was named Wolstenholme Sound. Passing onwards a gale began to blow from W. by S. which split their foresail, and when it cleared a little they found themselves embayed in a sound. Standing over to the south-east side, an anchor was let go, but both anchor and cable were lost. The wind blew with such fury that they could find no anchorage, and were obliged to stand off and on. In the afternoon the wind had less force and they stood out. Many whales were seen in the sound, so it received the name of Whale Sound, in 77° 30′ N.

Baffin then anchored off an island he named Hakluyt Island, between Sir Thomas Smith's Sound to the north, and Whale Sound to the south, but it was such bad weather that the boat could not land. Of Sir Thomas Smith's Sound, Baffin says that it runs to the north of 78° and that "it is admirable in one respect because in it is the greater variation of the compass of any part of the known world; for by divers good observations I found it to be above five points, or 56° variation to

the westward." "Also this sound seemeth to be good for the killing of whales, it being the greatest and largest in all the bays."

It was blowing very hard when the *Discovery* left her anchorage off Hakluyt Island, and next day a group of islands was sighted which received the name of Cary Islands, after Mr Allwyn Cary, their ship's husband. Baffin then stood over to the west side, and sighted land at the entrance of a sound which was named "Sir Francis Jones his Sound." A boat was sent on shore, and the crew, on their return, reported that they saw many sea horses, but no signs of people. This was the only landing that was effected in the north part of the bay. On the 12th July the *Discovery* was off another great opening in 74° 20′ N. which was called "Sir James Lancaster's Sound."



Baffin's Discoveries.

Baffin concluded that all the openings were bays. He was right as regards Wolstenholme and Whale Sounds. But those named after Sir Thomas Smith, Sir Francis Jones, and Sir James Lancaster are channels leading to the Polar Ocean, not sounds.

In returning south the *Discovery* had to run through much ice, and Baffin was never able to reach the land on the west side, which he was anxious to do, so as to obtain green food for the sick, for scurvy had attacked them. Richard Wayman, the cook, died on the 26th July, and Master Herbert[89], with two or three others, was very ill. So Baffin stood over to the Greenland side, and reaching Cockayne Sound on the 28th an abundant supply of scurvy grass, sorrel, and orpine was

gathered, while the natives brought salmon peel to barter. The scurvy grass was boiled in beer, and made into salads with sorrel. In a week all were restored to health, and on the 6th August, 1616, they were homeward bound. The Irish coast was sighted on the 25th, and on the 30th the *Discovery* anchored in Dover roads.

Purchas has printed the brief narrative of Baffin, and his very interesting letter to Sir John Wolstenholme in which he says that though there is no passage by Baffin's Bay, voyages might be profitable from the whalebone and oil, the seal-skins, and the walrus and narwhal ivory. In this he was right, and his discovery led to the annual acquisition of wealth for many years.

We only have in Purchas the *Briefe and True Relation* and the letter to Sir John Wolstenholme; but in the *Relation* Baffin says, "all these sounds and islands the map doth truly describe." We are then treated to the following exasperating note by Purchas, "This map of the author, with the tables of his journal" (the tabulated log) "and sailing were somewhat troublesome and too costly to insert." The mischief done by the loss to posterity of these precious documents endured for two centuries. It led to such confusion in the ideas of map-makers that at last the very existence of Baffin's Bay was doubted. On the map of Luke Foxe (1635) it is shown correctly[90]. But Hondius published a version quite different from the reality, and others followed him. In Moll's Atlas (1720) both the correct delineation of Luke Foxe and the very erroneous one of Hondius and his imitators are given. Van Keulen and D'Anville caused still greater confusion. In the Maltebrun atlas (1812) there is a slight improvement. Daines Barrington gives what he calls "a circumpolar map according to the latest discoveries." He treats Baffin's Bay as a semicircular dotted line with "*Baffin's Bay according to the relation of W. Baffin in 1616 but not now believed*" written across it. Finally in Sir John Barrow's *Chronological History of the Voyages to the Arctic Regions* (1818) Baffin's Bay is entirely expunged, Davis Strait being made to open northwards on a blank space. Thus, owing to the omission of the map and log by Purchas, the great discovery of Baffin became at length entirely ignored and discredited.

Baffin, on his return from his great discovery in 1616, had made five voyages to the Arctic regions. The fjords and islets of west Greenland, the glaciers and ice floes of Spitsbergen, the tidal phenomena of Hudson Strait, and the secrets of the far northern bay which he unveiled, were all familiar to him. He had practically investigated, and deeply pondered over the absorbing questions of polar discovery. As an astronomical observer and navigator his unwearied diligence was as remarkable as his talent. If he was an untaught man who had risen from a humble origin, he had so far educated himself as to be able to write letters which are not only well expressed, but graced with classical allusions.

Baffin, who was probably past middle age when he returned from his great discovery, then entered the service of the East India Company, being rated as Master's Mate, under Captain Shilling, on board the *Anne Royal*, one of the fleet which was got ready in the winter of 1616. His most important service during the voyage 1617–1619 was the survey of parts of the Red Sea and the Persian Gulf. There is the following entry in the Court's minutes on the 1st October, 1619, "William Baffin, a master's mate in the *Anne*, to have a gratuity for his pains and good art in drawing out certain plots of the coast of Persia and the Red Sea which are judged to have been very well and artificially performed."

In the following year Captain Shilling was selected to command the Company's fleet. He was on board the *London*, and, at his special recommendation, Baffin was appointed Master. The Company's fleet encountered the Portuguese off Jáshak, near the entrance of the Persian Gulf in December 1620, and the fight continued without intermission for nine hours. The Portuguese ships then anchored to repair damages. The English, after raking them, put into Jáshak Roads on the coast

of Mekran. A second and more decisive encounter took place on the 28th December, when the Portuguese were defeated, but the victory was dearly bought by the death of Captain Shilling, who was interred at Jáshak on the 9th January 1621.

Captain Baffin remained in command of the *London*, and the fleet returned to Surat. The English then made a treaty with Abbas the Great, Shah of Persia, to drive the Portuguese out of Ormuz, a Persian port which they had occupied since 1515. The English fleet, consisting of five ships, arrived at an open roadstead on the Persian coast near Ormuz, where news was received that the Portuguese had erected a fort on the island of Kishm to protect some wells. It was necessary to take it before investing Ormuz. The Kishm fort was already beleagured by a Persian army, and the English fleet arrived there on the 20th January, 1622.

After two days, Captain Baffin went on shore with his mathematical instruments, to take the height and distance of the castle wall so as to find the range "for the better levelling of his guns." But while he was so engaged he was hit by a shot from the fort, and killed on the spot[91].

Baffin's geographical discoveries were extensive and his scientific observations were not only valuable at the time but were of permanent use. Without his numerous magnetic observations Professor Hansteen could not have constructed his first magnetic chart. Baffin's devoted zeal and untiring industry, his genius as an inventive observer, his gallantry and intrepidity, and his great services have secured for him a permanent and an honourable place among the naval worthies of the Elizabethan era, side by side with Frobisher and Davis.

CHAPTER XVII

JENS ERIKSEN MUNK. FOXE AND JAMES. WOOD

Sir John Wolstenholme was one of the most persistent of the Merchant Adventurers and, after Baffin's return, he fitted out a ship in 1619 for John Hawkridge, the friend of Button who had accompanied him on his voyage. But Hawkridge never got beyond the entrance to Hudson Strait.

The sailor King of Denmark then resolved to have a turn at the North-west Passage and appointed Jens Eriksen Munk to command an expedition.

The early adventures of this gallant Danish seaman are not without interest. His father had an estate at Barbo near Arendal in Norway, but the boy Jens was brought up by an aunt at Aalborg in Jutland from the time that he was nine years old. Three years later, in 1591, he was sent in charge of a Friesland skipper to England, and thence to Oporto to learn the language, in the employment of a Portuguese named Duarte Duez. Duez sent the boy at the age of 13 to his brother Miguel Duez at Bahia in Brazil. On his arrival young Munk found that Miguel Duez was gone, so the boy went on a returning ship to go home. The ship was attacked by a French privateer and sunk, only seven of the crew being saved, including the Danish boy. He was landed at Bahia destitute, and became a shoemaker's apprentice for eleven, and a portrait painter's boy for six months. At last Miguel Duez came back, and young Munk was with him for three years. In 1598 two Dutch vessels arrived, and the Spaniards on shore formed a plot to seize them. They were saved by the youthful Dane. Getting wind of the treachery, he swam off to the ships in the night, and warned them just in time. The Dutchmen were grateful, and enabled their saviour to return to Copenhagen. In 1601, Munk entered the service of a merchant named Hendrik Rommel, and made voyages to the Baltic ports and to Spain. He became a Captain in 1605 and made a voyage on his own account to Iceland for a cargo of sulphur, then to Archangel and Kolguev Island, where he was wrecked. In 1610 he made a voyage to Novaya Zemlya. In 1611 he received a commission as Captain in the Danish Royal Navy, and was in a naval action with the Swedes, but peace was signed in 1613. Next he accompanied Jacob Ulfeldt in an embassy to Spain, and in 1616 we find him at St Jean de Luz engaging Basques for the whale fishery.

Christian IV could not have found a better man to command his Arctic expedition than Jens Eriksen Munk, then aged 40. He was to lead two exploring ships, the *Eenhiörningen* (Unicorn) and *Lamprenen* (Lamprey), sailing from Copenhagen on the 9th May, 1619. When Munk sighted Cape Farewell he humorously remarked that he who gave it the name never wished to see it again. The two exploring vessels had to make their way through much ice before they could enter Hudson Strait. Crossing Hudson's Bay Munk decided upon wintering on the west side, at a place now called Port Churchill, where they anchored in September, and moored with six hawsers on the 28th during a terrible snow-storm.

Captain Munk did his best for the health of his people. He sent them out to gather whortleberries and crowberries, and to shoot ptarmigan, and also procured white whale flesh. There was weekly divine service and Holy Communion, and exercise for the men, who were sent out on ski. But the dreaded scurvy appeared very early. The first death was on December 13th, the surgeon of the *Lamprey*. There was a solemn service on Christmas Day, but the chaplain, Rasmus Jensen, took to his bed a few days afterwards and died in February. Those who were strong enough were

sent to gather berries for the sick. Day after day more and more were prostrated. Men were dying almost every day. At the end of March, Munk wrote, "commenced my greatest sorrow and misery, attending all day to the sick. I was then like a wild and lonely bird." On the 1st of April his own young nephew, Erik Munk, died, then his Lieutenant, Morits Stygge, then the mate, a young Englishman named John Watson. Munk had baths prepared for the survivors, and on April 20th he shot three ptarmigan. Still there were deaths daily. Those smitten with the scurvy suffered great pains in the loins, the body turning blue and brown, and becoming powerless, the mouth in a miserable condition, with all the teeth loose. Captain Munk was at last too weak to bury the dead. Only three besides himself were left in June. He wrote a note asking anyone that came to bury him. He and the other survivors crawled about on shore, seeking for any green thing. Towards the end of June they caught some fish, and got some every day. They began to gain strength, and in the middle of July they were strong enough to get the little *Lamprey* ready for sea, leaving the larger vessel, and the four survivors at length sailed, arriving at Bergen on the 25th September, 1620.

After this appalling experience Munk needed some rest. His ability, however, was well known to the King and he was later much employed. During the early part of the Thirty Years War he was in command in the Weser. He became an Admiral, and died in 1628[92].

After Munk's disastrous voyage there was a pause for a dozen years, and then Luke Foxe, with his diligent research, whole-hearted enthusiasm, and quaint humour engages our attention.

Foxe was a Yorkshireman and almost certainly from Hull. He tells us that he was sea bred from a boy and had been in voyages to the Baltic and the Mediterranean. He had evidently received a good education and was well read. He had an excellent opinion of himself, and was very young when he applied to Captain Knight to take him as his mate. He was reminded of his youth and he afterwards admitted that he had been rather presumptuous. Foxe was much with John Tappe, a bookseller with a shop on Tower Hill, who published the *Maryner's Book*, and a translation of the *Arte de Navegar* by Martin Cortes. This friend enabled him to study Arctic history. Foxe also had the great advantage of securing the friendship of Henry Briggs, the famous mathematician, Professor of Astronomy at Oxford, who introduced the practical use of logarithms. When Foxe resolved to get command of an Arctic expedition, it was through Briggs that he obtained the patronage of Sir Thomas Roe, the ambassador, who had returned from India.

In 1631, with the help of the Trinity House, Luke Foxe, full of intense eagerness, secured his heart's desire. He was allowed to have H.M.S. *Charles*, an old gunboat of 70 or 80 tons, which had seen much service, and had been ordered to be sold. The Master, whose name is never given, and the mate Yourin or Hurin, were not of his choosing, having been appointed by the Trinity House. Of the Master, Foxe says he was "the most arrogant bull calf that ever went or came as Master and the most faint-heartedest man." The crew consisted of 20 men and 3 boys, and the ship was provisioned for 18 months. Foxe was against the use of tobacco as "a thing good for nothing," but all the men smoked.

The *Charles* sailed from Deptford on the 5th of May, 1631, going north about, instead of down channel.

Another expedition had sailed from Bristol nearly at the same time and with the same object, under the command of Captain James. He sighted Greenland encompassed about with ice, and worked continually to keep clear of it. Passing down Hudson Strait and between Nottingham Island and Cape Digges, Captain James, as we shall see, met the *Charles* in Hudson's Bay on the 29th August.

Foxe first came to Lumley Inlet on the west coast of Davis Strait, really Frobisher Strait, which Davis did not realise. Davis named it after Lord Lumley who had "built the pier of that distressful poor fisher town Hartlepool at a cost of £2000, and was a great favourer of Davis." In Hudson Strait the progress of the *Charles* was much impeded by ice from the 23rd June to the 4th July. Foxe describes the ice and also mentions the use of log and line for registering the ship's run[93].



Captain Thomas James.

In the middle of July Foxe tried to sail between Nottingham and Salisbury Islands, but he was stopped by the ice in his attempt to go to the north-west, as others had been before him. He therefore turned to the south and made his way along the south coast of Southampton Island, sighting Mansel Island and Cary's Swan's Nest, named by Button. Foxe then discovered the wide opening between the west side of Southampton Island and the main land, without finding the narrow strait at the northern end. Supposing it to be a deep bay, he named it after his patron, "Sir Thomas Roe's Welcome." An island was named "Briggs his Mathematics" on the 31st July, after the great mathematician to whom we owe the use of logarithms, who had died a few months before Foxe sailed on his voyage of discovery. Our explorer then visited the winter quarters of Button and Munk, finding the remains of their ships, but, convinced that there was no passage on the west side of Hudson's Bay, he resolved to return to the east side of Southampton Island and make another attempt by the north-west.

In crossing Hudson's Bay the *Charles* came in sight of another vessel, which proved to be the *Henrietta Maria*, commanded by Captain James. The two exploring ships stopped to communicate

and Captain James entertained Captain Foxe at dinner, the ships then proceeding on their respective ways on the 1st September. Captain James wintered at Charlton Island in the extreme south-east angle of Hudson's Bay. The party underwent the most terrible suffering, but the ship arrived safely in England in the autumn of 1632[94].

On the 7th September the *Charles* was off the south point of Southampton Island. Much hampered by ice Foxe reached Mill Island of Baffin, and then stood over to the north main land at a point he called King's Cape. He was now in the locality where Baffin turned back, judging from the indications that there was only a large bay ahead. All beyond would, therefore, be new discovery. He had reached what we now know as Fox Channel. Sailing onwards, he passed two promontories, 20 leagues apart, which he named Lord Weston's Portland and Cape Dorchester; then, on the 22nd, in 66° 47′ N., he reached his furthest point, which he rather pompously called "*North-West Foxe his furthest*." He was on his way to a north-west passage or rather to one lane by which the two oceans unite, for it could never be a passage. The discovery was completed in after years by Parry, Ross, Rae, and M'Clintock.



Part of Foxe's Map, 1635.

Foxe had found his master and mate to be nuisances and hindrances throughout the voyage, and the former was very pusillanimous. Now his difficulties were much increased by the spread of

sickness among the crew. His decision to return without risking a winter was no doubt right. He took all possible means at his disposal for the good of the sick, and established a dietary of four beef days in the week. Passing Cape Chidley on the 15th, the *Charles* arrived off the Downs on the 31st October, 1631, "not having lost one man nor boy, nor any manner of tackling."

The account of his voyage published by Luke Foxe is a remarkable book in several respects. It is the first attempt to give a history of all the Arctic voyages which preceded his own, from the account of Othere's voyage given by King Alfred down to his own time. It contains the only narrative that has been preserved of the voyage of Button. His own story is that of a well-conducted and, on the whole, successful expedition. Above all, "North-West Foxe," as he calls himself, has given us the quaintest and most amusing narrative in the whole range of Polar literature, which is fairly voluminous. His too obvious self-conceit and very high estimation of the merits of North-West Foxe himself may well be forgiven for the sake of his quaint remarks and the amusing style of his writing. Foxe's book is an acquisition to Arctic literature.

One more rather unimportant expedition closes the first period of Arctic endeavour. John Wood was a Master's mate in the *Sweepstakes* under Sir John Narborough when a voyage was undertaken through Magellan's Strait to Chile in 1669. He gave want of employment and aversion to an idle life as reasons for submitting a plan to Government for discovering the north-east passage. The plan met with the approval of Samuel Pepys, the Secretary to the Admiralty, and Wood received the command of the *Speedwell*, with the *Prosperous* pink as a tender. The *Speedwell* also had the eminent hydrographer Grenville Collins on board. The expedition sailed on the 28th May, 1676; the polar pack between the North Cape and Novaya Zemlya was reached on the 22nd June, and Novaya Zemlya was sighted on the 26th. But there was no one on board with any experience of ice navigation; the *Speedwell* grounded on the 29th and became a wreck. Fortune, however, favoured the crew. There was no loss of life, and all the members of the expedition returned home in the pink, arriving in the Thames on the 24th August.

The civil war and the unsettled state of the country gave pause to Arctic work until the 18th century, but this "Elizabethan era" of polar discovery as it may comprehensively be termed, forms a truly magnificent record. Novaya Zemlya and the two straits on either side of the Waigat discovered, the greater part of the Spitsbergen shores delineated, portions of the eastern side of Greenland sighted, the whole west coast of Greenland from Cape Farewell to Smith Sound discovered or re-discovered, the whole western side of Baffin's Bay and Davis Strait traced, Hudson Strait, Hudson's Bay, and Fox Channel discovered, and this mostly in frail little vessels of from 10 to 100 tons, with few appliances, no comforts, instruments most difficult to work with any accuracy, and very limited means. But the Elizabethan heroes had fortitude, indomitable energy, and the strongest sense of duty, and were influenced by that loyalty and patriotism without which no country can remain great. *Virtute non armis fido* was their motto. The splendour and magnitude of their achievements remains unsurpassed.

CHAPTER XVIII

HANS EGEDE AND DANISH GREENLAND

In the beginning of the 18th century there was living at Vogen, in the diocese of Trondhjem in Norway, a priest named Hans Egede, who for some years had been engaged solely in his parochial duties. In about 1708, when his age was 26, he became deeply impressed with the story of the abandonment of the Greenland colony. The fact that Christians had formerly lived in Greenland, that they had been abandoned to their fate, and that the world had heard of them no more, preyed upon his mind. He felt that it was the duty of every Norwegian to help in the search for them. If no one else had that feeling he, a poor parish priest, would do so single-handed. He was torn by conflicting duties to his parish, and to his wife and children, but his Greenland duty seemed the most urgent. This inward impulse was the strongest, and in 1710 he addressed a petition on the subject to his Bishop. The reply commended the project, but dwelt on the almost insuperable difficulties.

Hans Egede was looked upon as a fanatic, as a knight errant. At first no one would listen to him. He went to Bergen to try and get support, but none could be obtained, though some were touched by his zeal. One great comfort was that after a time his wife embraced the idea and became as enthusiastic as her husband. At last, in 1718, he determined to go to Copenhagen and appeal to his King. Frederick IV admired the good priest's devotion to a noble cause, encouraged him in his efforts, and used the royal influence for raising funds. At last a sum of £2000 was got together, while the King gave £40 towards the equipment of a vessel and granted a salary of £60 a year to Egede.

A vessel called the *Hope* was bought, and the adventurous priest embarked with the crew and his wife and four little children, a party altogether of forty souls. The 2nd May, 1721, was the memorable day when the *Hope* sailed from Bergen, and the history of modern Danish Greenland was commenced.

Though ice was found blocking up the approaches to the Greenland coast, a lane of water was seen apparently leading to the land, and the little vessel was steered into it. But the ice closed, and she was beset, a dense fog being followed by a strong gale, and for some time the adventurers were in danger. The gale had the effect of clearing away the ice, so that at last the *Hope* was brought safely into Gilbert Sound of Davis. Hans Egede called it Bell's River. He appears to have been ignorant of the details of Davis's voyages, but he must have known the expedition of Hall, who named one of the branches of the fjord Bell's river, after Mr Richard Bell, and the other after Sir James Lancaster. Hans Egede set up the house he had brought out in pieces on an island in Gilbert Sound, the native name of which was Kenget, renamed by him Haabetsö or Hope Island. At first the Eskimos were very friendly and Egede at once began to learn the language. But neither he nor his people were at all efficient in hunting and fishing, and they could only occasionally get food from the natives. The consequence was that scurvy broke out, and most of his people returned in the *Hope* when the navigable season arrived. But in 1723 two ships arrived with provisions and the good news that the King had imposed a Greenland assessment for the support of the colony.

It was found that the Dutch had long frequented Davis Strait for the whale fishery. Several ships arrived every year and they made use of two or three harbours, but had no permanent

settlement.

In the second year after his arrival Hans Egede undertook a boat voyage in search of the lost Greenland colony. The distance was great from Gilbert Sound to Cape Farewell, and then round to the east side of Greenland, for the general belief then was that the "East Bygd" of the Norsemen was on the east coast. On Egede's map Frobisher's Strait was shown to pass through Greenland, instead of on the other side of Davis Strait, and he naturally relied upon being able to make a short cut to the east coast by passing through it. This was the last time that anyone was misled by the errors of Niccolo Zeno's chart. For the first land of Frobisher was supposed to be the Friesland of Zeno, in which case the second land would be Greenland. In reality the first land was Greenland, and the second land of Frobisher was the other side of Davis Strait.

Hans Egede proceeded along the coast to the southward, examining the principal fjords, discovering the ruins of the church at Kakortak[95] and other vestiges of the Norsemen, little thinking that all the time he was in the "East Bygd," which he supposed to be on the other side of Greenland. He looked out anxiously for Frobisher's Strait, which of course he never found, and went almost as far as Cape Farewell. The lateness of the season at last obliged him to return.

Hans Egede then devoted all his energies to the instruction and conversion of the Eskimos, who were scattered in small bodies along the coast. He carefully sought out any words in their language that resembled those of the Norsemen[96]. Probably he thought that these Greenlanders had Norse blood in their veins, that in fact they represented all that remained of the lost colony. The Danish Government came to the conclusion that Greenland might be a valuable acquisition and there was still a desire to reach the east coast where the East Bygd of the Norsemen was supposed to be. In 1728 Major Paar arrived as Governor with five ships, one of them a man-of-war, bringing materials for a fort and a garrison, as well as horses for crossing to the East Bygd, so little was the inland ice then understood. Major Paar removed the settlement from Kenget Island to the mainland, on the south side of Gilbert Sound, where it received the name of Godthaab, and is now the capital of Danish Greenland. Unfortunately a form of scurvy broke out and the people died off rapidly, the mortality continuing until the spring of 1729, when the survivors were sent home, and this first attempt at a colony came to an end, leaving Hans Egede almost in despair. His eldest son Paul was sent to Copenhagen to complete his education.

Governor Paar made an attempt to comply with his instructions about the east coast. On April 25th, 1729, he set out with a party of seven men to explore the Amaralik Fjord, but found it impossible to make any progress on the inland ice, and returned on the 7th of May. On the map in the English translation of the book by Hans Egede there is a strait passing right across Greenland from Disco Bay with the following legend:—"*It is said that these streights were formerly passable but now they are shoot up with ice.*" All the names from Ivar Bardsen are scattered along the east side of Greenland in this map of 1740.

The attempt to form a colony had a very injurious result for the mission, as it made most of the natives move northwards to Disco Bay.

The death of King Frederick IV, who had steadily supported Egede and the Greenland enterprise, seemed to be a mortal blow. The Government of his successor, Christian VI, saw no probability of any commercial advantage, and considered that the ten years of missionary efforts had produced little or no result. An order was therefore issued that the colony was to be given up, Hans Egede being given the option either to return with the rest or to remain. He resolved to stay, ten sailors volunteering to stand by him, and after much importunity, a year's provisions were left with him. His youngest son Nils was now old enough to assist his father, and undertook the

commercial part of the work, going about to collect blubber and other products, and striving, when possible, to take the part of a catechist. But privations and anxieties were telling upon Egede. A feeling of despondency was beginning to weigh him down, and he was only encouraged to perseverance by the heroic constancy of his wife.

At last hope was revived. In May, 1733, a ship arrived with the news that the Greenland trade was to be continued, and that the King would make an annual grant of £400 a year to the mission. In the same ship three Moravian missionaries arrived who formed a station which they called "New Herrnhuth," a few miles from Godthaab, and worked in harmony with the Danish missionaries[97]. But progress was still further delayed by an appalling calamity. An Eskimo boy who had been at Copenhagen brought back the smallpox. It spread like wildfire, and threatened to wipe out the whole Eskimo race. The sufferings were terrible and several thousands died.

Hans Egede's eldest son Paul had returned, and gave lessons in the Eskimo language, of which he was a master, having learnt it from childhood, to the Moravian missionaries. He afterwards had charge of the mission station of Christianshaab in Disco Bay until 1740. The devoted wife of Hans Egede died in December 1735, a true Christian heroine, full of zeal for the conversion of the natives and of helpful care for their welfare. With the loss of his brave wife Hans Egede felt that his work was at an end and sailed with his daughters and his youngest son on the 9th August, arriving at Copenhagen on the 24th September, 1736. His wife's remains were taken with him, and interred in St Nicholas churchyard.

Hans Egede had made a beginning. He had sown the good seed. He left four missionaries and two catechists in Greenland, twenty or thirty adult converts, and about a hundred baptized children. He had formed rather a high opinion of the Eskimo character after an experience extending over 15 years. He looked upon the Greenlanders as even-tempered and good-natured, of orderly behaviour and hating every kind of strife. There was no thieving among themselves, though foreigners were considered fair game. They were hospitable, and every one was content with his own state and condition.

On the arrival of Hans Egede at Copenhagen he had an audience of the King, who appointed him Superintendent of the Greenland Mission, with a salary of £100 a year. He passed the last years of his life in retirement with his daughters on the island of Falster, where he died, in his 73rd year, on the 5th November, 1758[98].

The Danish Government took both the Greenland Mission and the trade under royal protection. For it began to be understood that there was wealth in the products of Greenland, in the whalebone and oil, the skins of seals, deer, and foxes, the walrus and narwhal ivory, and the eider-down. There were to be royal factors and storehouses, side by side with missionaries and churches. Stations were to be formed at intervals along the coast, to be visited annually by ships which were to receive the products collected by the factors during the year. The larger stations consisted of the factor's house, storehouse, and smithy, the mission house and church, and the native huts.

The most southern station, Frederikshaab, was formed in 1742 by Jacob Severin, a merchant of Jutland. About 40 miles to the north of this station is the famous *Eis blink*, a great ice mass whose "glance" or "blink" in the sky is seen for many leagues out at sea. It forms a vast ice bridge over the fjord, two leagues across and eight leagues long and the ebb tides take quantities of ice out to sea, under the bridge. Further north is the bay which Hans Egede called Fischer's Fjord, in lat. 63° N. Here a station was formed in 1754, and, four years later, on the same island, the Moravians settled their second mission, which they called Lichtenfels. These were the only stations south of Godthaab in the early days.

To the north, the station of Sukkertoppen was founded in 1755, and in 1759 Holsteinborg was established, and named after Count Holstein, President of the Missions College. The first factor was Nils Egede, younger son of the great missionary. Holsteinborg is well placed in an excellent harbour with the numerous Knight Islands in the offing. Fifty miles further north is the station of Egedesminde which was founded by Nils Egede in 1759, who gave it that name in memory of his father. In Disco Bay a settlement was formed by order of Jacob Severin as early as 1734 and named Christianshaab. Paul Egede was the first missionary there[99]. Claushavn was established further north in 1752. The shores and islands of Disco Bay were, at that time, the most populous part of Greenland. Another station was founded there in 1741, which was named Jacobshavn in memory of the Director of trade, Jacob Severin. In the south entrance of the Waigat the station of Rittenbenk was founded in 1755, and at the other end that of Noursoak in 1758. In those days nothing was known further north, but these 12 stations had factors, and were annually visited by ships to receive the year's collection of blubber and skins. Some 20 years later, in 1774, the station of Julianshaab was founded in the far south.

Danish Greenland has since continued on much the same lines. The Royal Trade Monopoly was established by a statute in 1774, and the system of collecting the products along the coast commenced. There are 176 inhabited places scattered over 1000 miles of coast, and 60 trading stations where the products are collected and sent to the chief stations. Besides the yield of the cryolite mine these products consist of oil, the skins of seal, reindeer, fox and bear, eider-down, feathers, whalebone, narwhal horns, walrus tusks, and dried cod; the net revenue being about £6600 a year, not including the cryolite royalty.

The Danish Mission is also a government institution, there being eight missionaries with small salaries, besides catechists, not counting the Moravian missionaries with four stations.

CHAPTER XIX

THE HUDSON'S BAY COMPANY. HEARNE AND MACKENZIE, COOK AND PHIPPS

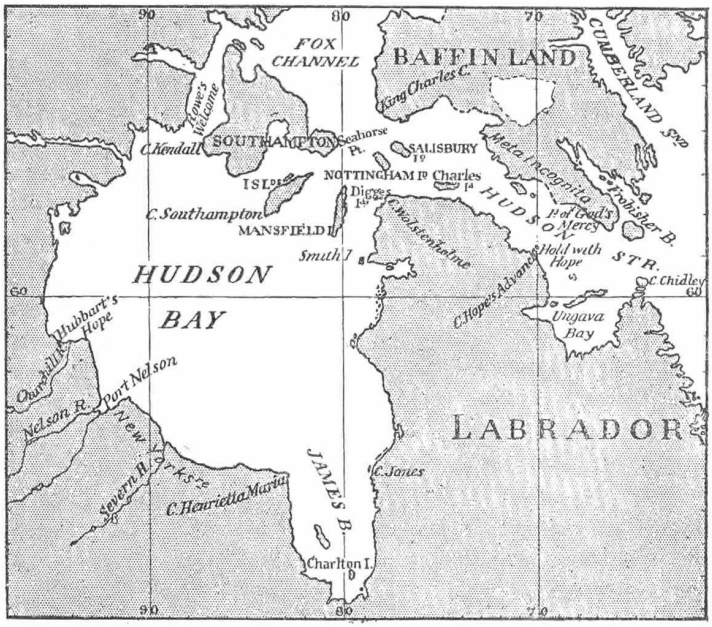
We have seen how quickly a lucrative trade and remunerative returns followed on the heels of Arctic discoveries. It was so in the Spitsbergen seas, it was so in Greenland and Davis Strait, and now we shall see that it was so in Hudson's Bay. The Hudson's Bay Company, under the auspices of Prince Rupert, was founded in 1668, and an expedition was sent out, consisting of the ship *Nonsuch*, under the command of Captain Zachariah Gillam. That officer wintered with his crew in Rupert's river and established a station called Fort Charles. A charter was granted by which the sole right to trade in Hudson's Bay and Strait was given to the Company, with territorial rights and jurisdiction. Stations were formed and a trade in furs was established with the Indians, who received European goods in exchange.

Discovery was not altogether neglected, although nothing was thought of but trade during the first 50 years. In 1720 a sloop was sent on a voyage of discovery under two officers named Knight and Barlow, but they were never heard of more. A Captain Scroggs was sent in search, but without result. Again in 1737 a sloop and shallop were despatched by the Company, also without result.

In 1741 a Mr Arthur Dobbs became the chief projector of an expedition to discover a north-west passage by Hudson's Bay. The Admiralty gave assistance, and Captain Christopher Middleton received the command of an old bomb vessel called the *Furnace*, with a pink called the *Discovery*, under Captain William Moore, as a consort. Arriving late in the season of 1741, Captain Middleton resolved to winter in the Churchill river, housing his men in an old fort. In February, 1742, scurvy broke out. The only efficacious treatment was not then understood, and Captain Middleton's panacea was plenty of rum with sugar to make punch. There were some deaths in March but not enough to hinder the expedition, and in July 1742 the voyage was resumed, the plan being to explore the great opening called by Luke Foxe "Sir Thomas Roe his Welcome," and to seek a passage by that route. The cape on the western side of the sound in 65° 10′ N. Middleton named Cape Dobbs. Proceeding up the Welcome he discovered an opening which at first seemed likely to lead to the desired passage, but it turned out to be the estuary of a river which was named the Wager River, after Sir Charles Wager, then First Lord of the Admiralty. A point of land was named Cape Hope, because hopes of a passage were revived on rounding it and further north another opening to the west was seen, but it could not be explored owing to the ice and the state of the weather. It received the name of Repulse Bay. Then Frozen Strait was discovered at the head of the Welcome and, on climbing a high hill, Middleton saw that the coast trended south-east to the Cape Comfort of Baffin, thus proving the insularity of Southampton Island. The expedition then shaped a course down Hudson Strait, arriving in the Thames in October 1742.

Middleton had done his work well, and had made some important discoveries. But he was subjected to an unjustifiable attack[100] from Mr Dobbs, the projector, who accused the explorer of stating that the Wager River was only a river when he knew it to be a strait. Dobbs had sufficient influence to enable him to raise funds for a second expedition. Two vessels, the *Dobbs* and the *California*, were fitted out and despatched under the command of Captain Moore, who fully confirmed Middleton's report. Mr Ellis wrote the history of this voyage, and pointed to Chesterfield

Inlet as a possible passage. Accordingly Captain Christopher was sent to settle the question in the sloop *Churchill* in 1761, and again with Captain Norton in 1762, when the survey of Chesterfield Inlet was completed.



Hudson Bay.

The next expedition of the servants of the Hudson's Bay Company was by land, and was conducted by Samuel Hearne, who had been a naval officer. Through the Indians who traded with the Company's factories rumours were received of a tribe which possessed copper mines on a river which emptied itself into a northern sea, and the Governor of Fort Prince of Wales on the Churchill river resolved to despatch an expedition to ascertain the truth of these rumours.

Hearne made two false starts. In the first journey he was robbed by Indians, in the second, when some months on the way, he had to return owing to an accident to his great Cotton's quadrant. At last he set out in December, 1770, under the guidance of a remarkable Indian chief, named Matonabi, and without any European companion. This guide was the son of a northern Indian by a slave woman. His father had died, and the boy was adopted and brought up by the Governor of Fort Prince of Wales, who employed him as a hunter. He was a fine man, of nearly six feet, and possessed of many good moral qualities. He had been on an embassy to a powerful tribe, establishing peace and trade, and had also visited the Coppermine river. It was indeed owing to his report that the expedition was undertaken. Matonabi's influence was so great that he was made Chief of the northern Indians, and caused great quantities of furs to be brought to the Churchill factory.

The method of travelling was for each man to drag his own little sledge. These one-man sledges were 8 to 9 feet long by 12 to 14 inches wide, made of boards a quarter of an inch thick sewn together with thongs of deer-skin, with wooden cross-bars on the upper side. The fore part was turned up so as to form a semicircle, to prevent the sledge from diving into soft snow. The trace was

a strip of leather with a loop across the shoulders. The snow-shoes were 4½ feet long by 13 inches broad.

The country crossed by Hearne and Matonabi, accompanied by a large party of Indians with their wives and children, was fairly well supplied with game. In May, 1771, a lake was reached where they began to build canoes and were joined by more Indians, eager to rob and massacre the Eskimos.

The women and children were left behind, and the party of Indians, in company with Hearne and Matonabi, entered the Arctic regions, and began the descent of the Coppermine River on July 14th, 1771. Then five Eskimo tents came in sight on the left bank. The Indians put on their war-paint, formed an ambuscade, and approached stealthily. The wretched Eskimos were completely taken by surprise, and Hearne was an unwilling witness of a horrible massacre. One young girl clung to Hearne's legs, writhing in agony while the Indians drove their spears into her.

Hearne continued his voyage down the Coppermine River with his bloodthirsty companions, until he reached the mouth on July 18th, 1771. He found that it was full of islets and shoals, with many seals on the ice outside. For 30 miles there had been nothing but barren hills and marshes. Above that distance there were stunted pines and dwarf willows on the river banks. In returning, he visited one of the surface copper mines. He gives an interesting account of the musk oxen, deer, wild geese, salmon, and other sources of food-supply, and of the building habits of beavers, and describes the Eskimo weapons and mode of life.



Alexander Mackenzie

On June 29th, 1772, Hearne returned to Fort Prince of Wales, and was soon afterwards rewarded by being made Governor. But in 1782 a French Expedition under La Pérouse destroyed the fort, carrying off Hearne and the other Company's servants as prisoners. Hearne was several years a prisoner of war, and only returned to London to die. This disaster so affected the faithful Matonabi that he committed suicide.

It was 18 years after Hearne's discovery of the mouth of the Coppermine that a young man named Alexander Mackenzie undertook to trace the course of another river, flowing north from the Great Slave Lake. This explorer was not one of the Hudson's Bay Company's servants, but at an early period of life he had been led, with commercial views, to the vast region north-west of Lake Superior. His voyage down the river which received his name was undertaken in six canoes, chiefly manned by French Canadians. Starting in June, 1789, he reached the numerous channels which form the estuary of the Mackenzie river on July 13th, and thus was the second European to reach the American polar ocean. The river journey was over 1000 miles in length. Mackenzie was knighted in recognition of the value of his discovery.

It was in a year between the dates of the two river mouth discoveries that Captain Cook, during his third voyage, made his researches in the Arctic Sea between the two continents of Asia and America. The *Resolution* under the command of the great navigator himself, and the *Discovery* under Captain Clerke, were commissioned in 1776, but it was not until August, 1778, that they crossed the Arctic Circle. The first Lieutenant of the *Discovery* was James Burney, so well known to geographers as the historian of voyages in the Pacific, and the writer of an interesting account of Cook's Arctic discoveries.

The Sandwich Islands had been discovered on January 18th, 1778, and on August 4th the *Resolution* and *Discovery* anchored off Sledge Island in 64° 30′ N. The westernmost extremity of the American continent in Bering Strait, 65° 45′ N., received the name of Prince of Wales Cape. Captain Cook then stood over to the Asiatic side, and landed to investigate the Tchuktches, of which tribe he gives an interesting account. Continuing his exploring work he crossed Bering Strait, and proceeded along the American coast, naming a cape after another Arctic explorer, Lord Mulgrave. On the 18th August the two ships were close to the edge of a very heavy pack which was drifting towards the coast. The furthest point seen was very low and much encumbered with ice. Captain Cook gave it the name of Icy Cape, in lat. 70° 29′ N., long. 161° 42′ W. This was the furthest point reached on the American side.

Captain Cook found himself in a narrow lane in shoal water with the ice coming down upon the ships. He plied to the westward, making short boards between the ice and the shore. On the 19th the ships were among loose pieces, and were brought to at the edge of a close pack. There were immense herds of walrus on the ice, which afforded them a welcome change of diet from the salt beef. Much attention was given to soundings and to the force and direction of the currents. The sea in Bering Strait is shallow, and the strait exercises no influence on the general direction of the movement of the water. The principal current in the strait is tidal and intermittent, flowing north with the flood and south with the ebb.

From the 21st to the 29th of August the exploring ships were sailing along the coast of Asia, which was low, with elevated land behind. The furthest point was in lat. 65° 56′ N., long. 179° 11′ W., and received the name of Cape North. The thick weather made it prudent to return. The greatest depth north of Bering Strait was 30 fathoms, the current slight. Passing through Bering Strait on a southerly course, the distance across between Tchuktchi-nos and Prince of Wales Cape was found to be 13 leagues. The ships arrived at a large bay on the American side, which received the name of Norton Sound, after the Speaker of the House of Commons (Lord Grantley). Here spruce was collected to make spruce beer, and the men were sent on shore to collect berries, for Captain Cook was ever thoughtful for the health of his people. A corporal of Marines, John Ledyard, volunteered to go in search of settlers in one of the frail *baidor*, a light wooden-frame boat covered with whale skin, and he brought back two Russians whose information was very useful to Captain Cook[101].

Captain Cook's expedition returned to the Sandwich Islands, where the great navigator was murdered. There was to have been a second voyage to the Arctic regions in the next navigable season. Captain Clerke succeeded to the command, but he was in a dying state. In April, 1779, the *Resolution* and *Discovery* arrived at Petropaulovsky in Kamschatka, where they were most hospitably received by the Russian Governor, and in July the ships again passed through Bering Strait, and were among the ice in lat. 69° 20′ N. But on the 27th further attempts were relinquished and it was decided to return to England. Captain Clerke died on the 23rd of August.

The Arctic discoveries of Captain Cook extend on the Asiatic side to Cape North, and on the American side to Icy Cape. For nearly 50 years the knowledge of the polar sea north of America was bounded by Cook's Icy Cape, with the mouths of the two rivers Coppermine and Mackenzie.

A gun brig had been fitted out to meet Captain Cook in Baffin's Bay, the *Lion*, commanded by Lieutenant Pickersgill, who had served in Cook's second voyage. But he never got north of 68° 14′, though he fixed several positions in Davis Strait. He left the Scilly Islands June 20th, 1776, with instructions to protect the whalers from any attacks from colonial rebels, as well as to meet Captain Cook's expedition[102]. In the following year the *Lion* was sent north again, under Lieutenant Young, but did still less.

Our Government then had a far clearer perception of their duties as regards discovery than is the case now. By Acts George II cap. 17 (1745) and George III cap. 6 (1776) £5000 were offered for reaching 89° N. and £20,000 for making the North-West Passage. In 1818 a further attempt to stimulate discovery was made by offering proportionate rewards for reaching high latitudes from 83° to 89°. But it was due to the persistent representations of a private geographer that the Government itself was induced to take action.

The Hon. Daines Barrington—brother of the excellent Dr Shute Barrington, Bishop of Durham, and friend of Gilbert White of Selborne—was born in 1727, and after leaving Oxford became a barrister, and eventually a Bencher of the Inner Temple and Recorder of Bristol. He was a Fellow of the Royal Society and of the Society of Antiquaries, and the author of a translation of King Alfred's work on Orosius. He was deeply interested in northern voyages, and collected many accounts of ships reaching high latitudes from English and Dutch whaling captains. He published the information he had collected in his *Possibility of approaching the North Pole asserted*[103], and at the same time made strong representations to the Royal Society on the scientific importance of a northern voyage. At last he induced that body to make an appeal to the Government, and Lord Sandwich, then First Lord of the Admiralty, resolved that an expedition should be fitted out and despatched.

Two ship-rigged bomb vessels, the *Racehorse* and *Carcass*, were selected and specially strengthened. Captain Constantine John Phipps, the eldest son of Lord Mulgrave, a scientific officer and a good seaman, received the command of the expedition on board the *Racehorse*, and Captain Lutwidge was appointed to the *Carcass*. The Board of Longitude appointed Mr Israel Lyons as astronomer. Great pains were taken with the outfit, but the ships were not intended to winter. The surgeon, Dr Irving, had invented an apparatus for distilling fresh from salt water, which was very simple, but answered its purpose admirably. Lord Sandwich visited the ships on the 22nd April, and on June 4th, 1773, the expedition left the Nore.

Phipps's expedition was well conducted throughout. A latitude of 80° 50′ N. was reached, and the edge of the ice was examined along all the meridians north of Spitsbergen, without a sign of any opening. Near the Seven Islands the ships were closely beset, the ice piling up to a great height, and there seemed little hope of extricating them without a strong north-east wind. A party was sent to an

island about 12 miles off, under a midshipman, named Walden, to see if any open water was in sight from its summit. He reported that there was water to the westward. The island received the name of Walden. Boats were also sent to see if a passage could be found into open water. One of the boats of the *Racehorse* was attacked by a herd of walrus, and was in danger of being swamped when she was rescued by one of the boats of the *Carcass* under the command of Horatio Nelson, a young midshipman not quite 15 years old.

The same young midshipman was keeping the middle watch on board the *Carcass*, when a bear came in sight, and he started off after it with a musket and one companion. A fog came down over the ice, and when it rose young Nelson and his friend were seen at a considerable distance, attacking the bear. A gun was fired which frightened their intended quarry, and the boys returned. Nelson's excuse to his Captain was that he wanted the bear's skin for his father.

The danger to the ships appeared to be so imminent that preparations were made to abandon them, and all the boats were got ready. At the same time all sail was made, and taking advantage of every slight opening, the ships at length reached open water. They passed Hakluyt Headland, and came to anchor in Smeerenburg Harbour in company with some Dutch whalers. Very heavy weather was encountered during the voyage home, but the ships reached the Thames safely and were paid off in October, 1773.

This was an ably conducted expedition, and should have shown the folly of attempting to approach the pole by trying to make headway against ice drifting south, without the refuge of a land-floe. But it did not. Captain Phipps published an interesting narrative of the voyage, prefaced by a review of former attempts, with some valuable scientific appendixes. He succeeded to the barony of Mulgrave on his father's death in the following year, and marrying into an old naval Yorkshire family, Cholmley of Howsham, left an only daughter when he died in 1792. Captain Phipps was among the ablest of our scientific Arctic explorers[104].

One important interest connected with the expedition of Captain Phipps is the presence of Nelson as a midshipman on board the *Carcass*. The future hero thus gained his first naval experience in the Arctic regions, as other naval heroes of lesser fame have done before and since his time. Nelson's continued friendship for, and correspondence with, his old captain show that his Arctic work was not forgotten in after life. It is this phase of exploration that has the highest importance. Great as are the commercial advantages obtained from Arctic discovery, and still greater as are its scientific results, the most important of all are its uses as a nursery for our seamen, as a school for our future Nelsons, and as affording the best opportunities for distinction to young naval officers in time of peace.

CHAPTER XX

RUSSIAN ARCTIC DISCOVERIES

THE Russians have taken no inconspicuous part in Arctic discovery. If we look at a map of 130 years ago, such an one as is used to illustrate the book of Daines Barrington or Scoresby's *Arctic Regions*, we shall see the whole continuous coast line delineated in the Siberian quadrant, while in the American quadrant there is nothing beyond Icy Cape but the mouths of the Coppermine and Mackenzie rivers. Moreover, in the achievement of their discoveries, the Russians often had to overcome even greater dangers and hardships than their fellow explorers in the other quadrants.

In the earlier period of the occupation of Siberia by the Russians, the Arctic portions were discovered by Cossack leaders engaged in the reduction of northern native tribes, the Samoyeds, Ostiaks, Tunguses, and later the Tchuktches. As early as 1610 a Cossack had reached the mouth of the Yenisei. In 1636 the Lena and the mouth of the Yana were discovered, and by 1644 the Cossack Stadukhin was on the banks of the Kolyma, and gave the first account of the Tchuktches. Two years afterwards Issai Ignatieff and some fur-hunters made the first attempt to navigate beyond the mouth of the Kolyma.

Simon Deshneff was the most enterprising of the Cossack pioneers. With another Cossack named Ankudinoff, he built two small vessels in the Kolyma and faced the icy Siberian sea. Ankudinoff was wrecked, but Deshneff fought a battle with the Tchuktches, and navigated his little craft through Bering Strait into the Gulf of Anadyr. For six years Deshneff was a prominent figure in establishing Russian ascendancy in those distant regions. He is last heard of in 1653, but his ultimate fate is unknown.

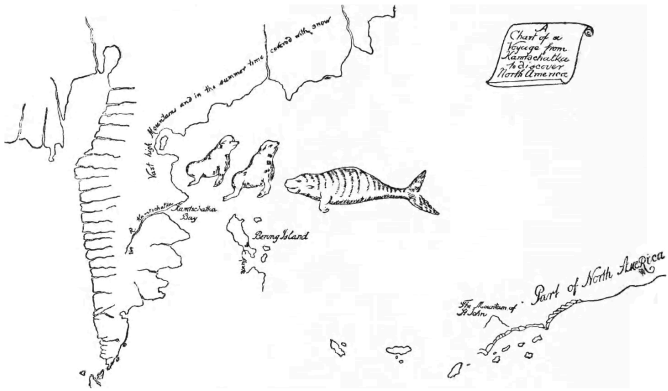
It was in 1734 that trained and educated explorers first began to take the place of pioneer Cossacks. Where English and Dutch had failed, Russian officers, after persevering attempts and the loss of more than one vessel, succeeded. They made the voyage from Archangel to the Obi. Then vessels were built at Tobolsk, and after one failure, when his vessel was wrecked, Lieutenant Owzin reached the mouth of the Yenisei in 1737. He was succeeded by Lieutenant Minin, who surveyed the course of the Yenisei from Yeniseisk to the mouth, and sent Sterlegoff on a voyage northward, who reached a latitude of 75° 26′ N.

It was the object of the Russian Admiralty to examine the whole of the Siberian coast either in sailing vessels or by the use of sledges, and for this purpose they divided the coast into sections to be undertaken by different expeditions. Vessels called *kotchys* were built in the Siberian rivers, but the most successful work was done by sledge travelling. The native methods were adopted, and the *narti* of the Tunguses and Tchuktches became the exploring sledge of Russian officers. The runner of a Siberian *narti* of the best construction is 5 feet 10 inches long, its width 1 foot 9 inches, height of runner 10¼ inches. The runners are of birch-wood, and the upper surface of the sledge of willow shoots, woven together. All the parts are fastened with hide thongs. Before use the sledges are turned over and water is poured on the runners to produce a thin crust of ice which glides easily over the snow. In summer these ice runners (*wodiat*) cannot be used and whalebone is sometimes substituted. A well-loaded sledge requires a team of 12 dogs, and they will drag 1260 lb. in spring, but 360 lb. is a heavy load in the intense cold of winter.

The earliest attempt to round the extreme northern point of Siberia from the east side was made by Lieutenant Prontchishcheff, who sailed down the Lena from Yakutsk in 1735, accompanied by his wife. Hampered by ice, they were obliged to winter at the mouth of the Olenek. In the next season Prontchishcheff forced his way nearly to the extreme point, but he found the ice quite impenetrable. He and his wife died at their winter quarters, leaving the command to the mate Chelyuskin, who returned.

The Government at St Petersburg was still bent on rounding the extreme northern point of Siberia. Lieutenant Cheriton Laptef was appointed to command a second expedition, with Chelyuskin as his mate. They sailed from Yakutsk in July, 1739, descended the river Lena, and reached Cape St Thaddei in 76° 47′ N., but they were stopped by the ice, and forced to winter at a permanent settlement of Tunguses at the mouth of the Khatanga river. Convinced of the impossibility of rounding the cape, Laptef resolved to return to the Lena, but his vessel was caught in a furious gale, she sprang a leak, and when the wind went down, the crew escaped to the land with much difficulty. The vessel drifted away and probably sank. Laptef and his people were left without resources, and underwent the most dreadful sufferings. Many died of hunger and cold. At length they reached the old wintering-place on the banks of the Khatanga. In April, 1741, Chelyuskin was sent with sledges to trace the coast line and discover its northern point, which is in 77° 30′ N. In this he succeeded, and this extreme northern point of Asia has since been known as Cape Chelyuskin. Laptef explored the Taimyr peninsula, and traced the river from its rise in the Taimyr lake to the sea. The whole party reached the Yenisei, and arrived at Yeniseisk at the end of August.

In the period from 1760 to 1766 a fur-trader named Shalaroff made two expeditions and sighted the Liakhov islands, but his vessel was ultimately destroyed by the ice, and he died, with his crew, of cold and misery. He was the first to examine the great inlet called Chaun Bay.



Bering’s Voyage from Kamschatka to North America.

(*From a chart of 1741 drawn by a member of Bering’s expedition; it contains one of the few original drawings of the extinct sea-cow.*)

It was at an earlier date than this, however, that the Czar Peter, just before his death in 1725, gave his instructions to Captain Vitus Bering, a Dane in the Russian service. Bering was despatched from St Petersburg to the furthest point of Siberia, with sailors and shipwrights. Two vessels were built, one at Okhotsk the other in Kamschatka, called the *Fortune* and the *Gabriel*. Sailing in July, 1728, Bering ascertained the existence of the strait between Asia and America which now bears his

name. His second voyage was abortive, but in the third and final one in 1741 he left Okhotsk in a vessel called the *St Peter*, with a consort—the *St Paul*—commanded by Lieutenant Chirikof. George Wilhelm Steller was with Bering as a naturalist. The Aleutian Islands were explored and the grand peak of Mount St Elias was discovered and named. Scurvy broke out among the crew and the commodore himself was attacked by it. In November the *St Peter* was wrecked on the island which afterwards received the name of the ill-fated discoverer. Bering was very ill. He was carried on shore and placed in a trench dug in the side of a sand-hill. Here he was almost buried alive, for the sand kept continually rolling down, and he requested that it might not be moved as it kept him warm. In this miserable condition Bering died on December 8th, 1741. Steller, who was the ship's surgeon, as well as naturalist, was very anxious to procure fresh food for his patients. He attributed the cure of those who recovered from the scurvy to the flesh of the sea-otter. Nine hundred skins of these were collected, for which the Chinese at Kiakta, on the Russian frontier, would pay at the rate of £30 a piece. Thirty of the crew died on the island, and the rest made their way to Kamschatka in a boat built from the wreck of the *St Peter*. Steller discovered a rare and previously unknown species of manatee or sea cow, which was named *Rhytina Stelleri*. This animal not long after became extinct.

Next to Bering Strait the most important Russian Arctic discovery was the group of islands off the coast between the mouths of the Lena and Indigirka, now known as the Liakhov or New Siberian Islands. They consist of five large and some small islands between 73° 10′ and 76° 10′ N. Liakhov, the most southerly, is only 25 miles from the Siberian coast at Sviatoi-nos. It is 50 miles long and 30 broad. At a distance of 55 miles N.N.W. of Liakhov is Kotelnoi, 100 miles long by 60 broad. To the east Kotelnoi is connected by a sandbank with Faddiev (Thaddei) Island, which is 50 miles long by 30, with a narrow spit 35 miles long running out to the north-west. Faddiev is separated from New Siberia Island by a strait 15 miles across, and Bennett Island lies due north of the latter.

This group, which is very remarkable for several reasons, was discovered in 1770 by a fur-hunter named Liakhov. He had seen a great herd of reindeer coming south over the ice, and rightly concluded that there was land to the northward. This led to his discovery of Liakhov and Maloi Islands and in 1773 of Kotelnoi Island. Faddiev and Belkova Islands were discovered in 1805, New Siberia in 1806, and Bennett Island in 1881.

With the exception of a few granite hills, practically the whole soil of Liakhov Island was found to consist of mammoth bones. Kotelnoi is composed of strata of the Devonian period and Silurian coral. But New Siberia with its "Hills of Wood" is the most curious island of all. On its northern coast there are lofty and precipitous rocks of sandstone. The "wood hills," 210 feet high, are formed of horizontal sandstone strata alternating with bituminous trunks of trees. On the summit there are long rows of tree-trunks fixed perpendicularly into the rock, and projecting 7 to 10 inches. The "wood hills" extend for more than three miles along the coast. The largest trunk is 10 inches in diameter, the wood is friable, black with a slight gloss, and not very hard.

The mammoth ivory from Liakhov Island soon became a source of commercial profit; indeed, the quantity that was carried off by Liakhov and his successors was enormous. In 1821 a merchant brought back 20,000 lb. of ivory, each mammoth tusk averaging a weight of 108 lb. In 1809 Sannikoff collected 10,000 lb. of ivory. The supply continued, and in 1856 and 1857 great boats are mentioned in the river Lena, laden with fossil ivory. At Yakutsk, from 1825 to 1831, the sale of ivory amounted to 54,000 lb. annually, besides 5700 lb. sold in other markets. Middendorf's calculation was that the annual sales amounted to 110,000 lb., representing 1000 individual mammoths. A very large proportion of this ivory comes from Liakhov Island, and there appears to be no diminution in the supply. There is also believed to be a vast additional store on the sea

bottom, as tusks are found in abundance when the sea recedes after a long continuance of easterly winds.

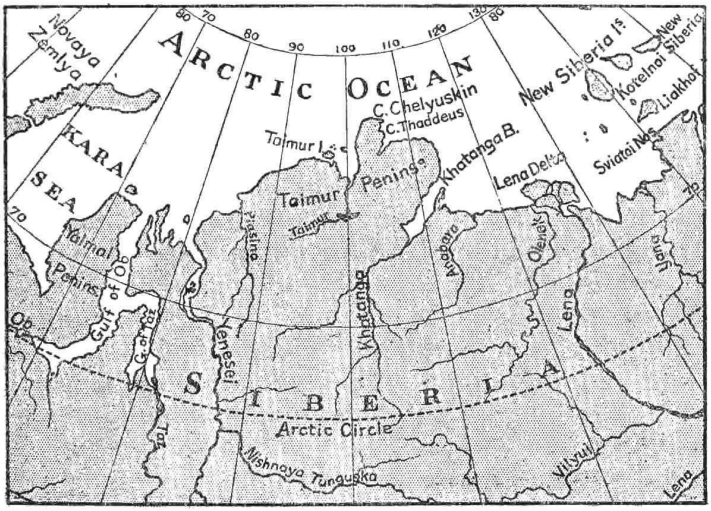
Sannikoff saw land to the north of the New Siberian Islands, but was prevented from reaching it owing to open water. This was the Bennett Island, discovered by De Long in 1881, in 76° 38′ N. and 148° E. He explored 17 miles of the south coast of the island, and found great numbers of birds breeding on the cliffs. Here also mammoth tusks were met with. A barren rocky ice-capped islet, named Jeannette Island, was also discovered by him, and another named Henrietta Island, 27 miles away.

Hedenström, a Russian officer residing at Yakutsk, was employed by the Government to survey the New Siberian Islands in 1809, accompanied by Sannikoff, and he was occupied on this service for three years.

In 1821 Lieutenant (afterwards Admiral) Anjou was sent to make a more accurate survey, and to discover the land reported by Sannikoff to the north of Kotelnoi Island. He crossed the ice with *narti* or dog sledges, but at a distance of 40 miles north of Kotelnoi he was stopped by unsafe ice on two occasions. On April 9th he started over the ice to the eastward of New Siberia, and again met with thin ice at a distance of 60 miles from the land. His conclusion was that all efforts to advance on sledges to any considerable distance from the land would prove unavailing owing to thin ice and open water. He completed a survey of the New Siberian group of islands.



North-eastern Siberia.



North-western Siberia.

While Anjou was surveying these islands, his friend Baron Wrangell was also occupied in exploration and research with his headquarters at Nijni Kolymsk. He made four sledge journeys over the Polar Sea from 1820 to 1823, in the *narti* or dog sledges already mentioned. He considered March to be the best time of the year for travelling, because it is then easier work for the dogs. The dogs were fed on frozen herrings. The men wore reindeer-skin shirts, leather boots lined with fur, a fur cap, and reindeer-skin gloves. The party had a reindeer-skin conical tent, 12 feet across on the ground and 10 feet high, with a light framework of six poles. When they camped they lighted a fire in the centre of it, and were half smothered by the smoke. Each man slept on a bear-skin, and there was a reindeer-skin coverlet for every two.

In his first journey Wrangell surveyed the coast from the mouth of the Kolyma eastward to Cape Chelagskoi, with the temperature sometimes as low as -31° Fahr. His second journey, starting on March 27th, 1821, was undertaken to see how far he could go over the ice to the northward, away from the Siberian coast. At a distance of two miles from the shore the party had to cross a chain of high and rugged hummocks five miles wide. Beyond, the ice was fairly level, but after advancing for 140 miles Wrangell found the ice to be weak and rotten owing to large patches of brine being lodged on the snow. It was therefore deemed prudent to commence their retreat on April 4th. They returned to Nijni Kolymsk on the 28th after an absence of 36 days, having travelled over 800 miles, averaging 22½ miles a day.

Wrangell was much struck by the wonderful skill displayed by the sledge drivers in finding their way by the wave-like ridges of snow formed by the wind. These, formed on the level sea ice by any wind of long continuance, are called *sastrugi* in Siberia. The ridges always indicate the quarter from which the prevailing winds blow. The inhabitants of the *tundras* often travel over several hundred miles with no other guide than these *sastrugi*. They know by experience at what angle they must cross the greater and lesser waves of snow in order to arrive at their destination, and they never err. It often happens that the true permanent *sastrugi* have been obliterated by temporary winds, but the traveller is not deceived. His practised eye detects the change, he carefully removes the recently drifted snow, and corrects his course by the lower *sastrugi*, and by the angle formed by the two.

On his third journey, Wrangell started northwards from the coast on March 16th, 1822, chiefly with the object of ascertaining the truth of a native rumour that there was high land in that direction. But again, after travelling for many days through ranges of hummocks, showing there must have been heavy ice pressure during the winter, he came to weak unsafe ice at a distance of 170 miles from the land. He was away 55 days and went over 900 miles, a little over 16 miles a day. May 5th saw them back at Nijni Kolymsk.

The fourth journey was begun on March 14th, 1823. At Cape Chelagskoi a Tchuktche chief told Wrangell that, on a clear summer's day, snow-covered mountains might be descried at a great distance to the north, and that herds of reindeer sometimes came across the ice, probably from thence. The natives concurred in stating that Cape Jakan was the nearest point to this northern land. Wrangell struck off to the north when he had gone a little way beyond Cape Chelagskoi. A violent gale came on, and cracked and broke up the ice, placing the party in considerable danger. They only succeeded in crossing the cracks owing to the incredibly swift pace of the dogs. Wrangell was obliged to turn back at a distance of only 70 miles from the land. Even then the men had to ferry themselves across many cracks on pieces of ice, the dogs swimming and towing, the temperature of the sea being +28° Fahr. This was in the end of March. Lanes of water were opening in all directions and, without a boat, the little party was placed in a position of extreme danger. The gale dashed the pieces of ice together with a loud crashing noise, and broke some of the floes into fragments. The dogs alone saved them. Land was reached on the 27th March, and Wrangell continued the coast survey for some time longer, returning to Nijni Kolymsk on May 10th, after an absence of 78 days, having travelled over 1530 miles.

The unknown land sighted from Cape Jakan was seen by Captain Kellett in 1849, and by Captain Long, an American whaler. Captain Kellett landed on an islet near it in 71° 18′ N., 175° 24′ W., in 1849, which he found to be a solid mass of granite, almost inaccessible on all sides, about 4½ miles long by 2½ across. It was named Herald Isle. But it was not until 1881 that Lieutenant Berry, U.S.N., landed on and explored the land seen from Cape Jakan. It is in 70° 57′ N. and 178° 10′ W., and is 70 miles long from east to west. Its distance from the nearest point of the Siberian coast is 80 miles. Two ridges run parallel to the north and south shores, and between them is undulating country traversed by streams fed by the melting snow. Mammoth tusks and bones were found by Lieutenant Berry's party, as well as relics of Siberian tribes. The hills rise to a height of 2500 to 3000 feet. It has been named Wrangell Island, after the Russian explorer who encountered such great dangers in seeking for it. The Russian explorers came to the conclusion that there was a great deal of open water in summer to the north of the Siberian coast.

In 1843 Middendorf was sent to explore the region which terminates in Cape Chelyuskin. He went by land, descending the river Khatanga, and reached the Taimyr lake in June. In August he got to the shores of the Polar Sea and sighted the Cape, whence he saw open water and no ice blink in any direction. The rise and fall of the tide was 36 feet. F. Schmidt was also sent by the Imperial Academy of Sciences at St Petersburg to examine the country between the Obi and Yenisei, and to amplify the work of Middendorf.

The Russians were also occupied with the exploration of Novaya Zemlya, an incentive being given to the merchants of Archangel by the belief that silver ore was to be found. As the search for the philosopher's stone led to many discoveries in chemistry, and the quest for El Dorado had as its consequence important discoveries in South America, so this imaginary silver ore was the cause of the discoveries along the Novaya Zemlya coast.

Novaya Zemlya is a long narrow strip of land stretching away N.E. for some 500 miles with the Barentsz Sea on its western and the Kara Sea on its eastern side, and separated at its southern

extremity from Waigatz Island by Burrough Strait. It is divided into two islands by the narrow Matyushin Strait.

The southern island is 160 miles long, and there are a few Samoyed settlements on its shores. The northern island is quite uninhabited. The southern part of it is called Lutke Land after the Russian Admiral who surveyed the western coast, and the northern part is Barentsz Land. The two islands form an arc or curve with the concave side towards the Kara Sea from lat. 70° 30′ to nearly 77° N. They are a continuation of the Ural system and consist of a range of mountains with peaks of black clay and slate chiefly, rising to 4000 feet, and land covered by an ice sheet, with glaciers sometimes descending to the water's edge. The rocks are Upper Silurian or Devonian. The climate is colder than that of Spitsbergen.

Opposite to Waigatz is Cape Menschikoff, the southern point of Novaya Zemlya, the coast trending thence westward to the deep bay called Kostin Shar, with the island of Meshdusharsky at its entrance. The Kostin Shar hills have a formation of grey primitive limestone, like the northern part of the Ural mountains. North of the Kostin Shar, on the west coast, is Goose Land, a low stretch of coast extending from 71° 30′ to 72° 10′, a distance of 40 miles. It consists of grass flats and small lakes, the breeding-place of geese and swans, and in the short summer the flowering plants cover the land with as beautiful a carpet as on the Waigatz. Belusha Bay, where there is a Samoyed settlement, is on the South Goose coast, and there are submerged reefs, as well as rocks and islets, which render the navigation dangerous. Goose Land ends to the north at Moller Bay, the northern termination of which is Cape Britvin (= Razor). Here the coast line rises to 300 or 400 feet, in raised beaches, and there is a depth of only 10 to 20 fathoms four miles from the shore. Nameless Bay is bounded on all sides but the west by high hills, from 800 to 1500 feet above the sea, which slope downwards, and terminate in precipitous limestone cliffs, with a sheer face of a hundred feet, broken by narrow ledges. These cliffs form the famous "loomeries," extending along the southern side of the bay for three miles, and here, during the breeding season, the birds congregate in countless myriads.

The entrance to the Matyushin Strait has Cape Saulen on the south side, and Silver Cape, 1885 feet high, on the north. On both sides of the strait the mountains rise in a series of lofty peaks, covered with snow, and with glaciers resting on their sides. Through this mountainous region the deep and narrow channel called the Matyushin Shar winds from the Barentsz to the Kara Sea. It is nowhere two miles across, and in some places contracts to a quarter of a mile, and the winding of the strait gives the appearance of passing through a succession of lakes surrounded by lofty mountains and overhanging precipices, while many glaciers pour down the mountain sides almost to the water's edge. At the eastern end there is a deep inlet on the northern side. Throughout this region the raised terraces give evidence of the land having been upheaved to a height of from 500 to 600 feet. The eastern coast of Novaya Zemlya is comparatively low and barren. It has many bays and harbours and all the promontories terminate in steep cliffs. The beautiful little grass, *Pleuropogon Sabinii*, which is found in Franz Josef Land, but is very rare in other parts of the Arctic regions, grows in profusion in Novaya Zemlya and was found by Colonel Feilden at Belusha Bay of South Goose Land, in Nameless Bay, and in the valleys on both sides of the Matyushin Strait.

The west coast of Lutke Land forms a succession of large indentations, and there are glaciers at the head of almost every bay, winding between the mountain ranges. Beyond Admiralty Peninsula the coast trends more to the east, and at Cape Nassau, in 76° 20′ N., it turns almost due east. Here many glaciers extend along the coast, and the hills appear to be from 1000 to 2000 feet in height. Off the northern coast are the two Orange Islands, each about half a mile long, with precipitous

sides and flat summits about a hundred feet above the sea. The eastern shores of Barentsz and Lutke Lands are low and barren.

The first circumnavigation of Novaya Zemlya is attributed to a pilot named Loshkin in 1760, and eight years afterwards Lieutenant Rosmyssloff wintered in the Matyushin Shar and made a survey. From 1821 to 1824 Admiral Lutke made an admirable survey of the whole west coast of Novaya Zemlya during four summers. Subsequently the pilot Zinvolka made several exploring voyages, in one of which he was accompanied by Professor Baer[105], who made large botanical and zoological collections. Zinvolka's last voyage was in 1838, when he died during the winter in Cross Bay.

The Russians also made expeditions to Spitsbergen. Their plan was to form a depôt in Bell Sound, and Lieutenant Nemtinoff built five houses there in 1764, where stores were landed. In May 1765 Captain Vassili Tchitschakoff sailed from Archangel in command of three small vessels, did battle with the ice during two months, but could never get further north than 80° 26′. He returned to Archangel, and was sent to make another attempt in the following year. He reached a latitude of 80° 30′ and then gave it up. The Russians had passed two winters in Bell Sound, in charge of the stores.

The praise which Baron Wrangell bestows on the gallant Russian officers and sailors, who faced and overcame hardships and dangers of no ordinary kind, and did such splendid exploring work during more than two centuries, is justly their due. It is satisfactory to reflect that the Arctic discoveries of the Russians led to no barren results. They were the direct causes of the establishment of a lucrative fur trade, and of an equally flourishing trade in fossil ivory. Such have been the almost inevitable results of Arctic enterprises, which enrich communities while they confer great benefits on science.

CHAPTER XXI

THE BRITISH WHALE FISHERY AND THE SCORESBYS

A HISTORY of polar discovery would be incomplete without some notice of the whaling trade in the Spitsbergen Seas and in Davis Strait, for scientific observations were taken by some of the whaling captains, and many discoveries were made. Their duties, of course, obliged them to give the first place to the work on which they were employed. Sir Martin Conway puts it very well when he says of Scoresby that "he never neglected business in the cause of science, but was always mindful of science when business permitted."

The Dutch, at first our rivals, were for a long series of years far superior to the English as successful whale-fishers. While the English continued to fish round Bell Sound and the number of their vessels decreased year by year, the Dutch, when the whales ceased to come to the bays, sought them by facing the dangers of the open sea, abandoned Smeerenburg, adopted new methods, and became very expert.

When the learned Frederik Martens of Hamburg made a voyage to Spitsbergen in 1671, on board a whaling ship called the *Jonah in the Whale*, he found Smeerenburg quite deserted. His history of the voyage contains the first detailed account of Spitsbergen, with notices of the fauna and flora[106]. Although Smeerenburg was so early abandoned, the Dutch fishery continued to flourish for another century, enriching the communities of the Netherlands with products annually yielding great wealth. In 1709 their fishery in Davis Strait was commenced. In the unsuccessful whaling captain Zorgdrager the Dutch found a diligent historian[107].

The revival of the English whale-fishery was due to the fostering care of Sir Robert Walpole's government. In 1733 a bonus of 30s. per ton was offered to owners of whaling ships, increased to 40s. in 1740. Then the fishery began to flourish. Previously there were only from three to six ships going north, but in 1749 there were 40, soon increased to over a hundred from Hull and London. In 1787 there were 162 English and 23 Scottish whalers, and in 1788 there were 255 ships going to the Spitsbergen seas and Davis Strait, bringing back 5989 tons of oil, 380 tons of whalebone, and 13,386 skins of seals and bears. It was then considered safe to reduce the bounty, the British whale-fishery being established on a firm basis. From 1788 to 1790 London was the chief port, Hull being a good second in 1788 with 29 sail for Spitsbergen, and 7 for Davis Strait. Whitby began the whaling business in 1753. Mr Pitt, by an Act of Parliament (26 Geo. III, c. 41) enumerated the conditions constituting a whaling ship, the crew, boats, implements, lines, etc., with so many apprentices according to tonnage, to be indentured between the ages of 12 and 20. The Act was altered and amended by later Acts down to that of 1815 (55 Geo. III, c. 32).

The whalers were vessels of 300 to 400 tons, doubled and strengthened with plates of half-inch iron round the stem. The working of the sails was arranged so as to be done by the fewest men, a bentick boom being fitted for the foresail instead of tacks and sheets[108]. The look-out had to be many hours at the mast-head, watching the ice and looking out for whales. As this duty had often to be performed in the intensest cold, the "crow's-nest" was invented to protect the look-out men from the weather. The improved top-gallant crow's-nest, used since 1807, was invented by Scoresby. It was fixed at the head of the main top-gallant mast, with nothing above it and consisted of a cylindrical frame 4½ feet by 2½, covered with painted canvas, open above, and closed below with a

square hatch which served as the entrance. There was a small seat, and places for the telescope and other instruments. A screen worked on the upper hoop of the crow's-nest, 2 to 3 feet long and 1 foot high, which was moveable, and adjusted to windward. The vessels carried six or seven boats, carvel-built, 26 to 28 feet long by 5 feet 9 inches beam, of fir planks half an inch thick; the keel, gunwales, stern and stem posts being of oak. They had six oars, 16 feet long, the steer oar being 18 to 20 feet. The oars were fixed to thole-pins by rope grummets. When the ship reached the fishing ground, the boats were kept at the davits, ready to lower. The whale lines, beautifully "flaked down" in the boats, were of 2½-inch rope, and a total of 4320 feet of length was carried in the six lines supplied to each boat, each line being 120 fathoms. A bollard for passing them round was fixed near the boat's stem.

The harpoon consisted of socket, shank, and "mouth" or point with barbs or "withers," and was 3 feet long. Later, the harpoon gun came into use. Lances were 6 feet long, the socket, into which is fitted a stock or handle, a shank 5 feet, and a sharp point 8 inches long. The fore ganger is an important part of the harpoon gear. It consists of 8 or 9 yards of 2½-inch rope, spliced round the shank of the harpoon, the swelling socket preventing it from being drawn off when the harpoon is thrown. When a harpoon is ready with stock and foreganger, it is said to be "spanned in." The point, when not in use, is guarded by a shield of oiled paper.

Each boat had two harpoons, six or eight lances, a pole and flag to signal when a whale is struck, and a tail knife to perforate the tail or fins of a dead whale. There was also an axe for cutting the line if necessary, the *mik* to support the stock of the harpoon, and a *piggon* for baling and for wetting the running lines to prevent the bollard from catching fire.

It was thought politic to arouse the zeal of the chief officers by giving them an interest in the work. The captain got three guineas for each fish, 10 to 20 shillings per ton of oil, and a twentieth of the value of the cargo besides. A harpooneer got six shillings per ton of oil and 10 shillings for every fish he struck. The chief mate was generally a harpooneer. The "speksioneer," who directs the cutting of the blubber, the boat-steerers, line managers, coopers, carpenters, etc., were also given an interest in getting a full ship.

Sailing in the end of March the whaling fleet made the ice in 70° to 72° N.; the sea between 78° and 79° being most productive. Then the captain was in the crow's-nest for long hours at a stretch, conning the ship through the ice, watching every change, and looking out for whales; all on board being on the alert and watching for every sign from the crow's-nest.

Foremost among a splendid set of men stand the two Scoresbys for the Spitsbergen fishery, and Captain Marshall for that of Davis Strait.

Thanks to the pious tribute of his son we can trace the career of the senior William Scoresby from his boyhood. He was born at Nutholm farm near Cropton, about 20 miles from Whitby, and was intended to follow his father's profession of a farmer. But at the age of eighteen he resolved to go to sea, and got a recommendation to Mr Chapman, an opulent ship-owner at Whitby. He walked to Whitby one February day, and got a berth in a ship destined for the Baltic, but as she was not sailing until April, he set out for his home, taking a short cut across the moors. When miles from any house, he encountered a furious gale with a blinding snow-storm, and lost all the tracks. He was in no little danger. But he had noted the angle of the wind while he was on the road, and by that means he recovered the track and finally reached a house nearly exhausted. The intelligence and endurance he evinced on this occasion foreshadowed his future career. In his Baltic voyages, while doing his duty as a foremast hand and learning seamanship, young Scoresby also diligently studied the theory and practice of navigation.

In 1782 Scoresby joined the *Speedwell* cutter, taking stores to Gibraltar, but he had the ill-fortune to be captured and became a prisoner of war in Spain. He fled from San Lucar, and his final escape appears to have been due to the sympathy of some Spanish girls for the handsome young Englishman. They fed him and concealed him, until at last he got on board a cartel, and returned home. After his return he married and was two or three years at home. In 1785 he entered the whaling trade on board the *Henrietta*, Captain Crispin Bean, and devoted himself to the work. After his fifth voyage he was made speksioneer and second mate, when the whaler was laid up. When Captain Bean retired, he recommended Scoresby to succeed him, and in 1792 he became Captain of the *Henrietta* and afterwards of the *Resolution* of Whitby, 290 tons.

We may here glance for a moment at the ordinary mode of procedure in the taking of a whale. Directly one is viewed from the crow's-nest the look-out man gives notice, and instantly a boat is lowered and another follows. The harpooneer pulls the bow, the line manager the stroke oar. The whale is dull of hearing but quick of sight. He seldom remains more than two minutes on the surface, and is generally 10 to 15 minutes below, moving half a mile or more. The knowledge and skill needed to harpoon him during his short stay on the surface will be understood. There is often danger when the fish is struck, from the violent movement of fins and tail.

The moment a wounded whale goes down the flag is shown from the boat, and there is a cry on deck, "A fall! a fall!" In an instant all hands are on deck, boats lowered, and many of the crew go away half dressed. When struck a whale goes down to a great depth. Sometimes a whale gets under the ice and will run all the line out in ten minutes, when it is probably lost. One or two turns of the line are taken round the bollard, but the line flies out at such a pace that smoke rises and it has to be kept wetted. If the line runs foul the boat is drawn under water.

The struck whale goes down into the depths at a rate of ten miles an hour, and keeps under water for half an hour or more. The longest recorded time is 56 minutes. When, after a dive to 700 or 800 fathoms, the great beast returns to the surface, he is again harpooned and plied with lances, blood rises from the blow holes, he turns on his side and expires.

All the boats in a line then tow the carcase to the ship, and it is cleared of lines and placed alongside with the tail abreast the fore chains and the head at the ship's stern. The process of *flensing* follows, the blubber being 2 or 3 feet thick. The band between the fins and head is called the *kent*. The *kent purchase* is passed from the kent to the head of the mainmast, and the fall taken to the windlass. The upper surface of the carcase is then raised one-fifth out of the water, with the belly up. The harpooneers then go down with "spurs" (iron spikes strapped to the foot) to prevent slipping, and boys in boats are in attendance with knives. The speksioneer directs the operations. The blubber is divided into oblong pieces or strips by blubber spades and knives. *Spek tackles*[109] are fixed to each strip and flay it off, being worked with winches. The spek tackle consists of two single blocks, one fast to guys between the fore and main mast, the other fast to the blubber by a strop. The blubber pieces, half a ton to a ton in weight, are received on deck by the boat-steerers and line-managers, the former dividing it into smaller pieces with *strand knives*, the latter passing it between decks with *pick haaks* down the main hatchway. It is received by two men called *kings*, who pack it in the *flens gut*. As soon as the strips are off, the whale is turned on its side by the kent purchase taken to the windlass. The whalebone is thus exposed, and is taken off on one side by bone handspikes and bone knives and spades, with the help of the spek tackle. It is split into junks on deck with bone wedges, and stowed away. Then there is another kenting. When the flensing is finished the carcase generally sinks. If it floats it is attacked by thousands of gulls and fulmars. The flensing of 20 to 30 tons of blubber can be completed in three or four hours, the average time. It is an extremely difficult operation, however, when the sea is rough.

Some casks have been cleared out of the hold, and the space is called the *flens gut*. When it is full of blubber comes the operation of *making off*[110]. This is the freeing of blubber from all extraneous matter, cutting it into small pieces, and stowing it in the casks. The *skee-man* directs these operations. The *spek trough* is an oblong box over the place where the casks are to be filled. The surface of the lid forms a table, on which pieces of the whale's tail are placed as chopping blocks. A canvas tube, called a *eull*, is then led down to the hold. The *kings* then throw the blubber out of the *flens gut*. It is received by the *krengers*, who remove all the muscular parts called *kreng*. The harpooneers then slice off the skin, and the boat-steerers divide the blubber into blocks 4 inches in diameter. The line managers receive it in the hold by the *eull*, and put it in the casks through the bung-holes. Their cries were "*let lob*" when they wanted the blubber to come down, and "*rip the eull*" when it was to be stopped. In the early days of the fishery the *making off* was always done on shore. The jaw-bones, 25 feet long, were brought home to make posts and arches for gateways: still to be seen in the country round Hull and even further afield.

It will be seen that the catching of a whale was not the mere harpooning with the attendant danger and excitement, but that it entailed a long and very hard day's work, with incessant labour and the exercise of much skill and intelligence. It was a splendid nursery for our seamen, combined with the dangers of ice navigation and the constant need for a bright look-out.

In 1806 Captain Scoresby had his son with him on board the *Resolution* as Chief Officer. Both were good sailors and navigators and unrivalled as whaling officers. The son had the advantage of a better education, and was devoted to scientific research. Both were unostentatiously religious, as all our great Arctic heroes have been.

In 1806, the Scoresbys determined to see how far north it was possible to go, entering the ice in 76° N. on the 28th of April. Captain Scoresby found the ice to be of extraordinary width and compactness. He pressed into a pack which, to ordinary apprehension, was impenetrable. There was a strong ice blink along the northern horizon which, to all minds on board but one, precluded hope. But Scoresby, narrowly scanning this ice blink from the crow's-nest, discerned a blueish grey streak *below* the ice blink, and closely skirting the horizon. He knew this to be an indication of open water beyond the pack. The watchful veteran detected another sign. He perceived occasionally a very slight motion of the water between the lumps of ice near the ship. He knew that this could only arise from a distant swell, which must proceed from an open sea either to the north or to the south. The distance he had penetrated into the ice and the unmixed ice blink to the south, convinced him that it did not come from that quarter. With this conviction came the resolution to push on through the formidable body of consolidated ice before him. Every effort was made. It was then that Scoresby invented the practice of *sallying*, which consisted in the whole crew running across from one side of the ship to the other in order to make her roll, and so break up the ice close round her. Then boats were lowered quickly from the bowsprit to break up the ice ahead. When a lane of water was formed, there was tracking and towing. All this hard work and perseverance was finally rewarded, and at length an open sea was reached, bounded in the north by the solid polar pack. On the 24th May the latitude was found to be 81° 30′ in 19° E. Though the ice was fixed and solid to the north, there was an open sea, with a water sky, from E.N.E. to S.E. This is the furthest north ever reached by a sailing ship on the Spitsbergen meridians[111].

With the distinction of this highest latitude Captain Scoresby returned with a full ship. After four more years of full ships, he resigned the command of the *Resolution* to his son in 1810. The elder Scoresby lived on until 1829 as a respected citizen of Whitby and saw his son's successful career not only as a whaling captain, but also as a universally esteemed man of science.

The younger Scoresby went to the fishery for three years in the *Resolution* and in 1813 was transferred to the *Esk*, a larger ship. The dangers from the ice were far more serious than those to which men were exposed in capturing whales. Many ships were lost in this way, and the risks run are well exemplified in Scoresby's account of the perilous position of the *Esk* in 1816. It was blowing hard with a heavy sea when the vessel came upon the ice on the 30th April. It freshened to a furious gale, the sea mountains high with huge blocks of ice tossing in the foam. Scoresby tried to wear ship, but she failed to go round, and fell off to leeward with terrible force. She continued to beat against the ice wall, threatened with destruction every moment. All the time Scoresby was in the crow's-nest.

When the gale subsided it was found that there were 8½ feet of water in the hold. At first an attempt was made at fothering, passing a thrummed sail under the leak. But it was found that 22 feet of the keel and 9 feet of the garboard strake were broken and turned at right angles, so that the sail could not be passed under the leak. Then an attempt was made to heave the ship down alongside the ice-floe. Stores were landed on the ice, scuttles were caulked and hatches closed. Hawsers were passed under the bottom, clenched to the mainmast, and then led to purchases on the ice. The keel was in this way drawn to the edge of the floe, while anchors were suspended from the tops on the other side. The crews of other ships came to help. But the attempt had to be given up, though an effort to cut off the broken parts of the keel and garboard strake was successful, and it became possible to pass the thrummed sail under the leak. Half the cargo was given to another whaler, as the price of staying by the *Esk* on the way home; and Captain Scoresby was welcomed and rewarded on his return for his splendid seamanship in saving the good ship under his command.

In 1820 the *Baffin* was specially built at Liverpool, and Scoresby made commercial profit in her, as well as discovering and surveying part of the east coast of Greenland. In the same year he published his great work on the Arctic regions. He was devoted to science and corresponded with Sir Joseph Banks and Professor Jameson of Edinburgh. His book on the Arctic regions immediately became the standard work on the subject, and has not been superseded by anything of equal merit down to the present day. A few years after its publication Scoresby resolved to terminate his successful career as a whaling captain and take holy orders. With this object in view he went to Queens' College, Cambridge, took his degree, was ordained, and became D.D. in 1839. For seven years, from 1840 to 1847, he was Vicar of Bradford, and after his retirement he lived chiefly at Torquay. He specially worked at terrestrial magnetism, but other branches of science received attention from him and he was elected a Fellow of the Royal Society. His last work was a most interesting life of the elder Scoresby entitled *My Father*. Dr Scoresby died at Torquay on March 21st, 1857[112].

The Scoresbys stand in the front rank, combining most able and efficient work as seamen and whaling captains with zealous promotion of discovery and scientific research. At the same time Captain Marshall of Hull held a like position in the Davis Strait fishery.

By these fisheries, due to the discoveries of our earlier Arctic worthies, several communities in England and Scotland were enriched during a long series of years, and the welfare of the whole kingdom was advanced. Further discovery received advocacy through the reports of whaling captains, and an unequalled nursery for British seamen was securely established.

CHAPTER XXII

BUCHAN AND ROSS

Polar exploration had been neglected since the return of Captain Phipps owing to the protracted European war, which came to an end in 1815. But the duty of prosecuting it had never been forgotten, and the authorities, being educated and patriotic men, were quite ready to consider suggestions favourably. The country is indebted for those suggestions to William Scoresby. In 1817 he found that the Spitsbergen seas were unusually clear of ice between 74° and 80° N., and he represented to Sir Joseph Banks what a favourable time there appeared to be for expeditions of discovery. Sir Joseph brought Scoresby's letter to the notice of Sir John Barrow, the Secretary of the Admiralty, who strongly represented the advisability of despatching expeditions to discover the connection of the Atlantic and Pacific Oceans north of the American continent. One was to proceed by way of Spitsbergen and the North Pole, the other by Davis Strait and the bay supposed to have been discovered by Baffin.

Four whalers were purchased by the Admiralty and strengthened for special service in the ice—the *Isabella*, 385 tons, and *Alexander*, 252 tons, for Baffin's Bay; the *Dorothea*, 370 tons, and *Trent*, 250 tons, for the North Pole. Captain Buchan, R.N., who had recently been employed on the Newfoundland coast and had made an important journey into the interior of that island, received command of the *Dorothea* in the Spitsbergen and North Pole expedition, with Lieutenant John Franklin as his second, on board the *Trent*. Buchan's first Lieutenant was Arthur Morell, with Charles Palmer and William J. Dealy as mates, George Fisher as astronomer, and Cyrus Wakeman as clerk. In the *Trent* with Franklin were Lieutenant F. W. Beechey, son of the artist Sir William Beechey, Andrew Reid and George Back, mates, and Alexander Gilfillan as surgeon.

This expedition left the Thames in April, 1818, and was at Lerwick on the 1st of May. The *Trent* was leaking badly, and every effort to find the place, while they were at Lerwick, failed. It was a serious matter, as half the watches were occupied in pumping, which entailed a great amount of extra labour, when the ordinary work was almost as much as they could do.

On entering the icy region Buchan's expedition was met by a furious gale, and took refuge in Magdalena Bay. The expedition was fortunate in its historian, for Morell, the first Lieutenant of the *Trent*, was a man of high literary attainments as well as an accomplished artist. The attack on one of the boats of the *Trent* by walrus is as admirably described by his pen as it is portrayed by his pencil. He also relates the ascent of "Rotche Hill," 2000 feet high, and describes the little-auks or 'rotches' flying in such crowds that thirty came down in one shot. It was calculated that 4,000,000 were on the wing.

When the two ships again put to sea they were driven into the pack-ice north of the north-east point of Spitsbergen. There was a heavy swell, and the huge masses of ice were crashing and grinding together, breaking in pieces, and covering the sea with brash ice for miles. All night they were striving to keep the ships' heads to the sea, while the leak in the *Trent* increased, and all hands were at the pumps. Pressing along a lead to the north of Cloven Cliff, they were stopped by the ice, and laid out ice anchors. Here they were beset for 13 days.

The leak on board the *Trent* had long been a serious drawback to her efficiency, indeed ever since she left the Thames. At last its position was discovered. Old Sir George Back used to tell the

story. The Assistant Surgeon, when lying half asleep in his berth, thought he heard water flowing into the ship below the deck. He listened and feeling sure, he reported. The spirit room was cleared, and it was found that a bolt-hole had been left open. A remedy was at once applied and, to the great joy of all on board, the work at the pumps was no longer necessary.

While the ships were beset a party was sent to reach the shore. A dense fog came down, and the men could not find their way back, being on the verge of perishing before they could be rescued, after 18 hours' exposure. Meanwhile the ships were pushed southward, and at length reached open water. Great efforts had been made to attain a high latitude, and they advanced to 80° 34′ N., but the ships were exposed to great pressure, the *Trent* being raised four feet out of the water and some of the *Dorothea's* beams were sprung. After the ships were released, Captain Buchan gave up all idea of trying the state of the ice by the Seven Islands to the eastward, and determined to examine the prospect in the direction of Greenland.

When the two ships were sailing along in sight of the main pack on the 30th of July a furious gale sprang up and the *Dorothea* bore up to seek shelter within the ice. The *Trent* could find no opening. Huge masses were broken up and tossed up and down on the waves, the ship being in such violent motion that the bell tolled incessantly until it was muffled. It was as if they were surrounded by battering rams. When the wind went down it was found that the *Dorothea* was very seriously injured, beams being sprung and timbers broken. The two ships took refuge in Fairhaven. By the end of August the repairs were finished so far as was possible, but it was considered necessary that the *Dorothea* should return, and that the *Trent* should keep with her. The two vessels arrived in the Thames on the 22nd October, 1818; all on board eager to volunteer again for Arctic service.

Buchan's expedition was doomed to failure, for it was an impossible route, as Phipps and Scoresby had already shown. It is hopeless to struggle against the great Arctic drift with no land floe to hold on by. Still there was gain. The experience of ice navigation at its worst, acquired by several zealous naval officers, was a gain. Beechey's excellent narrative, illustrated by his own graphic pencil, is one of the very best Arctic books[113].

We must now turn to the story of the companion expedition. The *Isabella* and *Alexander* were well strengthened, and destined for more important Arctic work. Owing to the suppression of Baffin's log book and map by Purchas, the existence of Baffin's Bay had come to be considered doubtful. On the map in Daines Barrington's book, as already stated, there is printed over the site of Baffin's Bay "according to the relation of W. Baffin in 1616, but not now believed." It was accordingly resolved by the Admiralty that the expedition should proceed up Davis Strait, verify the discovery of Baffin, and seek a passage.

Lord Melville was the First Lord of the Admiralty, and his colleagues, Sir J. S. Yorke, Sir George Hope, and Sir Graham Moore, were enlightened and accomplished naval officers. For the command of the expedition Sir George Hope recommended his old shipmate, John Ross, as zealous and energetic and a thorough seaman. This officer, born in 1777, was the fourth son of the Rev. Andrew Ross of Ballaroch in Wigtonshire, by Elizabeth, daughter of Robert Corsane, Provost of Dumfries. Entering the navy at a very early age, he served for four years, and was then in the merchant service for some years. Returning to the navy he served under Sir James Saumarez in the Baltic and the White Sea, where he fixed the longitude of Archangel by occultation of Jupiter's satellite. In 1812 he became a commander. He was in three actions, and was wounded in every one. After his promotion he had command of the *Briseis*.

The selection of Ross was very carefully made, and his second in command was Lieutenant Edward Parry, on board the *Alexander*. The two first Lieutenants were Robertson in the *Isabella* and Hoppner, a son of the artist, in the *Alexander*. The younger aspirants for Arctic fame, all to be heard

of again, were A. M. Skene, J. Bushnan, Joseph Nias, and the Commander's nephew James C. Ross. Drs Edwards, Beverley, and Fisher were the surgeons. Captain Sabine, R.E., joined the *Isabella* for magnetic observations. An Eskimo interpreter was also secured in the person of John Sacheuse, who had found his way from Greenland to Leith. He was recommended as a useful member of the expedition by Captain Basil Hall, R.N.

The expedition sailed in April, 1818, proceeded up Davis Strait, and. reached Hare Island off the north-west cape of Disco I. on June 17th. Here 45 whalers were found waiting to go north, and Ross received the excellent advice from the captain of the whaler *Larkin* to "stick to the land floe." The reason why all the attempts by the Spitsbergen route failed is that there is no land floe to stick to. On July 2nd the *Isabella* and *Alexander* were off Sanderson's Hope, the further point of Davis, and entering upon Baffin's work. Up to this time the whalers had never been north of 75° 10′.

The formidable ice-encumbered sea to the north received from Ross the name of Melville Bay. Here they were beset, pressure raised the ships out of the water, and they had to track through narrow lanes in the ice. The point at the north end of Melville Bay, so well known in after years, received the name of Cape York. Between Cape York and Cape Dudley Digges the crimson snow was seen from the ships, and Mr. Beverley landed on August 17th, and Ross's nephew on the 18th, to collect specimens of it[114].

It was on the 9th of August that people were first seen, coming over the ice in dog sledges. Sacheuse was sent out to meet them, but found that they spoke a different dialect from his own. Afterwards several were induced to come on board. A most interesting people had been discovered, for they had been isolated, possibly, for centuries. Captain Ross took great pains to collect information about them. He minutely described their persons, clothing, and weapons, and careful drawings were made of a dog sledge, narwhal-horn spear, and a knife made of thin circles of meteoric iron fixed into a bone handle. The iron was said to come from a place near called Sewallik. Ross and Sacheuse also collected 38 words, 24 of which had the same meaning as in the Greenland Eskimos' language. Sacheuse declared that the tradition of his people was that they came from the north and pointing to the newly-discovered men, exclaimed, "These are our fathers." Captain Ross gave them the name of Arctic Highlanders, and called the heights at the back, from Wolstenholme Sound of Baffin to Melville Bay, the Duneira Mountains.

The expedition then proceeded northwards, re-discovering Wolstenholme and Whale Sounds, and the Cary Islands. But here Captain Ross began to make fatal mistakes. He passed too far south of Sir Thomas Smith's Sound of Baffin to ascertain whether it was a channel, though he named the two points at the entrance after his two ships. It was the same with Sir Francis Jones's Sound. He entered and advanced some distance up Sir James Lancaster's Sound, but unfortunately he fancied that he saw high land across it, which he named the Croker Mountains after the Secretary to the Admiralty. He then sent Lieut. Parry, Captain Sabine, and a party on shore at a point on the south side of Lancaster Sound, which he named Cape Byam Martin, to take possession and make collections. This practically brought their work to an end, and a homeward course was set. On his return Captain Ross wrote in the highest terms of the correctness of Baffin's latitudes, and quite restored the good name of that illustrious navigator.

The mistakes of Captain Ross may well be forgiven, for his expedition was in many ways most fruitful in results. Among other researches, he took special pains to obtain specimens from great depths. For this purpose he invented a very ingenious contrivance which he called a deep sea clam, and on the 1st of September, 1818, in 73° 37′ N. he brought up a beautiful *Caput medusae* in 1000 fathoms. It was the first time any animal was brought up from anything approaching this depth. A

new and very interesting gull was also discovered by Captain Sabine on an island in Melville Bay, the *Xema sabinii*, usually found associated with the Arctic tern.

The most important results of Ross's expedition, however, were the restitution of Baffin's good name as a navigator and discoverer, the discovery of the Arctic Highlanders, and the training of several young naval officers in ice navigation. The greatest practical result was that his voyage showed the way to the whalers, and that by reaching the north water of Baffin's Bay they would find another very lucrative whale fishery. It was another example of the use of Arctic enterprises in furthering the commercial prosperity of the country which encourages them.

On the return of Ross's expedition there was an outcry about the supposed closing of Lancaster Sound, as some of the officers believed it to be a wide channel leading westward. Lieut. Parry was decidedly of that opinion. Sir John Barrow strongly represented the doubt to the Board of Admiralty, and it was decided that another expedition should be despatched in 1819.

CHAPTER XXIII

PARRY AND HIS SCHOOL

Sir Edward Parry was one of the greatest of Arctic discoverers. Without an equal as an organiser and administrator, unsurpassed as a leader of men, he was an accomplished officer and a bold and resolute navigator, knowing when to take risks and when to avoid them. Parry was a very perfect sailor, thoroughly well read in all that concerned his enterprises, thoughtful and levelheaded. While promoting hilarity and good-fellowship, he was, through life, deeply yet unostentatiously religious. He was the beau ideal of an Arctic officer.

Parry was the son of a physician at Bath, where he went to school. As a boy he was tall and athletic, very popular, with a good ear for music, a talent for acting, and a habit of doing all he had to do with all his might. Miss Cornwallis, a friend of the family and a near relation of the Admiral then in command of the fleet blockading Brest, obtained an appointment for him. Young Parry could not have entered the service under better auspices. He continued to serve in the Channel, Baltic, and North Sea, always fortunate with his captains and winning their regard, until he attained the rank of Lieutenant.

His next service was on the coast of Scotland, and one season his ship was employed to protect the returning whalers, when he made his first acquaintance with pack ice. In these days Parry was devoted to the study of navigation and surveying. He made several useful surveys of harbours in Scotland, which his captain sent to the Hydrographer, and he wrote a little book on nautical astronomy for the use of young officers which his father caused to be printed. It contained useful directions for finding stars in the northern hemisphere.

In 1813 he served on the North American station, and was engaged in an important and very dangerous boat action up the Connecticut river, when between 40 and 50 privateers and letters-of-marque vessels were burnt. On this station Parry formed a life-long friendship with Charles Martyn, the Admiral's secretary, who was about the same age, but died young in 1825.

After the peace Parry was anxious to be employed in an exploring expedition. He had been much interested in African discovery, and had read the narrative of Clapperton with deep interest. He therefore volunteered for Tuckey's Congo expedition, but could not get back in time to join it. His letter and his little book on nautical astronomy were shown to Sir John Barrow, who was so pleased with them that he recommended Parry, whose age was then 28, for the command of the *Alexander* in Ross's expedition. He then had had 15 years of service, and had necessarily acquired a considerable knowledge of ice navigation during Ross's re-discovery of Baffin's Bay.

The Lords of the Admiralty, as we have seen, were not satisfied with Captain Ross's report. It was thought that there should have been a closer examination of the sounds at the head of Baffin's Bay, and accordingly it was resolved that another expedition should be despatched to discover whether Lancaster Sound opened on to a channel leading to Bering Strait. Lieut. Parry received the command of the expedition, and nearly all the officers and men who had served in the Buchan and Ross expeditions volunteered to go with him. They were to receive double pay.

The memorable success of this expedition was perhaps due to the youthfulness of the officers. The oldest was Captain Sabine, R.E., the astronomer, who was 30. Beechey, Parry's first

Lieutenant, the accomplished artist and writer of the *Trent*, was 23. The other Lieutenant, Hoppner from the *Alexander*, was about the same age. The remaining executive officers were eight young midshipmen aged from 17 to 19, three rather more.

Two vessels were selected. The *Hecla* was a very strong bomb vessel of 375 tons, built at Hull in 1815. Her consort was a slow-sailing old gun brig, the *Griper* of 130 tons, with a deck of 6 feet raised upon her, to increase stowage. Lieut. Liddon commanded her. Both were barque rigged, the object being to restrict the number of men working the vessels. Stores and provisions were got on board for three years[115]. The main objects of the expedition were the advancement of the knowledge of geography and navigation, as well as of science generally.

On the 21st of July, 1819, the *Hecla* and *Griper* were off Sanderson's Hope, when Parry counted 88 icebergs from the crow's-nest. He boldly determined not to creep northwards along the land floe of Melville Bay, but to force a passage through the middle pack direct for Lancaster Sound. An older man would have hesitated. But there is no great success without risks, and young men take them. The ice was only 80 miles wide in that most favourable year, and Parry was at the entrance of Lancaster Sound by the 28th July.

It would be difficult to imagine a more exhilarating moment than that when the Croker mountains were found to have no existence and the wide channel was discovered, leading into an unknown region. The lofty cliffs, with their scored sides like pillars and buttresses, form a grand portal to the unknown, as Dr Fisher described them, "like an immense wall in ruins, rising almost perpendicular from the sea." There was a fresh breeze, and the *Hecla* ran quickly up the channel, with mast-heads and rigging crowded with officers and men eagerly looking westward.

Then there was some ice obstructing a westward course, but a wide channel opened to the south. Parry sailed down it for 150 miles, giving it the name of the Prince Regent, while the western land was called North Somerset, after Parry's own county. A strong ice-blink across the channel induced him to turn north again into the westward channel. Then a wide open channel was discovered to the north and received the name of Wellington, but that was not the way. Westward Ho! was the cry, with new discoveries and new islands in every watch: Cornwallis Island, named after Parry's first naval patron; Cape Hotham after one of the Lords who signed his instructions; Griffith Island after Admiral Griffith, who was first Lieutenant of the *Culloden* at the battle of St Vincent. On into the unknown sailed the *Hecla* and *Griper*. Upwards of 20 islands were discovered and named, the group collectively being called the North Georgian Islands. Pressing westward no landing was effected until an island was reached which was honoured with the name of the Comptroller, Sir Thomas Byam Martin. A more promising land was found, within sight of Melville Island, the Arctic paradise. Without knowing it Parry had passed the barren limestone isles, and his first landing was on the more promising carboniferous region.

Sailing along the south coast of Melville Island, so named after the First Lord of the Admiralty, the expedition crossed the 110th meridian and thus became entitled to the bounty of £5000. In September the young ice was forming fast, and the *Hecla* and *Griper* were brought into snug quarters by sawing a long channel through the ice. The top-gallant and topmasts were sent down, all but the maintopmast which was left as a guide to returning sportsmen, and waggon-cloth housings were rigged over the upper decks.

One of Parry's greatest merits as an Arctic explorer was his success in bringing officers and men through the long winter in good health. This was due to his forethought, power of organisation, genial disposition, and warm sympathy for all who served with him. He had prepared for a winter before leaving England. The closest attention was given to the prevention of damp between decks by means of hot air from the Sylvester stove. Good bread was baked, beer was brewed, and rules

were enforced respecting diet, clothing, and above all sufficient daily exercise. Parry wisely realised the equal importance of exercising the minds of his people. A school was opened to teach reading and writing, accomplishments which were not so general in those days as they are now. A newspaper, edited by Captain Sabine, and entitled the *North Georgian Gazette*, kept the officers amused, and they, in their turn, devoted themselves to the amusement of the men. Parry was himself a good musician, playing on the violin, and a capital actor. A theatre was erected on the upper deck in spite of the intense cold, and the farces popular in those days were performed by the officers, with songs between the acts. An operetta entitled the "North-West Passage" was also composed by Parry and acted with great applause. By these various means, and by giving the closest attention to every detail, the first modern Arctic winter was a splendid success. The gunner had slight symptoms of scurvy which were soon removed, and one man died of some other disease, but all the rest emerged from the winter in perfect health.

On the approach of summer Parry resolved to equip an expedition to explore the interior of Melville Island. The party was to consist of himself as leader, Captain Sabine, R.E., Dr Fisher, two midshipmen named Nias and Reid, two serjeants of marines, two privates, and two seamen. Tents were taken, consisting of blankets passed over a ridge rope, supported by two boarding pikes. Provisions were loaded on a cart made of boards and the wheels of a field-piece. There were three weeks' provisions, and the diet per man per day—which was insufficient—was: 1 lb. biscuit, ⅔ lb. of preserved meat, 1 oz. salep powder, 1 oz. sugar, and half a pint of rum. Besides dragging the cart with 800 lb. of provisions and tents, officers and men carried spare clothing and sleeping-bags on their backs as knapsacks, 17 to 20 lb. each. Small faggots of firewood were also taken.

The party reached the northern coast of Melville Island, and some land seen to the north-east and supposed to be an island was named after Captain Sabine. In returning, Parry kept more to the westward, towards a range always in sight which the party called the Blue Mountains. In an Arctic June the climate is not severe, and they travelled at night, sleeping in the comparative warmth of the day. As the party approached the southern coast, or rather the deep gulf on the south side of Melville Island afterwards called Liddon's Gulf, they entered a deep ravine. The scenery was grand and imposing. In the steepest part the axle-tree of the cart split in two. It was impossible to repair it, so it was left, the wood of the cart being used to make a good fire to cook their ptarmigan.



The Parry Islands.

Two reindeer were also shot, and musk oxen, hares, ducks, and brent geese were seen. The ravine of the broken cart was called “Bushnan’s Cove.” Parry described it as “one of the pleasantest and most habitable spots we have seen in the Arctic regions.” Mosses, dwarf willows, saxifrages, and ranunculi were found growing. Owing to the breakdown of the cart, the loads that each man had to carry on the return march to the ships were from 60 to 70 lb. On the 15th of June the ships were reached after an absence of a fortnight. The details of this journey are specially interesting because it was the first naval Arctic travelling of modern times.

Until the ships could be got out of their winter prison, shooting parties were sent in various directions for fresh food, and 3766 lb. were obtained, consisting of 3 musk oxen, 24 deer, 68 hares, 53 brent geese, 59 ducks, and 144 ptarmigan. An inscription was carved on a huge block of sandstone 12 feet high and 22 feet long by Dr Fisher. It will for centuries commemorate the wintering of Parry’s Arctic expedition in Melville Island.

When the ships got free of the ice, Parry again shaped a course to the west as far as Cape Dundas, meeting with large, heavy, and extensive fields of ice, which were quite impenetrable. This was the heavy ice-flow from the polar ocean which finally impinges on the north-west coast of King William Island. Nothing more could be done, and Parry resolved to return home, surveying

the west coast of Baffin's Bay to 68° 15′. The exploring ships arrived at Peterhead on the 29th of October, and were paid off at Deptford on December 21st, 1820, all in excellent health.

This is one of the most memorable of all the Arctic voyages. It practically settled the question of a connection between the two oceans. Great discoveries were made, and important scientific observations were recorded. An Arctic winter was faced with preservation of health and Arctic travelling was commenced. Men of science as well as sailors received excellent training. This was the only expedition which has produced a President of the Royal Society and a President of the Royal Geographical Society. Besides the training of Arctic officers who continued in that branch of the service, Parry's first voyage brought out qualities which shone forth in after years at the battle of Navarino and in the first China war[116].

The Arctic discoverers were received with enthusiasm by their countrymen, and the authorities justly placed the greatest reliance on the skill and judgment of Parry, who was promoted to the rank of Commander.

Captain Parry thought quite correctly that a passage could not be forced by a sailing vessel on the parallel of the south coast of Melville Island. His conclusion was that it could only be effected along the north coast of North America, in which again he was quite right. But at that time only the mouths of the Mackenzie and Coppermine were discovered, and the distribution of land and water to the north of America was known to be excessively complicated. Parry advised that the next attempt should be by way of Hudson's Bay.

The Admiralty accordingly resolved to despatch Parry on a second Arctic voyage. He was to investigate and settle doubtful questions about Middleton's Frozen Strait and Repulse Bay, and then to get hold of the north-west corner of North America, and if possible to follow that coast to Bering Strait. The *Griper* was too small, a bad sailer, and ill adapted for the work. The great point was to select two vessels with equal sailing qualities and of equal size. Two bomb vessels were therefore commissioned, the *Fury* of 377 tons by Captain Parry and the *Hecla* by Captain G. F. Lyon, with Hoppner as his first Lieutenant. The other Lieutenants were three of Parry's midshipmen in the *Hecla*, Nias, Reid, and Palmer. Bushnan[117] was Assistant Surveyor; James Ross, still a midshipman, was in every voyage. Three new midshipmen who were afterwards distinguished as Arctic men appear for the first time in the second voyage, Sherer, Crozier, and Bird[118].

Dr Fisher, who had published his journal of the first voyage, also joined the expedition, as well as Mr Hooper, the purser, who had been in the *Alexander* and *Hecla*, a genial person who took five characters in the theatricals at Winter Harbour[119]. The Rev. George Fisher[120] took Captain Sabine's place as astronomer. Captain Lyon was an officer of varied accomplishments, a capable traveller, a good writer, and an excellent artist.

Several improvements were made in the arrangements. The Sylvester stove, an excellent invention, was better placed, and supplied more constant currents of warm air. A tank was fitted over the galley fire for melting snow. Hammocks were substituted for standing bed-places for the men, and the allowance of Gamble's preserved meat and soup was increased. Greater economy in stowage was secured by having the spirits above proof; and more flour for baking bread was supplied instead of biscuit. The expedition sailed in May, 1821[121].

In passing through Hudson's Strait it is pleasant to find how warmly Parry appreciated the merits of his great predecessor Baffin as a navigator and observer. An island was named after him near his farthest point on Southampton Island.

Parry had to choose whether he would reach Repulse Bay by Sir Thomas Roe's Welcome or by Frozen Strait. Dobbs had declared that Frozen Strait did not exist, but Parry preferred the evidence of Captain Middleton to that of his malignant critic, and resolved to proceed up Fox Channel and along the eastern side of Southampton Island. It was very difficult navigation, but Parry was a consummate ice navigator, and he succeeded in reaching and passing through the Frozen Strait of Middleton, and in examining Repulse Bay. Thus the first part of his instructions was complied with.

The next duty was to examine the coast to the northward until an opening was reached. This was done with great care until the winter set in; every inlet, some of considerable depth, being surveyed in the boats. Winter quarters were found under the shelter of an island, and the same routine was established as at Melville Island. The theatre was rigged in much greater splendour, dresses had been supplied, and there were performances once a fortnight. The most successful night was when the "Rivals" of Sheridan was acted by the whole strength of the company. Captain Lyon, as Captain Absolute in the "Rivals," went through the last act with two fingers frost-bitten.

Eskimo parties visited the ships during the winter, and received much assistance in food. One of the women was a very intelligent draughtsman, and showed Parry by the use of her pencil not only a strait to the north, but also that he was on the eastern side of a great peninsula. It received the name of Melville Peninsula.

On the 2nd of July the ships were extricated from their winter quarters by sawing a long passage through the ice, and on the 12th a fine fresh-water river was discovered, with a magnificent waterfall 100 feet in height. Rich vegetation clothed its banks, and reindeer were seen browsing with their fawns. It received the name of the Secretary to the Admiralty, Sir John Barrow.

In August the long-looked-for opening was at length discovered. It was found to be a strait, about two miles in width, but loaded with ice. It was named Fury and Hecla Strait. The ships forced their way into it for some distance, but the main body of ice was firm, and young ice was forming. After beating about for several days in a heavy pack, they at length reached their second winter quarters at the island of Igloolik, near the entrance to the strait, where they found a colony of Eskimo. Many of them were old friends at Winter Island. The habits and customs of these natives were carefully studied, and an extensive vocabulary was made of their language.

After leaving Igloolik in the middle of August, 1823, the wind fell, the ships were beset, and drifted down Fox Channel in constant danger. At length they were liberated in Hudson's Strait and returned to England. Besides the geographical discoveries and the studies of Eskimo life, the scientific results of Parry's second voyage were published in a special volume, and Captain Lyon also published his narrative of the voyage. Parry was promoted to the rank of Post Captain.

Parry's discoveries led to the conclusion that an eastern portion of the polar sea was at no great distance from Repulse Bay, and could be reached by crossing the Melville Peninsula to the gulf called Akuli by the Eskimo. It was considered a point of great interest to trace the coast as far as the mouth of the Coppermine river. For this purpose the Colonial Secretary, Lord Bathurst, decided to employ Captain Lyon without loss of time, and the Admiralty supplied the *Griper*, a little vessel very ill adapted for such service, to take him to Repulse Bay, where he was to winter and begin his journey in the spring of 1825.

Captain Lyon left England on the 19th June, 1824, and after passing through Hudson Strait, endeavoured to reach Repulse Bay by way of Sir Thomas Roe's Welcome. He was most unfortunate. There was thick weather on the 1st September and the water rapidly shoaled, so Captain Lyon came to with two bowers and a stream anchor. There was a tremendous sea running and the ship was pitching bows under. It was high tide, the fall 12 to 15 feet, so that at low water the

total destruction of the ship seemed inevitable. The long boat was got ready, and at dawn a low beach was seen on which a terrific surf was running. At six the ship was lifted by a tremendous sea, and struck the ground with great violence along the whole length of the keel. Lyon thought this was the forerunner of her total wreck. All hope of saving her was gone. It is impossible to read Lyon's narrative, describing the magnificent behaviour of all his men, without feelings of admiration and pride. At 6 p.m. the rudder rose, and broke up the after lockers. Then the pressure ceased, and in the morning the anchors were weighed and the ship was saved.

In a few days thick weather, with heavy seas, came on again. Lyon let go both bowers and the sheet anchor; the seas swept them fore and aft, while streams of heavy ice kept driving down upon the ship. The wind increased to a hurricane and all the cables parted. The trysails were set, but the fore trysail gaff went and could not be lowered, every rope being encrusted with a thick coating of ice. They were still 80 miles from Repulse Bay, with no hope of ever reaching it, and accordingly Captain Lyon reluctantly decided on returning to England. He bore up with a sad heart on the 15th September. Yet such a grand story of the pluck and endurance of British seamen so admirably told is worth much more than the journey from Repulse Bay to Cape Turnagain, if it could have been accomplished. Captain Lyon, so enthusiastic, so dauntless, so able and so beloved, is one of the greatest ornaments of polar history[122].

Parry thought that Fury and Hecla Strait opened upon a sea which communicated with Prince Regent's Inlet, and here again he was right. His idea was in a third voyage to take that route, and there was a prospect of co-operation. Franklin was again exploring the northern coast, while Captain Beechey, Parry's old first Lieutenant, was conducting a scientific voyage in H.M.S. *Blossom* in the direction of Bering Strait, and extending discovery from the Icy Cape of Captain Cook to Cape Barrow.

At that period there was no lack of enthusiasm, and expedition followed on expedition in rapid succession. The *Hecla* was commissioned by Captain Parry, and the *Fury* by his old and faithful comrade in all his northern voyages, Captain Hoppner, on January 17th, 1824. Of Parry's old shipmates in former voyages, besides Hoppner, there were Sherer and James Ross, now Lieutenants; Crozier and Bird, still midshipmen; and Mr Hooper, the purser. The most distinguished of the new officers were Lieut. Foster, the Assistant Surveyor[123], and Horatio T. Austin, first Lieutenant of the *Fury*.

The Arctic ships were accompanied by a transport which filled them up at the Whale Fish Islands in Disco Bay. Here, on one of the smallest islets, the observatory was set up, and Lieut. Foster set to work with his magnetic instruments. Captain Parry and Hoppner went in a boat to the Danish settlement of Lievely on Disco Island, where they made the acquaintance of Lieut. Graah, the explorer of East Greenland.

On reaching the ice, Parry again resolved to attempt the middle pack, but this time he was doomed to disappointment. The ice was closely packed, and for upwards of 40 days they were battling with it. At length they reached Lancaster Sound, but it was late in September before they entered Prince Regent's Inlet. Parry resolved to take up winter quarters on the east side, in Port Bowen, which he had discovered in 1819.

As at Melville Island there was a very well attended school under the superintendence of Mr Hooper, the Purser, and Captain Parry was convinced that to the moral effect it produced on the minds of the men were owing their cheerfulness, good order, and in some measure the excellent state of health which prevailed through the winter. At Captain Hoppner's suggestion there was a change in the amusements. Masquerades were substituted for theatricals and with great success. In

the spring there were some travelling parties. Captain Hoppner got over some very difficult country inland, Ross and Sherer went north and south. But the great event was the capture of a "payable" whale by these two redoubtable young Arctics, who had also achieved a similar success during Parry's second voyage.

On the 20th of July the ships were released from their winter quarters and, standing over to the west side, began to shape a course to the south. Then the ice in the centre of the channel approached the land, and drove both ships on shore. They were got off, but the *Fury* was seriously damaged, officers and men being nearly exhausted by their efforts to keep her afloat. On the 21st August she was once more driven on to a stony beach under a very lofty perpendicular cliff, and hopelessly stranded. The hold was full of water. The greater part of her stores were landed and she was abandoned, officers and men being taken on board the *Hecla*. The *Hecla* reached Peterhead on the 12th of October, 1825, all hands in excellent health.

For a time Parry's Arctic work was laid aside, and on the 23rd of October, 1826, he was married to Isabella, daughter of Lord Stanley of Alderley. Meanwhile his proposal to attempt an approach to the Pole by way of Spitsbergen was under the consideration of the Admiralty. The idea was to make the attempt in boats, which might be hauled over intervening ice. The Admiralty approved, and the *Hecla* was ordered to be commissioned again, Mrs Parry hoisting the pennant, to the delight of all the old Arctics at Deptford. At this time Parry was also filling the office of Hydrographer at the Admiralty. His hands were pretty full.

The officers of the *Hecla* were Lieutenants James C. Ross, Crozier, and Foster, Assistant Surgeon Beverley, and Mr Halse the purser, who had served in all Parry's expeditions.

The *Hecla* rounded Hakluyt Headland and reached the high latitude of 81° 5′ N. on June 14th, 1827. Parry then placed the ship in a good harbour called Hecla Cove, on the north coast of Spitsbergen, in 79° 55′ N. and 16° 53′ E. Crozier was left in command, and Foster was fully occupied with his scientific observations. The two boats, called the *Enterprise* and *Endeavour*, left Hecla Cove on the 21st of June, Parry and Dr Beverley being in the first, James Ross and Bird in the second, with ten seamen and two marines in each. The boats were flat-bottomed, 20 feet long, with an extreme width of 7 feet carried well fore and aft. Their timbers were of tough oak and hickory. On the outside of the frame a new system of planking was adopted, in order to secure elasticity in the frequent concussions with the ice. It consisted first of a covering of waterproof canvas coated with tar, then a thin fir plank, then a sheet of felt, and lastly a thin oak plank, all secured to the timbers by screws. On each side of the keel there was a strong runner shod with metal, on which the boat rested when on the ice. A hide span across the fore part of the runners had two horsehair drag-ropes attached to it. The boats had two thwarts, a locker at each end, and a light framework along the sides for provisions and spare clothing; they carried a bamboo mast and tanned duck sail, 14 paddles, and a steer oar. They started with 71 days' provisions. The weight of each boat was 1539 lb., when loaded 3753 lb., or 268 lb. per man, besides four light sledges weighing 26 lb. each. The daily allowance for each man was 10 oz. of biscuit, 9 oz. of pemmican, 1 oz. of cocoa, and a gill of rum. They slept in the boats and travelled at night.

When they started the weather was calm and clear, and as they paddled past the Seven Islands with loose sailing ice ahead the prospect looked very favourable. But on the 23rd they came to the close pack and hauled the boats up on the ice in 81° 12′ 5″ N. The travelling work then began and was most laborious and disheartening. The floes were of small extent intersected by high ridges of hummocks, necessitating constant launching and hauling up of the boats. The snow was soft, and there were pools of water knee-deep on the floes. It was not until July 7th that they reached a level floe, and on the 11th ridges of hummocks 30 and 40 feet high were again encountered. On the 22nd

they at length came to large floes some miles in extent, but it was too late. The southerly drift of the ice was increasing to such an extent that they lost by drift as much as they gained by many hours of laborious and fatiguing work at the drag-ropes. Parry at length determined to retrace his steps. His highest latitude was 82° 45′, the highest that anyone attained for the next half-century. They were 172 miles from the *Hecla*, having travelled over 292 miles of ground—200 by water before reaching the ice and 92 over the floes.

After an absence of 61 days the boats reached Hecla Cove on the 21st August, and the ship arrived in the Thames on the 6th of October, 1827. If Parry had wintered in Hecla Cove and started in February he would have probably reached a much higher latitude. But success was not possible owing to the southerly drift of the polar ice. The weight of 264 lb. per man was much too great to drag for a lengthened period, and the daily allowance of food was too small. Experience would have corrected these details, and Sir Edward Parry, it should be remembered, was the pioneer of Arctic travelling without the mistakes of others to guide him.

Parry returned to his work as Hydrographer. Of his companions, James Ross, Crozier, and Bird afterwards won renown as Antarctic discoverers.

Parry was knighted on the 29th of April, 1829. Although his Arctic work was over, he was hard at work and in harness for the rest of his life. In 1829 he was offered the difficult post of Agent to the Australian Agricultural Company. Its affairs had been neglected and mismanaged, and the Directors turned to Parry, as a most able organiser, to restore their affairs to a proper footing. He was appointed Commissioner to the Agricultural Company in New South Wales, receiving also the D.C.L. at Oxford. He held the appointment for several years, returning to England in June, 1834. In 1839 he organised the Holyhead Packet Service, and in the same year became Comptroller of Steam Machinery. During Parry's time as Comptroller an immense advance was made in the use of steam, and it was due to his strong advocacy that the screw propeller was adopted for naval ships. In 1846 he was appointed Captain Superintendent of Haslar Hospital and Clarence Yard, a position which he occupied for five years, retiring in 1851.

Sir Edward took the warmest interest in the searches for his intimate and dear friend Franklin. His visit to the *Assistance* at Greenhithe was ever a sacred memory to us all. In 1853 he was appointed Lieutenant-Governor of Greenwich Hospital, and began to reside in January, 1854. He died at Ems on the 8th of July, 1855, and was buried at Greenwich.

Sir Edward Parry, as we have said, must be ranked as one of the greatest of polar explorers. No one else had so many and such great qualifications. His life was wholly devoted first to his country and next to the good of his fellow men. It has been the privilege of few men to have done so much good in his generation. His life story has been beautifully told by his son, and should be read by all.

CHAPTER XXIV

DISCOVERY OF THE NORTH COAST OF AMERICA. FRANKLIN—RICHARDSON—BACK—DEASE—SIMPSON—RAE

HITHERTO the northern coasts of North America had remained completely unknown save for the work of Hearne and Mackenzie, and it was felt that something should be done to fill up the large area of blank on the map. The Secretary of State for the Colonies now resolved that, with the co-operation of the Hudson's Bay Company, the coast-line should be discovered and surveyed.

The officer selected for this arduous duty was Lieutenant John Franklin, who had just returned from the command of the *Trent* in the Spitsbergen seas. Few officers of his age had seen so much service. A Lincolnshire lad, born at Spilsby and educated at Louth Grammar School, Franklin entered the navy at the age of 14, and in his very first ship, the *Polyphemus*, he was at the battle of Copenhagen and closely engaged. Next he joined the discovery ship *Investigator* under his relative Captain Flinders[124], and was for two years engaged in the survey of the coast of the great island to which Flinders gave the name of Australia. At last the old *Investigator* was found to be no longer seaworthy. She was condemned, and her captain, officers, and crew were embarked on board H.M.S. *Porpoise* for a passage to England.

Entangled among the reefs off the coast of Queensland, the *Porpoise* ran on shore, became a wreck, and young Franklin found himself one of 94 souls on a sandbank. Flinders went in an open boat to Port Jackson, 750 miles off, and returned with help, and eventually Franklin got a passage in a vessel bound for Canton, with the object of returning home in one of the East India Company's ships. He was taken on board the *Earl Camden*, Commodore Dance, and sailed with the China fleet of merchantmen, when as signal midshipman he took part in an ever-memorable action. In the Straits of Malacca the French Admiral Linois was encountered with a line-of-battle ship and three frigates, and after a sharp fight the French retreated, and were chased for three hours by the English merchantmen.

In 1804 Franklin joined the *Bellerophon* at the blockade of Brest, and on the 21st of October, 1805, was at the battle of Trafalgar, when he was once more signal midshipman. His next service was on board the *Bedford*, escorting the royal family of Portugal to Rio. He became a Lieutenant in 1808 and served in the Walcheren expedition. In 1813 he convoyed a fleet of merchantmen to the West Indies, and his last war service was a severe but successful action with American gun-boats near New Orleans.

Franklin gladly accepted the appointment offered to him by the Colonial Office to take command of an expedition to co-operate with Hudson's Bay Co. in exploring the north coast of America and surveying it. His colleagues were Dr Richardson, who had sole charge of the natural history work; two midshipmen named Back and Hood, selected for their proficiency as artists, and a blue-jacket named Hepburn. Other members of the expedition were to be engaged in the country, Hudson's Bay men and Canadian voyageurs.

George Back was then aged 22. He had entered the navy in 1808 on board the *Arethusa*, and served in boat actions on the north coast of Spain, where in his last fight 14 of his crew were killed

out of 18. Back was taken prisoner while making an attack on a battery of heavy guns at Lequeitio and was detained at Verdun until 1814. On regaining his liberty he served in the *Akbar* under Sir J. Byam Martin at Flushing, and afterwards on the North American station. He passed for Lieutenant in 1817, and in the following year joined the *Trent* under Franklin in the Spitsbergen voyage. Franklin gladly secured the gallant young officer's services again for his first land expedition.

It was a difficult task, as the narrative of Hearne made sufficiently clear. The explorers were to discover the north coast of America from the mouth of the Coppermine eastward. The party reached York Factory in Hudson's Bay in August, 1819, and Fort Chipewyan early in 1820. In July they were at Fort Providence on the north-east side of the Great Slave Lake, and early in August they set out for the Coppermine river, wintering at a station which was built on Winter Lake, and called Fort Enterprise. The fatigue and difficulty of travelling thus far were enormous. Franklin calculated that all the portages, each having to be traversed four times, made together 150 miles.

One of the North West Co.'s men having joined the expedition, the party now consisted of six Englishmen and twenty-six others, principally Canadian voyageurs. Franklin arranged with the Indians that, on his return, there should be supplies of food and Indians at Fort Enterprise.

The descent of the Coppermine river was then commenced, and the mouth was reached on the 21st of July, 1821. Franklin and his gallant companions then embarked on the polar sea in their frail bark canoes. It was a rock-bound coast, fringed with masses of ice which rose and fell with every motion of the tempestuous sea, and the undertaking was in the highest degree perilous in canoes only fit for lake navigation. Franklin nevertheless persevered in the discovery of the coast-line until the 18th of August, when he felt obliged to begin the return voyage. Their provisions were nearly run out, and they were disappointed at not meeting with any Eskimos, from whom they might have obtained supplies. Their furthest point was named Point Turnagain, and was 6½° of longitude to the east of the mouth of the Coppermine. Franklin decided to land in Arctic Sound, at the mouth of a river he had named after Hood, and make direct for Fort Enterprise, rather than return by the Coppermine. He hoped to find more game by the new route. The canoes were broken up in order to construct smaller and lighter boats for carrying round the portages, and they left the banks of the Hood river on the 3rd of September, making straight for Fort Enterprise. The country proved to be stony and barren, there was no game, and their stock of provisions was soon exhausted. All they had to subsist on was *tripe de roche*, a noxious unwholesome lichen. At last, on the 10th of September, after six days of starvation, a herd of musk oxen was seen, and one was killed.

Affairs were so serious that young Back volunteered to make his way to Fort Enterprise and send back Indians with the supplies that had been ordered to be collected there. Back started on the 4th of October, Fort Enterprise being then 24 miles distant. The rest followed, several in a state of extreme weakness. Some of the men got weaker every day. At last it was settled that Dr Richardson, with Hood and Hepburn, should remain with the sick, while Franklin, with the stronger men, went on to Fort Enterprise for help.

Franklin, living on *tripe de roche*, took four days to reach Fort Enterprise and, on his arrival, found to his horror and dismay that there were no Indians there, no provisions, and that the place was quite abandoned. There was a hurried note from Back saying that he had gone on in search of Indians, and that if he found none, he intended to walk to Fort Providence. He added that it was doubtful whether, in his debilitated condition, he could make the journey. The temperature at Fort Enterprise was 15° to 20° below zero.

On the 29th Dr Richardson and Hepburn quite unexpectedly arrived at Fort Enterprise. They had a sad tale to tell. They were the only survivors of their party, the others having died of cold and starvation. But the horrors were made far more appalling by the crimes of a Canadian voyageur

named Michel. There was little doubt that he had murdered two of his comrades, and feasted on their bodies, getting fat and strong while the others became weaker every day, and were at his mercy. He then shot Hood through the head, while the others were away collecting *tripe de roche*, and they found the body of their murdered friend on their return. Their only chance of survival now was the death of Michel. Dr Richardson undertook the duty, and shot him. The two survivors then walked on to Fort Enterprise. Here they all remained in the last stage of starvation until on the 7th of November three Indians arrived with food, having been sent by Back, and their lives were saved. The Indians treated the starving explorers with the greatest kindness, attending to all their wants until they arrived at Fort Providence on the 11th December.

Back's sufferings while in search of help had been quite as severe as those of his comrades he had left behind. His sole food consisted of a pair of leather trousers, a gun-cover, and an old shoe, with a little *tripe de roche*. At length, after some days, he fell in with the Indians and sent them with food to Fort Enterprise. Reaching Fort Providence he found Franklin's commission as Commander, and his own as Lieutenant. On his arrival in England Franklin was promoted to the rank of Captain on November 20th, 1822.

Franklin was busily employed, while in England, in writing the narrative of his expedition, and in August 1823 he married Miss Eleanor Porden. Their married life was a brief one, for she died in February 1825, soon after Franklin's departure on his second expedition, leaving a daughter.

When Parry sailed on his third voyage by way of Prince Regent's Inlet, it was resolved that Captain Beechey, in the *Blossom*, should co-operate by way of Bering's Strait, while another land expedition was despatched to the north coast of America. Captain Franklin and Lieut. Back were to explore to the westward of the Mackenzie River, while Dr Richardson and Mr Kendall were to survey the coast between the mouths of the Mackenzie and Coppermine. Three boats were specially built for the expedition, combining lightness with stability. The largest was 26 feet long, the other two 24 feet.

The expedition left England in February, 1825. For a few days the explorers rested at Fort Resolution, the only station of the Hudson's Bay Company on the Slave Lake, and then proceeded to the Mackenzie River, which was reached on the 2nd of August. They descended the river to the Hudson's Bay post called Fort Norman. Lieut. Back, accompanied by Mr Dease of the Hudson's Bay Company, was then sent to the Great Bear Lake to select a site and build a house for winter quarters. Franklin and Kendall went down the Mackenzie to its mouth. They all returned to Fort Franklin on the Great Bear Lake in 65° 11′ 50″ N. to winter. The party consisted of 15 seamen and marines, nine Canadian voyageurs, and some Indians with their families. Another boat was built and named the *Reliance*.

The two parties, led by Franklin and Richardson, left Fort Franklin on the 24th of June, 1826, descended the Mackenzie River together, and parted west and east where the delta commenced, on the 3rd of July. In making his way along the coast to the westward Franklin's boats were often in danger from heavy masses of ice, and suffered long detentions from foul weather. On the 18th of August he found it necessary to give up any attempt to proceed further, having discovered 374 miles of new coast. He named his furthest point Cape Beechey. Captain Beechey in the *Blossom* was off Icy Cape by the middle of August, and sent a boat to meet Franklin, and the two boats were within 160 miles of each other, but Beechey and Franklin were not destined to meet. Beechey discovered Point Barrow.

Franklin and Back returned to Fort Franklin on the 21st of September. Meanwhile Dr Richardson and Kendall had discovered and surveyed the coast between the mouths of the Mackenzie and Coppermine, returning to Fort Franklin by the Coppermine River.

The large island facing the north coast has received several names, but the Dominion Government wisely determined that it shall be known by one only—Victoria Island. The strait between Victoria and the mainland was named after the two boats in which Richardson and Kendall embarked, *Dolphin* and *Union*.

The expedition returned to England in September, 1827, after an absence of over 2½ years, having surveyed a coast-line of more than 1000 miles, hitherto unknown. Back was promoted to the rank of Commander, and Franklin was knighted in 1829. On the 5th of November, 1828, he married *en secondes noces* Jane the daughter of John Griffin of Bedford Place, who both on her father's and mother's (Jeanne Guillemard) side was of Huguenot stock. He commanded the *Rainbow* frigate in the Mediterranean from 1830 to 1834, and was appointed Governor of Tasmania in 1837. Franklin's narratives of his two expeditions were published in quarto volumes beautifully illustrated by Captain Back's drawings.

The next expedition to the north coast of America was a private one. A Committee raised the necessary funds, and the plan was to descend a river which was supposed to have its rise in the Great Slave Lake, and to fall into the Polar Sea. The object was to obtain tidings of, and to succour, the expedition of the Rosses, which had not been heard of for some years. Captain Back received the command, and his companion was Dr Richard King, a medical man. Only three other men were taken from England. The explorers started in February 1833, 15 men were engaged, and the expedition reached the Great Slave Lake. The source of what Back called the Great Fish River was discovered, but its course was found to be tortuous and full of rapids. Back, therefore, caused two boats to be built, specially adapted for river navigation, and for being taken over the portages. They were sharp at both ends, with good beam, and plenty of floor for stowage. They were 30 ft. long over all, 24 ft. keel, with extra oars, masts, and tillers. Their lower parts were carvel, and the upper clinker-built. Runners, plated with iron, were fixed on either side of the keel, so that they could easily be drawn over ice by six dogs and two men. Eight men formed the crew.

Captain Back and Dr King were thus well equipped for discovering the course of the Great Fish River. But at this juncture the news was received of the safety of the Rosses, and it did not seem justifiable to do more than descend the river to its mouth. This Back did, finding that the river has a violent and tortuous course of 530 miles, sometimes expanding into large lakes, and having 83 falls and cascades. The estuary was surveyed, together with a large island named Montreal. Back intended to have traced the coast as far as Cape Turnagain, but only got 15 miles westward to Capes Richardson and Maconochie. Captain Back and Dr King both published narratives of the Great Fish River expedition.

There still remained unexplored the coast line from Franklin's furthest to Cape Barrow on the west side, and from Cape Turnagain to Repulse Bay on the east. The Hudson's Bay Company resolved to undertake these discoveries. Peter Warren Dease, who had assisted the Franklin Expedition, and Thomas Simpson were selected for the duty. Simpson was a very intelligent and energetic young Scot, born at Dingwall in Ross-shire in 1808. Dease was much older. The equipment was arranged at Fort Chipewyan. The two boats were clinker-built, 24 ft. keel by 6 ft. beam, each with a small oiled-canvas canoe. They were named the *Castor* and *Pollux*. Thirty bags of pemmican, each weighing 9 lb., and 10 cwt. of Red River flour were taken for the whole season. The daily ration per man was 3 lb. of pemmican.

Descending the Mackenzie, Simpson pushed on along the coast, passing and naming the Colville river. When stopped by ice he resolved to reach Cape Barrow by land. He took eight men each with a load of 40 lb., including pemmican and flour, a blanket, ammunition and instruments, and one man carried a canvas canoe. They encountered very bad weather, but they reached the long

low spit of land which Captain Beechey had named Cape Barrow, and were welcomed by the Eskimos settled there. Simpson returned to the Mackenzie, and ascended that river to his winter quarters at Fort Confidence.

In the following year Simpson went down the Coppermine river, to discover the coast to the eastward. On the 17th of July, 1838, the voyage was commenced. On reaching Cape Turnagain, Franklin's furthest point, Simpson went on by land with five of the Company's servants and two Indians. Each man carried a weight of 50 lb., including a tent, a canvas canoe, a kettle, two axes, and provisions for ten days. Open water was seen along the shores of Victoria Island while the continental coast was choked with ice. The party, after this excursion on foot, returned by the Coppermine to Fort Confidence to winter.

On June 15th, 1839, Simpson set out again for the Coppermine river on foot, arriving where three men had been left in charge of the boat and baggage. The boat sailed past Cape Turnagain, and on the 11th of August the discoverers came to the strait, about ten miles wide, between the continent and King William Island. It was named Simpson Strait. On the 12th there was a tremendous thunderstorm, with torrents of rain, and the next day they reached Cape Ogle at the mouth of the Great Fish River.

On the 16th Simpson landed on Montreal Island, where a depôt left by Back was found. He then crossed the strait to King William Island and explored its southern coast for nearly 60 miles, until it turned north at Cape Herschel, where a lofty cairn was erected, on August 26th, 1839. They also went eastward along the American coast beyond the Great Fish River, calling their furthest point after their boats "Castor and Pollux." In returning, Simpson explored the south coast of Victoria Island.

Geographers were not satisfied until the region had been explored between Simpson's furthest and the Gulf of Akuli on the west side of Melville Peninsula, reported by Parry's Eskimo draughtswoman. The Geographical Society urged the importance of this discovery on the Admiralty, and the old bomb vessel *Terror* was commissioned by Captain Back, with much the same instructions as were given to Captain Lyon in 1824. Many of Back's officers had won or were to win distinction. His first Lieutenant, Smyth, an artist of no mean powers, was the second Englishman to descend the Amazon. Owen Stanley had served under Franklin in the *Rainbow* and became a very distinguished surveyor in Australian seas, McMurdo was afterwards with Ross in his Antarctic voyages, Graham Gore perished with Franklin, and M'Clure was the discoverer of a North West Passage. These splendid officers received their polar training under Back, in the icy storms of Fox Channel.

On the 14th of June, 1836, the *Terror* left Chatham. Passing down Hudson's Strait, Back chose Parry's route by Fox Channel for reaching Repulse Bay. The *Terror* was soon beset, and on the 13th of September they were a few miles from land, off Cape Comfort. The ship was closely wedged between blocks of ice, with no water in sight and was drifted backwards and forwards between Cape Comfort and Baffin Island. In this situation they entered upon an Arctic winter of exceptional severity. In the depth of winter the ice broke up, and huge masses continually dashed against the ship. She remained locked in the ice for four months, and dragged helplessly about, until at length she was liberated towards the end of July, 1837. Nothing could be finer than the conduct of Captain Back and his officers throughout this trying time. The *Terror*, battered and leaky, crossed the Atlantic almost in a sinking state. Early one morning they came in sight of the Irish coast. The first Lieutenant came down to the Captain, who was in his cot, "Captain Back, Sir!" "Yes, what is it?" "The ship's sinking, Sir." "Very good, Smyth, call me again at eight bells." That day they reached safety in Lough Swilly.

In 1845 Sir George Simpson determined to complete the discovery of the Gulf of Akuli, starting from a base at Repulse Bay, which was to be reached by boats from Fort Churchill. The command of the expedition was given to Dr John Rae, one of the Company's factors. The boats were constructed at York factory, clinker-built, 22 feet by 7 feet 6 inches, with two lug sails and a jib. The crew consisted of six Orkney men and two Canadian half-breeds. On July 24th, 1846, they arrived at Repulse Bay, where they wintered, having obtained 63 deer, 172 ptarmigan, 5 hares, and 116 salmon. They built a stone house, with a roof of moose skin, and made toboggan sledges, 6 to 7 feet long and 17 inches wide, of battens from the boats.

On the arrival of spring Rae resumed his journey, starting on April 5th. He had two sledges, each drawn by four dogs and six men. A snow house was built each night. The food was pemmican, reindeer tongues, flour, tea, chocolate, and sugar. Rae carried the books and instruments himself, a weight of 35 lb. The rations were 1½ lb. of pemmican daily for each man and ⅓ lb. of flour, but they obtained a seal from the Eskimo, and had seal meat for eight days. They explored the west side of the Gulf of Akuli as far as Lord Mayor's Bay of Ross and returned May 5th, having proved that there is no outlet to the westward as was expected.

Rae's next journey was for 28 days, from May 13th to June 9th, to explore the west side of Melville Peninsula as far as the entrance to Fury and Hecla Strait. The party, travelling over soft snow, only got within ten miles of the Strait. Rae says that he traced 655 miles of new coast. He certainly settled the question of any sea from Fury and Hecla Strait to Cape Turnagain, and proved that Boothia was a peninsula, not an island. The Gulf of Akuli is the termination of Prince Regent's Inlet.

In 1818, as we have seen, nothing was known of the northern coast of America but the mouths of the Mackenzie and Coppermine rivers. In 1848 the whole coast had been mapped, from the Icy Cape of Cook to the Fury and Hecla Strait of Parry, a distance of 1000 miles. Franklin, Richardson, Back, Dease, Simpson, and Rae were the discoverers, and their achievements entailed deeds of heroism such as have never been surpassed, and seldom equalled, in the whole history of discovery.

CHAPTER XXV

JOHN ROSS, JAMES ROSS, AND THE NORTH MAGNETIC POLE

After his return from the re-discovery of Baffin's Bay, Captain Ross must have continually regretted his mistake about Lancaster Sound. He was discredited, and longed to have another opportunity given him. When Parry returned from his northern journey in 1827, Captain Ross offered his services to the Admiralty to lead another expedition for the discovery of a North West Passage. His idea was to take up the plan of Parry's third voyage and seek for a passage at the south end of Prince Regent's Inlet. The Admiralty declined, but he was fortunate enough to find an old friend who was willing to supply the funds. This was Sheriff Felix Booth, who gave him £18,000 towards the expenses of an expedition. Captain Ross bought an old packet that used to run from Liverpool to the Isle of Man. She was only 85 tons, but her stowage was increased by raising 5½ feet upon her, and she was fitted with an engine and paddle-wheels, but the engine was scamped and badly made, and proved useless. She was named the *Victory*. Captain Ross persuaded his nephew to go with him. James C. Ross, now 29 years of age, had been with his uncle in the *Isabella* and with Parry in all his voyages, and in his last northern journey. In all his Arctic service he had been a diligent observer, giving special attention to magnetism. He also studied natural history and was a careful collector: moreover his prowess had been shown in having killed and secured more than one payable whale. He was the life and soul of his uncle's expedition, and such success as it obtained was mainly due to him.

Mr Thom, who had been with Captain Ross in the *Isabella*, was purser, and Dr M'Diarmid, surgeon. Blanky, the first mate, had been with Lyon in the *Griper*, and with Parry in the *Hecla* in 1827. The second mate, Thomas Abernethy, was a character who served in many expeditions, whom I knew well in after years. He was born at Peterhead in 1802 and went to sea at the early age of ten, serving in several voyages to Davis Strait. He had been ten years at sea when he was wrecked in the *Fury* in 1825. He was with Parry in 1827, and was afterwards gunner of the *Blossom*. Abernethy was a very handsome man with a well-knit frame, and was resourceful and thoroughly reliable. The crew consisted of nine good men, and seven weak or useless hands.

On July 5th, 1829, the little *Victory* was off Cape Farewell. After a short stay at Holsteinborg she was very fortunate in passing through the ice of the middle pack, and it must have been with strange feelings that Captain Ross entered Lancaster Sound, and sailed over his Croker Mountains. The ship entered Prince Regent's Inlet, visited the beach where the *Fury* was wrecked, so well known in after years as "Fury Beach," and sailed onwards to the south, hoping for an opening westward. Upwards of two hundred miles of previously unknown coast-line were thus revealed. Captain Ross gave to this new land the name of Boothia Felix, in honour of his generous friend who fitted out the expedition, and ultimately the *Victory* was established in winter quarters in "Felix Harbour" on the coast of Boothia in latitude 69° 59′ N.

It was not until January, 1830, that Eskimos were met with. Their dwellings, which they could build in 45 minutes, were circular domes of snow, 10 feet in diameter, entered by a long passage. Light was given to the interior by an oval piece of clear ice, half-way up the dome. The stone lamp was fed with oil and moss, and the cooking-dish was also of stone. They used canoes for fishing in the summer, and a very remarkable kind of sledge in the winter, drawn by dogs. To construct this a

number of salmon are packed together into a cylinder 7 feet long and wrapped up in skins well corded with thongs. Two of these cylinders are pressed into the shape of runners, and left to freeze. Cross-bars made of the legs of deer or musk oxen are then fixed across, and the bottom of the runner is covered with a mixture of mossy earth and water, which freezes to the depth of two inches. The icy surface is then made smooth so as to run easily over the snow.

Captain Ross gave a very good character to this Eskimo tribe, whom he named Boothians. They are very affectionate to children, and treat their aged people kindly. They are also very kind to their dogs, never driving them for more than four days in succession, seldom so much, and then giving them a day or two's rest. The tribe only numbered about 160 souls, and were quite uncontaminated by civilisation. Like the Eskimos of Igloolik the Boothians proved intelligent geographers. One of them drew a chart showing that Prince Regent's Inlet ended with the Gulf of Akuli, and that there was no channel leading westward, a statement which was afterwards confirmed by Dr Rae. James Ross, who conducted all the travelling, received much assistance from these people. They lent him dogs, sometimes drove them for him, and gave him much useful information.

The young commander started on his first journey with a sledge and six dogs on March 11th, 1830. Several short journeys followed. At last he crossed the Isthmus of Boothia, 15 miles wide, with a large lake in the middle, and reached the western sea. On May 17th he commenced the great journey with Abernethy, first crossing the isthmus and turning northwards. He had 31 days' provisions and eight dogs. He discovered a bay or channel with a large island in it, which was named Matty Island. Crossing the channel, Ross and Abernethy left everything they could spare, and pushed onwards to the northern point, named Cape Felix, which was 200 miles from the ship. The newly-discovered coast was named King William Land, and Ross appears to have thought that it was part of the mainland of North America. The coast then trended to the south, to a point which Ross named Point Victory (69° 37′ 49″ N). Here a cairn six feet high was built, and a canister deposited in it with an account of their proceedings. The furthest point visible to the S.W. received the name of Cape Franklin.

On May 30th, 1830, the return journey was commenced, and they reached their depôt the next day, ultimately arriving at the ship in safety. The dogs, which had been overworked, had been useless after the eighth day.

James Ross had been very diligent in taking magnetic observations, and had deduced from them the position of the magnetic pole. After the second winter he commenced his journey to the exact spot with Blanky and Abernethy, and accompanied by Captain Ross as far as the western sea. On the 31st May, 1831, the party arrived at their destination. They discovered some abandoned snow huts which they found very useful. The land was low near the coast, rising into ridges of 50 or 60 feet about a mile inland. The dip of the needle was 89° 59′ and there was total inaction of the horizontal needle. The British flag was fixed at the magnetic pole in 70° 5′ 17″ N. and 76° 16′ 4″ W. Leaving Blanky with the party, James Ross and Abernethy went on, and at their furthest point found the coast line still running north. Here they built a cairn of stones. In returning to the ship they were detained by a gale, and did not reach it until the 13th of June, an absence of 17 days. A large supply of fish had been secured during the summer.

During the three summer seasons it had never been possible to get the *Victory* clear of the ice. She left Felix Harbour only to be driven into another hard by, which was named Victory Harbour. A third winter was approaching, and it thus became evident that it would be absolutely necessary to abandon the ship and retreat to Fury Beach in the ensuing summer. After the third winter preparations were accordingly made for a retreat, and on May 29th, 1832, the ship was abandoned. They travelled on, going round every bay and inlet owing to the roughness of the ice outside. James

Ross with a sledge crew of the strongest men, Abernethy and Park, pushed on to Fury Beach, and returned with supplies of food for the sick and weak. On July 1st they all arrived at Fury Beach, and a house was built for the winter. There were plenty of birds, 50 dovekies being shot on the 7th, and 100 on the 17th.

At Fury Beach they found three of the *Fury's* boats, and Captain Ross and his nephew, with selected crews, proceeded in them to see the state of the ice in Lancaster Sound. They got as far as Leopold Harbour, and on September 2nd Captain Ross climbed the hill on the south side, about 600 feet high, but could see nothing but closely-packed ice. Returning, they left the boats in Batty Bay, and journeyed on to Fury Beach, where they passed a wretched winter—their fourth. The fifth summer found them weak and desponding. Their only hope was to meet a whaler in Lancaster Sound, and for this they set out. First there was a long journey to the boats in Batty Bay, the sick being dragged on sledges. Only two men had died, a man who had consumption when he shipped, and Mr Thomas, the carpenter. Fortunately the boats met with the *Isabella* whaler in Lancaster Sound, the same vessel in which Captain Ross had re-discovered Baffin's Bay in 1818. They were hospitably received, and reached England in the following October.

Never before had explorers passed four consecutive winters in the Arctic regions. The results were commensurate with their perseverance. Upwards of 260 miles of coast line were discovered in the ship, and the sledge journeys of James Ross covered another 500 miles of newly-discovered land. The position of the magnetic pole was fixed, and a large collection of natural history specimens was made.

The gallant explorers were very cordially welcomed in England. Captain Ross was knighted and all he had expended was refunded to him. James Ross was made a Post-Captain, and many of the crew received recognition of their services. A Committee of the House of Commons refunded to Felix Booth the £18,000 he had expended on the expedition, and he was created a Baronet. Sir John Ross was appointed Consul at Stockholm in 1838.

Captain James Ross was soon employed on the magnetic survey. His services were needed in 1836 for the relief of some whalers supposed to have been frozen up. He fitted out a ship called the *Cove* at Hull, taking Crozier with him as First Lieutenant, and Erasmus Ommanney, then a young Lieutenant, who got his first experience of ice navigation in this voyage. The mate was A. J. Smith, who was afterwards with Ross in the *Erebus*.

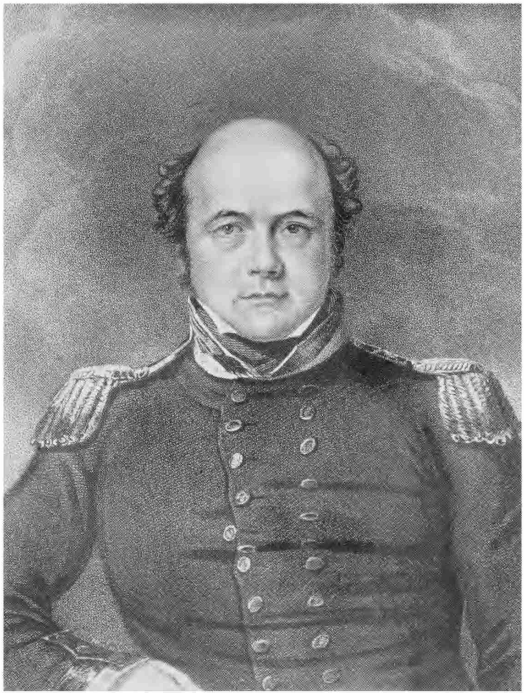
James Ross had now served fourteen navigable seasons and eight winters in the Arctic regions, a record never reached by any other man.

CHAPTER XXVI

THE FRANKLIN EXPEDITION

WHEN Sir James Ross returned from the Antarctic expedition, there were the two well-fortified bomb vessels, the *Erebus* and *Terror*, ready for Arctic work. Sir John Barrow was still Secretary of the Admiralty, and as eager as ever for the discovery of a North West Passage. There were the ships and he knew the best man in the navy to command them. James Fitzjames made the acquaintance of young John Barrow at the time when he was in the *Excellent*, passing out as a gunnery lieutenant, and he afterwards became acquainted with his father. Fitzjames was certainly an exceptionally fine character, and held a splendid record. He was in all the operations on the coast of Syria in 1840, and soon afterwards he and his friend Charlwood were specially selected to take out a steamer for Colonel Chesney's expedition, transport her in pieces across the desert, and put her together for service on the Euphrates. He served for two years with Chesney in Mesopotamia, and was the gunnery lieutenant of the *Cornwallis* during the China War. He was in nearly all the actions, including the command of the rocket brigade at the taking of Nankin, when he was severely wounded. Fitzjames wrote a graphic and most amusing history of the war in verse, which was published. Promoted to the rank of Commander for his distinguished services, he received command of the *Clio* brig, and was very usefully employed in the Persian Gulf. It was at this time that John Barrow hinted to him the possibility of Arctic work, and he at once eagerly volunteered.

When he paid off the *Clio* in October, 1844, the proposal was further discussed with Sir John Barrow. Before long it was settled, so far as the Secretary of the Admiralty could settle it, that there should be an expedition with Fitzjames in command, and his friend Charlwood in the second ship.



Sir John Franklin

Fitzjames was an orphan, an excellent sailor, full of zeal and devoted to his profession. He was exceedingly popular, and an officer of rare ability, with a talent for organisation and the management of men, the beau ideal, in short, of an Arctic leader. But Sir John Barrow reckoned without his Lords. They approved the scheme, but pronounced Fitzjames, who was 33, and four years older than Parry in his first voyage, to be much too young to have the command.

Sir John Franklin had just returned from Tasmania, where he had made an excellent Governor. But in the last year he had suffered much annoyance from the insubordinate and disloyal intrigues of the Colonial Secretary. Lord Stanley, then Secretary of State for the Colonies, took the part of the intriguer and not only treated Sir John Franklin with great injustice but with flagrant discourtesy. Franklin came home very sore at heart, and when he heard of the expedition he pressed for the command. But he was nearly 60, at least 20 years too old. Sir James Ross, fifteen years younger, had been offered it, but declined on the score of age. Lady Franklin wrote that “such an appointment would do more than anything else to counteract the effect of Lord Stanley’s tyranny and injustice.” “I dread exceedingly the effect on his mind of being without honourable and immediate employment.” Lord Haddington, the first Lord, then consulted Sir Edward Parry, who represented that the refusal of Sir John’s application would be a severe blow to him. He was appointed with some hesitation and misgiving. Sir John Barrow then assured Fitzjames that he would have the command of the second ship. But Captain Crozier, who was at Naples, came back and laid claim to the second ship as an experienced Arctic officer. He was appointed, though much too old. All this was a bitter disappointment to Fitzjames. But when Sir John Barrow told him he could go as commander under Franklin if he thought it worth his while, he at once accepted. He was delighted with Franklin and they worked together in perfect harmony.

Fitzjames naturally had a good deal to do with the appointment of officers. The First Lieutenant of the *Erebus* was Graham Gore, who was at the battle of Navarino, and with Sir George Back in the *Terror*. He served in the China war under Nias, who had been Parry's midshipman in his first two voyages and was "a man of great stability of character, a very good officer, and the sweetest of tempers" wrote Fitzjames. The second Lieutenant was Le Vescomte, who was First Lieutenant with Fitzjames in the *Clio*; the third, Fairholme, had been through trying adventures in Africa. When in command of a prize slaver he was wrecked on the African coast and captured by the Moors, who carried him off as a prisoner, but he was ultimately rescued by some French negroes on the Senegal. He next served with Fitzjames in the *Ganges* in the Mediterranean, afterwards volunteering for Trotter's Niger expedition. He went up the river as far as Egga, but was invalided. Afterwards he was in the *Excellent* and *Superb* until he joined the *Erebus*. He was a zealous, smart young officer, as also was Des Voeux, who was with Fitzjames in the *Cornwallis*. He was then "a most unexceptionable, light-hearted, obliging young fellow." Of the two youngest officers, Sargent and Crouch, many good things were said. In the *Terror* were Hodgson, who was with Fitzjames in the *Cornwallis*, and Irving, a relation of Sir George Clerk of Penicuick[125], who had had experience of roughing it in the Australian bush. Hornby—a good officer and messmate but a little disappointed at having so long to wait for his promotion—and young Thomas, were the mates in the *Terror*. Dr Goodsir, a man of considerable scientific attainments, was the naturalist in the *Erebus*, and Macdonald, the Assistant Surgeon of the *Terror*, had been for a cruise in a whaler, and had some knowledge of the Eskimo language.

Sir Edward Parry was often down at Woolwich when the ships were fitting out, giving Fitzjames the benefit of his experience. The *Erebus* was an old bomb vessel of 370 tons, very strongly built, and with a capacious hold. The *Terror* was also a bomb vessel, rather smaller, of 340 tons, repaired after Back's voyage, and specially strengthened. Fitzjames was very anxious to have steam power. There was little time, but it was arranged that each ship should have a small auxiliary engine and screw, to propel them a few knots during calms. This was the first time a screw steamer was used in Arctic service.

Crowds of visitors came to see the ships before they left Woolwich. On the 18th of May Sir John Franklin performed divine service for the first time, off Greenhithe, and on the 19th the expedition started with the brightest prospects.

Franklin's instructions were to make for the coast of North America by passing west of Cape Walker, high land seen by Parry at a distance, to the south of Barrow's Strait. He was also authorized to try a route by Wellington Channel, if he found it free of ice.

At the Whale Fish Islands the observatory for magnetic observations was set up on the same little island where Parry had done similar work in his third voyage. From here they sailed away to battle with the ice. The *Erebus* and *Terror* were last seen by the *Prince of Wales* whaler, Captain Dannett, in 74° 48′ N., 66° 13′ W. All were well and in remarkable spirits.

The expedition reached Lancaster Sound. Wellington Channel was found to be clear of ice, and Sir John Franklin was persuaded to try that route. Passing Cape Riley, Fitzjames must have noticed the excellent winter quarters formed by Beechey Island. Reid, the Greenland pilot of the *Erebus*, and Blanky of the *Terror*, who had served with Ross, were in their respective crow's nests, reporting "Water ahead! large water!" So the ships sailed gaily up the channel for a hundred miles, reaching 77° N. There they were stopped by impenetrable floes of heavy ice. The ships' heads were accordingly turned to the south and they sailed down a strait which they discovered between Cornwallis and Bathurst Islands, finally taking up winter quarters in the snug harbour formed by

Beechey Island. Great discoveries had been made, and no expedition had ever accomplished so much in a first season.

The winter at Beechey Island was no doubt passed happily. There was scientific work, and such a genial commander as Fitzjames would be sure to have provided plenty of amusement for officers and men. In the spring a workshop and an observatory were built on shore, and a garden was laid out with all the flora of North Devon. The naturalist had a station at Cape Riley. Shooting camps were formed at Cape Bowden to the north, and Caswall's Tower to the east, sending in supplies of fresh food for the ships' companies. But a cloud loomed upon their horizon, for the terrible discovery was made that the greater part of the tinned provisions were unfit for food. A third winter would be fatal.

Three men died during the winter, but on the whole the explorers must have emerged from their winter-quarters full of hope and bright anticipations. The water was making fast in the offing. A canal was cut to the edge of the ice, and at last the good ships were free. A record was certainly left in the cairn, but it was never found. We do not know whether any attempt was made to push westward from Cape Walker, in accordance with the instructions. If so, the impracticable character of the ice would soon have been discovered. Then the explorers would turn for a passage to the east of Cape Walker. Parry had seen this cape as a distant land to the south. Probably he saw a coast as well, which led him to call it a cape rather than an island. Nothing was known between the north coast of North Somerset and Cape Walker. It was evidently a very open season. The ships sailed on without hindrance, making discoveries of land on either side, all on board full of excitement and hope. At length they reached the latitude of Ross's magnetic pole. Then the fatal choice was made.

It was all open to the south. If they had continued on their southerly course the two ships would have reached Bering Strait. There was the navigable passage before them. But alas! the chart-makers had drawn an isthmus (which only existed in their imagination) connecting Boothia with King William Land. So the explorers thought that the only way was round the western side of King William Land. They altered course to the west, and were lost. For they were soon beset in that mighty ice-pack which flows down from the great polar ocean and impinges on the north-west coast of King William Land. The ships were in a precarious position, yet they must still have been full of hope that they would reach the coast of North America in the next navigable season. They were drifting very slowly to the west.

In the spring of 1847 travelling parties were organised. Fitzjames provided them with records in tin cylinders to be deposited in cairns. The records were as follows:

H.M. ships *Erebus* and *Terror*
Wintered in the ice in
Lat. 70° 5′ N. Long. 98° 23′ W.

28 May 1847.

Having wintered in 1846–47[126] at Beechey Island in Lat. 74° 43′ 28″ N. Long. 91° 39′ 15″ W. after having ascended Wellington Channel to Lat. 77° and returned by the west side of Cornwallis Island.

Sir John Franklin commanding the expedition,

All well.

Party consisting of 2 officers and 6 men left the ships on Monday 24th May 1847.

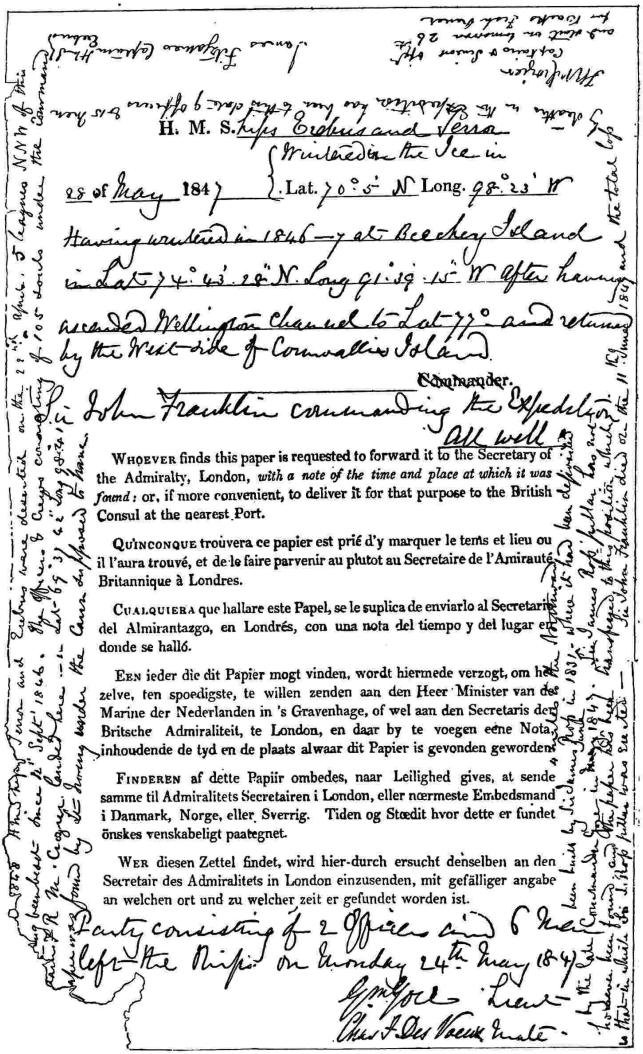
GM GORE, *Lieut.*
CHAS. F. DES VOEUX, *Mate*.

One party, probably led by Fitzjames himself, went east for magnetic observations, passing Cape Felix of Ross. The other, under Graham Gore, advanced southwards to the Cape Herschel of Simpson, and thus discovered the North West Passage. Franklin's party was thus the first to discover the connection of the Atlantic and Pacific Oceans.

When the travelling parties returned they found that Sir John Franklin was dying. He heard of the discovery of the North West Passage, he was confident that the ships would get clear in the summer, and he was in comparative comfort. Doubtless he bade farewell to officers and men, sent messages to Lady Franklin, and died happy and full of hope. His funeral is admirably portrayed in the bas-relief below his statue, by one who knew the Arctic regions well. The beautiful epitaph in Westminster Abbey is by Franklin's nephew-in-law, the poet Tennyson[127]—

Not here! the cold North hath thy bones, and thou
Heroic sailor soul
Art passing on thy happier voyage now
Toward no earthly pole.

The date of Sir John Franklin's death was the 11th of June, 1847.


H. M. S. Erebus and Terror

Whoever finds this paper is requested to forward it to the Secretary of the Admiralty, London, *with a note of the time and place at which it was found*: or, if more convenient, to deliver it for that purpose to the British Consul at the nearest Port.

Qu'inconque trouvera ce papier est prié d'y marquer le tems et lieu ou il l'aura trouvé, et de le faire parvenir au plutot au Secretaire de l'Amirauté Britannique à Londres.

Cualquiera que hallare este Papel, se le suplica de enviarlo al Secretario del Almirantazgo, en Londrés, con una nota del tiempo y del lugar en donde se halló.

Een ieder die dit Papier mogt vinden, wordt hiermede verzogt, om hetzelve, ten spoedigste, te willen zenden aan den Heer Minister van de Marine der Nederlanden in 's Gravenhage, of wel aan den Secretaris der Britsche Admiraliteit, te London, en daar by te voegen eene Nota, inhoudende de tyd en de plaats alwaar dit Papier is gevonden geworden.

Finderen af dette Papiir ombedes, naar Leilighed gives, at sende samme til Admiralitets Secretairen i London, eller nærmeste Embedsmand i Danmark, Norge, eller Sverrig. Tiden og Stædit hvor dette er fundet önskes venskabeligt paategnet.

Wer diesen Zettel findet, wird hier-durch ersucht denselben an den Secretair des Admiralitets in London einzusenden, mit gefälliger angabe an welchen ort und zu welcher zeit er gefunden worden ist.

EEN ieder die dit Papier mogt vinden, wordt hiermede verzogt, om her zelve, ten spoedigste, te willen zenden aan den Heer Minister van de Marine der Nederlanden in 's Gravenhage, of wel aan den Secretaris der Britsche Admiraliteit, te London, en daar by te voegen eene Nota, inhoudende de tyd en de plaats alwaar dit Papier is gevonden geworden.

FINDEREN af dette Papiir ombedes, naar Leilighed gives, at sende samme til Admiralitets Secretairen i London, eller nœrmeste Embedsmand i Danmark, Norge, eller Sverrig. Tiden og Stœdit hvor dette er fundet önskes venskabeligt paategnet.

WER diesen Zettel findet, wird hier-durch ersucht denselben an den Secretair des Admiralitets in London einzusenden, mit gefälliger angabe an welchen ort und zu welcher zeit er gefundet worden ist.

J. Netherclife Senr. Farsun 6th 113 St Martin's Lane
London. John Murray, Albemarle Street. 1859

Lieut. Graham Gore, his warm-hearted and steadfast friend, soon followed his beloved commander. With the rest there was hope of release during the summer months, but, as the month of September came to a close, hope must have given way to something like despair. For the ships had been much knocked about in their slow drift from off Cape Felix to about fifteen miles from Cape Victory of Ross, a distance of about 30 miles. If they ever got free of the ice it was doubtful whether they would float. There was scarcely sufficient food for the third winter, and what remained was slow poison. Nine officers and thirteen men died during that fearful winter, and the rest were much reduced and very weak.

Crozier and Fitzjames must have known the danger only too well. There must be a retreat by Back's Fish River, but only the strongest would be able to get so far and none were really strong. Fitzjames set to work to prepare two boats for the ascent of the river, taking as his model the boat described by Sir George Back and Dr King. The boats were originally carvel-built. For the seven upper strakes thin fir planks were substituted clinker-fashion, for the sake of lightness. Above the upper strake a weather-cloth, nine inches wide, was battened down round the gunwale, supported by 24 stanchions, so placed as to serve as thole pins for rowing. Six paddles were made for each boat, and they were provided with masts and sails, and sloping canvas awnings. The boats were 28 feet long and 7 feet 3 inches in beam. The sledges on which they were to be carried until they reached the open water required very careful consideration. There might be very rough ground, and it seems to have been thought that it would not be safe to sacrifice strength for lightness. The sledges, therefore, consisted of solid oak runners 23 feet 4 inches long, 8 inches high, and 2½ inches thick, with five oak cross-bars 4 feet long, bolted down to the runners, which were shod with iron. On the cross-bars there were supporting chocks for the boat, securely lashed. The drag ropes were 2¾-inch whale lines, the weight of the sledge 650 lb. Food and fuel for 103 men for 30 days would weigh 10,600 lb. If all hands dragged, the weight would even then be 200 lb. per man. It was indeed a forlorn hope. If succour came down the river in 1848 some might be saved. Crozier and Fitzjames did all for their people that was possible. The date of abandoning the ships was fixed at April 22nd, 1848. Boats' cooking apparatus, pickaxes, spades, silver of the officers' messes and other things of the sort for barter with the natives were taken and much clothing. There were also mementos of

those who had passed away, taken for their relations, such as Sir John's orders, a few books, and watches.

The travelling parties, with the two heavy boat sledges, started on their journey with a full knowledge of their condition, and that many must fall by the way. No more heroic band ever went forth to die. They had made great discoveries and had served their country right well.

They reached Cape Victory of Ross, on King William Island, and encamped. Lieut. Irving found the cairn erected by Graham Gore in the previous year, and brought the printed form, with the lines written on it, mentioned on p. 243, to Captain Fitzjames. Fitzjames had some ink thawed, and wrote round the margin:—

> In 1848, H.M. Ships *Terror* and *Erebus* were deserted on the 22nd April 5 leagues N.N.W. of this, having been beset since 12 Sept. 1846, the officers and crews consisting of 105 souls under the command of Captain F. R. M. Crozier landed here in Lat. 69° 37′ 42″ N. and Long. 98° 41′. This paper was found by Lieut. Irving under the cairn supposed to have been built by Sir James Ross in 1831 4 miles to the northward where it had been deposited by the late Commander Gore in June 1847. Sir James Ross's pillar has not however been found, and the paper has been transferred to this position, which is that in which Sir J. Ross's pillar was erected—Sir John Franklin died on the 11th June 1847, and the total loss by deaths in the Expedition has been to this date 9 officers and 15 men.
>
> JAMES FITZJAMES, *Captain*
> H.M.S. *Erebus*.
>
> F. R. M. CROZIER,
> *Captain and Senior Officer*.
>
> And start on to-morrow 26th for Back's Fish River.

On the 26th, in the early morning, preparations were made for a start. The men had much less strength than they supposed. Much had to be left behind. The boat's cooking apparatus, shovel, pickaxe, canvas, blankets, even Hornby's sextant, a dip circle, the doctor's medicine chest, and a pile of warm clothing were left, the latter making a heap four feet high.

Even thus lightened the boats were still much too heavy. Many of the men dropped and died; Crozier probably succumbed early at the cape which now bears his name, where a grave was found. A few reached Todd Island with one boat. The other had been left, full of a great variety of things, near Cape Crozier. The survivors crossed the strait and reached the bay formed by the long promontory ending at Cape Richardson. A few wandered inland. All perished. When the ice loosened the *Erebus* sank. The *Terror* was drifted on to the American coast, and ransacked by the Eskimos. Then a gale drove her off the rocks into deep water, and she too sank.

A veil should be drawn over the last struggles of brave men fighting cold, disease, and hunger. One likes to think that Captain Fitzjames, the chivalrous, the sympathetic, the dauntless leader, was perhaps the last,—that he tended them all and saw them all depart before him; and that then

His soul to him who gave it rose
God led it to its long repose
Its glorious rest.
And though Fitzjames's sun has set
Its light shall linger round us yet
Bright, radiant, blest.

CHAPTER XXVII

THE SEARCH FOR FRANKLIN. I.

THE sad fate of Sir John Franklin and his gallant companions is rendered still more melancholy by the reflection that some at least of them might have been saved. When no news arrived in 1846 prompt measures should have been taken, but the Admiralty asked advice and did nothing.

Dr King, who accompanied Sir George Back down the Great Fish River in 1833, made earnest and repeated appeals to the Admiralty and to the Colonial Office in 1847 to send a relief party down that river, and he pointed out quite correctly the position where the *Erebus* and *Terror* had been beset. His letters were not even answered. For Sir James Ross told them there was not any reason for anxiety and gave a strongly expressed opinion that the crews of the *Erebus* and *Terror* would never under any circumstances make for the Great Fish River. Other authorities concurred. This sealed their fate. Admiral Beechey alone thought that a boat should be sent down that river.

The year 1848 arrived, but no news reached England. Sir John Richardson was accordingly sent out to examine the coast between the Mackenzie and Coppermine rivers, but not to extend his voyage to the mouth of the Fish River, where even then he might have saved a few. Two ships, the *Enterprise* and *Investigator*, were also fitted out to go to the relief of the lost expedition, and Sir James Ross received the command. He was on board the *Enterprise*, and his old Antarctic first lieutenant Bird, who had been his companion in three of Parry's voyages, was Captain of the *Investigator*. But Sir James went in the full conviction that he would meet the *Erebus* and *Terror*, or that they would pass him and that he would find them in the Thames on his return.

In his ship were M'Clure, who had been with Back in the *Terror*, and M'Clintock, greatest of sledge travellers, who was then entering upon his glorious Arctic career. M'Clintock found a good friend in Sir James, who took a great liking for the young lieutenant. Sir James was then forty-eight, with an experience of polar work unrivalled by that of any living man, but he was somewhat shaken by Antarctic work, and lacked elasticity and the qualities of his youth, when he was foremost in keeping his shipmates in high spirits and good health. In person he was short but powerfully built, and was remarkable for his aquiline nose and very piercing black eyes.

The expedition was unfortunate. It was stopped by closely-packed floes across Barrow Strait and across Prince Regent's Inlet. There was nothing for it but to take refuge for the winter in Port Leopold, at the north-east end of North Somerset.

From this position Sir James could only send a travelling party in the spring for 80 miles to Fury Beach, to ascertain whether any of Franklin's people had visited the shore there; while he himself made a more extended journey along the northern and western shores of North Somerset. This journey is specially memorable as the initiation of M'Clintock in that art of sledge travelling which he afterwards brought to such perfection.

Sir James Ross arranged for an absence of 40 days, travelling with M'Clintock and two sledges, each dragged by six men. The two tents were 9 feet by 6. They travelled at night, starting after a cup of luke-warm cocoa. Luncheon at midnight consisted of a few mouthfuls of biscuit and frozen meat, with some snow water and half a gill of rum. After the tent was pitched supper consisted of 1 lb. of meat, and 1 lb. of biscuit and the other half gill of rum with lime-juice. But the

meat was pork including bone, or preserved meat not weighing nearly what was pretended. It was really less than half a pound of meat, and was quite insufficient.

On reaching Cape Bunny, the north-west point of North Somerset, which proved to be an island, they left the coast discovered by Parry in 1819 and, turning south, entered on a previously unknown region. The furthest point to the south in 72° 38′ was reached on June 6th, whence land, seen at a distance of fifty miles, was named Cape Bird. They little knew how near they were to the solution of the Franklin mystery.

The sledge travellers reached the *Enterprise* again on June 23rd. The strength of all the men was much impaired, mainly from insufficiency of food. Four broke down altogether, one having to be carried on the sledge. The return journey had been a period of intense labour, constant exposure, and insufficient food. M'Clintock alone returned well. They had gone over five hundred miles in thirty-nine days. The weight to be dragged per man was too great, and the whole scheme required revision. Still, it was the greatest Arctic sledge journey that had ever been made up to that time. M'Clintock noted everything, down to the minutest detail, and with the eye of genius saw the numerous improvements that might be made, and the great future that sledge travelling had in the work of polar discovery.

As the summer advanced scurvy broke out, and it was only kept in check by the very large number of birds (2300) that were shot. A long lane had to be cut through the ice, and it was not until quite the end of August that the ships were clear of their winter quarters. Sir James Ross had intended to continue the search in Barrow Strait, but on the very day after leaving Port Leopold the ships were closely beset and drifted helplessly down Lancaster Sound into Baffin's Bay. They were not released until September 24th, having been firmly fixed in the drifting ice for 24 days. There was nothing for it but to return to England, which they did in the full expectation that they would find the Franklin expedition safely returned before them. Bitter was their disappointment.

In the spring of 1849 the old *North Star* frigate, under Mr Saunders, the Master who served in the *Terror* with Sir George Back, was sent out with stores to enable Sir James Ross to continue the search, but he too was unfortunate. Unable to get through the ice of Melville Bay in time, he was obliged to winter in Wolstenholme Sound on the Greenland coast. In the summer of the succeeding year Mr Saunders landed a depôt of provisions at Admiralty Inlet in Lancaster Sound and returned to England.

The results of Sir James Ross's expedition were the discovery of 150 miles of coast on the western side of North Somerset, the certainty that none of Franklin's people had been to Fury Beach, and above all the experience gained by M'Clintock. Ross and Bird, who had commenced as Parry's faithful and loyal midshipmen, had now completed their polar careers[128].

The country was now thoroughly alarmed when it was too late; the warmest sympathy was felt throughout the civilised world, and the Government was forced to take steps on a large scale. The *Enterprise* and *Investigator* were re-commissioned and despatched to search by way of Bering Strait, under the command of Captains Collinson and M'Clure, while the *Plover* was stationed near Cape Barrow as a depôt ship. Two strong bluff-bowed, barque-rigged vessels of 410 and 430 tons, named the *Resolute* and *Assistance*, were strengthened and fitted out in the yards of Green and Wigram respectively, and two sharp-bowed screw steamers were bought as tenders, and named the *Pioneer* and *Intrepid*. These four vessels, under the command of Captain T. H. Austin, were to search by way of Lancaster Sound. Captain Ommanney was to have the *Assistance*, with M'Clintock, Mecham, and Vesey Hamilton. Sherard Osborn was to command the *Pioneer*, J. Bertie Cator the *Intrepid*. The Admiralty also bought two brigs, which were named the *Lady Franklin* and *Sophia*, for another expedition under Captain Penny, a well-known whaling captain in those days.

Old Sir John Ross, with some aid from Sir Felix Booth and others, managed to fit out a small schooner called the *Felix*, towing the *Mary*, a decked boat.

Sir John Ross declared that Franklin had promised to leave a record for him at Cape Hotham. He had with him Lieutenant Philips, who had been in Ross's Antarctic expedition on board the *Erebus*, and that old polar veteran Abernethy. Lady Franklin, with marvellous intuition, felt very strongly that one important route was being omitted—that by Prince Regent's Inlet. She therefore equipped another schooner named the *Prince Albert*, under Commander Forsyth, to search in that direction. That warm-hearted and philanthropic American, Mr Grinnell, also fitted out and despatched two small vessels from New York, the *Advance* and *Rescue*. Thus no less than twelve vessels were despatched in 1850 in search of Franklin's expedition.

Since the *Enterprise* was paid off, M'Clintock had been studying all the details of sledge travelling. He joined the *Assistance* at Woolwich directly he was appointed, and was absorbed in the work of fitting-out. In Captain Austin he found an officer with a genius for organisation who had been brought up to Arctic work in the splendid school of Parry. He examined into every detail; if care and forethought availed anything there would be no scurvy where Austin commanded. He secured the health and comfort of the men in the winter by fixing the Sylvester stove on the keelson, and sending warm air from it round the living decks, while bathing and all washing was done in the holds, so that the living decks were kept dry and wholesome. Austin was a short, stout man, of florid complexion, fifty years of age and thus rather too old for sledge-work, but he was full of vivacity and life, very kind-hearted, and most sympathetic and thoughtful for those under his command. If there ever was justification for employing an Arctic commander at the age of fifty, it was in the case of Austin. The perfect health of all in the four ships was due to him.

The present writer served on the *Assistance* under Ommanney. Sir Edward Parry, now near the close of his well-spent life, visited the ships at Greenhithe, and bade us God speed with a few earnest words which went to our hearts. Owing to constant adverse winds in the Atlantic we did not reach the Whale Fish Islands until the 15th of June. We filled up with stores from the transport and on the 25th reached the edge of the Melville Bay ice, where we overtook Penny's brigs. Then on to battle with that ice for many arduous days, and to come out victorious.

Parry had twice attempted the middle pack. The first time he was successful, but the second time he suffered long detention. It is better to stick to the land floe in Melville Bay and run no risks. Forty days of hard work, towing, tracking, blasting, and cutting docks amidst the fairy scenery of refracted icebergs saw our squadron through the ice and off Cape York, in company with Penny's brigs, the *Felix* and the *Prince Albert*. We gazed on "the crimson cliffs of Beverley," which were a very pale, scarcely perceptible pink, but dear old Sir John Ross, who was visiting us, staunchly defended the brilliant crimson as correctly depicting, in his book, the colour the snow had in 1818. Here too we were visited by a party of Sir John's "Arctic Highlanders," and one of them, a lad of about eighteen named Kalahierua, who also received the names of Erasmus after Captain Ommanney and York after the cape, accepted an invitation to cast in his lot with us, and came on board. Like the Eskimo of Igloolik who drew the Melville Peninsula with such accuracy for Parry, our friend Kalahierua had a wonderful eye for topography. When asked to draw a map of his country he took the pencil and delineated the coast-line with marvellous accuracy, making marks to indicate islands and bird-frequented cliffs, leaving a space where glaciers reach the sea, and marking the places where his people had winter stations, mentioning the names. The northern part of the map was then unknown, but it was afterwards proved to be quite correct.

The *Resolute* and *Pioneer* went to Pond's Bay for news, while the *Assistance* and *Intrepid* proceeded direct to Lancaster Sound, discovering a fine harbour near Cape Warrender, with some

interesting Eskimo remains.

On the 19th of August, before sunset, it was blowing a stiff gale with thick weather. The *Assistance*, under close-reefed topsails, drifted rapidly to leeward, rolling her lee boats into the water. The chief anxiety was whether there was ice to leeward, and whether the gale would last long enough to drive the ship down upon it, in which case the heavy sea which was running would effect her destruction in a very few minutes. Next day the wind moderated, and we passed between Leopold Island and the mainland of North Somerset. Crossing Lancaster Sound on the 20th, Captain Ommanney proceeded on board the *Intrepid* to land at Cape Riley, which, with Beechey Island, forms a good harbour. This cape is a cliff rising from the sea, with a talus of fallen rocks and stones at its base. Strange things were reported on shore. There were numerous remains of a camping party, and among the relics a long staff with a cross-piece at the end, secured with spun yarn, and four bent pieces of cask hoop fastened to it. This had probably been used with a net for catching specimens. The officers of the *Assistance* thought that the winter quarters of Sir John Franklin must be off Beechey Island, but Captain Ommanney seeing open water before him resolved to push onwards.

The other ships soon afterwards arrived at Beechey Island, and discovered Franklin's winter quarters: first Penny's brigs, followed by the *Resolute* and *Intrepid*, then the *Felix* and the two American vessels. The *Prince Albert* had gone home, nobody knew why. After the most exhaustive search, no record could be found. The cause of its disappearance will never be known.

The *Assistance* was beset for some days in Wellington Channel, and then rounded Cape Hotham, the south-east point of Cornwallis Island. Again the ship was stopped by the ice, within 150 yards of a low gravelly promontory where the ice was piled up to a height of 20 feet. On the morning of September 6th, the tide setting rapidly to the eastward, a heavy floe struck the ship, which sustained severe pressure and was listed over to port, forced astern, and raised 3½ feet out of the water. The kedge anchor was set in the ice to hold the ship, but the fluke gave and snapped off and the rest of the anchor was hurled into the air. The shank was then imbedded in the ice and the chain secured to it, and this, with four large hawsers, at last held the ship. Next day a northerly wind drove the ice off shore. The *Intrepid* discovered a bay suited for winter quarters on the south coast of Cornwallis Island, which was named Assistance Harbour.

But the cry was still Westward Ho! Pushing onwards, the *Assistance* and *Intrepid* were finally stopped by an immense field of ice extending from Griffith Island to Cape Walker, entirely precluding further progress. On September 10th the *Resolute* and *Pioneer* joined company, then Mr Grinnell's schooners, and Penny's brigs were seen in the offing. It was then that I made the acquaintance of Dr Kane on board the *Rescue*. But progress for that year was finally stopped. The American vessels were unprepared for a winter and parted company to return home. Like Ross's ships, however, they were beset in Lancaster Sound and were forced to winter while being drifted down Baffin's Bay, their crews suffering great hardships and privations. Penny's brigs, and the little *Phoenix* with Sir John Ross on board, wintered in Assistance Harbour.

The squadron of Commodore Austin—a brevet rank universally given to him by his followers—had to winter in the pack between Cornwallis and Griffith Islands, but within a short walk of the latter. Never, before or since, had so large a body of men assembled together in the Arctic regions, never for a nobler purpose, and never better organised. The arrangements for keeping the living decks dry and sweet, for bathing and washing clothes, for ventilation, and for exercise, were admirable, and perfect health was maintained. All hands were kept fully employed and amused. The chief work was the preparation for the search by sledge travelling. There were various classes of instruction for the men, and a class for navigation. A fine theatre on the upper deck, with a beautiful

proscenium and appropriate scenery, was erected on board the *Assistance*. There were plays every fortnight, one acted by the officers and another by the men, winding up with a pantomime and songs composed for the occasion. For the play-bills, printed on silk, wood blocks were cut of the Royal arms and other adornments. A monthly newspaper called the *Aurora* appeared on board the *Assistance*, the *Illustrated Arctic News* in the *Resolute*, and another more short-lived paper called the *Minavilins*. The Commodore revived the *bal masqué* on board the *Resolute*, in memory of those in which he had taken part in the winter of Parry's third voyage; and there was also the "Intrepid Saloon." Ashore the ravines of Griffith Island were explored in the winter walks, and collections of fossils made.

Captain Austin had a permanent Sledge Committee of heads of departments. But he was a good judge of character; he had the great merit of appreciating M'Clintock, and every detail was practically left to that officer. He had inaugurated autumn sledge travelling and depôts had been established for the spring journeys.

The sledges were made of Canada elm, the cross-bars of ash. The upper and lower pieces were called the bearer and the runner, the uprights being tenoned through them. A shoeing of ⅛-inch iron, 3 inches wide and slightly convex on its under surface, was riveted and clinched to the runner. The length of a ten-man sledge was 13 feet, of a six-man sledge 9 feet. The cross-bars were lashed on with strips of hide whilst warm and wet, so that drying would shrink them and make all tight. The width of the bearer was 2½ inches, and there were six uprights, and six cross-bars 3 feet long. At each corner there were light iron stanchions dropped into sockets, forming supports to the sides of a canvas tray or boat capable of ferrying the sledge crew across water. The weight of the sledge was 125 lb. The tents were 15 feet long by 8 feet high, of closely woven duck, the head-rope of horsehair. The four tent-poles were of ash, pointed at one end with metal, 9 ft. 8 in. in length; the weight of tent and poles 55 lb. Seven flannel or felt sleeping bags weighed 42 lb., and a wolf or buffalo robe over all 40 lb., waterproof floor-cloth 12 lb., and shovel 5½ lb.

The cooking apparatus consisted of a spirit-lamp holding 1½ gills, a kettle with a short spout and two handles fitted on it, and the stand, all weighing 17 lb. Then there were knapsacks for spare clothes, and a sundry bag. The irreducible constant weights amounted to 440 lb.

The scale of diet per man per day was as follows:

Lime-juice	½ oz.
Pemmican[129]	1 lb.
Biscuit	12 oz.
Boiled Pork for luncheon	6 „
Rum	½ gill
Biscuit dust	1 oz.
Tea and Sugar	¾ „
Chocolate and Sugar	½ „
Tobacco	½ „

besides salt, pepper, curry, and onion powder. The fuel for this ration would be 21½ oz. of spirits of wine, or rather over a pint. The provisions and fuel for seven men for forty days weighed 876 lb., which in addition to the constant 440 lb. gave a total of 1316 lb., or 220 lb. per man at starting, the weight being reduced by 22 lb. each day.

M’Clintock’s plan was that each division of sledges should have an auxiliary sledge to fill them up at a distance of 50 miles from the ship; and each extended sledge was to have a limited sledge to fill it up at a hundred miles further. At an average rate of only ten miles a day this would enable the extended sledges to advance 350 miles from the ships, picking up depôts as they returned.

The dress consisted of flannel waistcoats and drawers, woollen socks with a square of blanket folded over them, and duck boots with leather soles or moccasins in extreme cold. Box-cloth trousers, waistcoat with chamois leather sleeves, and a box-cloth monkey jacket were worn, and over all a white duck jumper as a snow repeller, with chamois leather on the shoulders, and pockets for ammunition, watch, and note-book. The head covering was a fur cap with ear-flaps. A water-bottle covered with flannel was carried next the flannel waistcoat, but until June the water always became ice. The weight of an entire suit was from 16 to 20 lb.

March was the coldest month, the mean being -34° Fahr, and the minimum -53° Fahr. From March 10th nothing was thought of but making the sledge equipments complete. The Commodore issued a series of questions in minutest detail relating to the various requirements.

These details are of the greatest importance, because they constitute the original basis of sledge travelling, of which Leopold M’Clintock was the founder. He placed a most comprehensive means of search for our missing countrymen in the hands of the Commodore. Nothing to be compared with it, in magnitude and efficiency, has ever been seen in the Arctic regions before or since. There were, including Penny’s crews, no less than 220 men ready to start, all full of zeal and enthusiasm.

Commodore Austin had no clue as to the position of the missing crews, and at that time little was known of the region to be searched. He accordingly resolved to explore in every direction to the utmost extent of the means at his disposal. Penny undertook Wellington Channel. He had a team of dogs and the best dog driver in Greenland in the person of a Dane named Carl Petersen, a man of large experience and full of ancient lore as well as modern knowledge. M’Clintock and two other parties, led by Aldrich and Bradford, took the direction of Melville Island. Captain Ommanney led another division to Cape Walker, and smaller parties were to examine the intermediate coasts and islands. Altogether, search parties were despatched in eight different directions.

Each sledge had a name, motto, and flag. They exercised all through March, and April 4th was the day selected for starting, the starting-point being at the north-west point of Griffith Island. The sledges with their crews went in two long columns to the appointed place with colours flying, a splendid sight, the Commodore delivered a spirit-stirring address to the assembled travellers, paying a just tribute to all they owed to the genius of M’Clintock, and the explorers started in two great divisions, one to the west and the other to the south.

The ice surface was fairly good, though sometimes interrupted by lines of hummocks. Sails were set with the wind aft or on the quarter, the tent poles being used as sheers and as a yard, and the floor-cloths for a sail. Under favourable circumstances this was a great success. Large square kites, invented by Mr Leigh Smith’s father, were partially successful.

We travelled at night and slept in the day-time. As soon as the tent was pitched, the floor-cloth was put down, sleeping-bags laid out, and the buffalo robe placed over them. The men took it in turn to be cook of the mess, supper consisting of pemmican, biscuit, and grog. Boots were taken off, feet carefully examined for frost-bites, snow blindness doctored with *vinum opii* (“open eye” the men called it) and then all got into their bags.

Songs and stories followed until all were overcome by sleep. “Is the chronometer wound”? was the form of saying good night. In the evening the agony of having to force our feet into boots frozen as hard as iron had to be undergone. Breakfast consisted of cocoa or tea and biscuit. Everything

being packed, the journey began at 6 P.M., the officer falling in to the drag-ropes except when he was wanted to guide the sledge or shoot a bear. There was a short halt for luncheon consisting of hard frozen pork fat, biscuit, and a tot of rum. But it was difficult to drink out of a pannikin without leaving the skin of the lips attached to it. The process called for considerable caution, but I had a piece of blanket on purpose to put over the rim. The time of marching was from 8 to 10 hours.

The region to the south was quite unknown except Cape Walker, which can be seen at a great distance. Captain Ommanney, leading the southern division, reached that lofty cliff. Then Mecham explored the island on which it is situated; Lieut. Browne was sent down to the east coast of the newly-discovered land, exactly in the direction of the lost ships if he had only known it; Vesey Hamilton examined Lowther Island; while Captain Ommanney and Sherard Osborn made a long journey down to the west side of the new land which was named after the Prince of Wales. Osborn observed the tremendous ice in what has since been named M'Clintock Channel, and it was clear to him that Franklin could never have passed in that direction. Captain Ommanney travelled round a very extensive bay. The Cape Walker division of sledges did its work thoroughly well.

M'Clintock marched to the westward[130], with two other extended parties, one under Lieut. Aldrich of the *Resolute* examining the eastern shores of Bathurst Island, and the other under Dr Bradford taking the west side of Melville Island. M'Clintock himself went along the southern coast of Melville Island, reaching and passing Cape Dundas, the furthest western point of Sir Edward Parry. M'Clintock was then in high hopes of finding traces of some of Franklin's parties, as there was an idea that Sir John might have passed up Wellington Channel and made his way to the north of Melville Island. It was thought that a retreating party might have made its way to Bushnan Cove, as Parry had given such a pleasant description of that ravine. Thither M'Clintock went, but only to find the wheels of Parry's cart and the bleached bones of the ptarmigan his party had eaten. He then marched overland to Parry's winter quarters, and encamped at the foot of Parry's sandstone rock with the inscription carved by Dr Fisher.

The wayworn sledge travellers started on their return on May 27th. They had had the advantage of fresh food from musk oxen, hares, and ptarmigan, and additional fuel from bear's blubber. But with the summer the most harassing kind of sledge travelling began. Large pools of water formed on the ice floes, and the men often got wet through in ice-cold water. A mixture of ice and snow formed a crust over these pools of water, but not strong enough to bear, and through these they had to wade and struggle as best they could. At length M'Clintock and his gallant band arrived alongside the *Assistance* on July 4th. Up to that date it was the greatest Arctic feat on record. M'Clintock's party had been 80 days away, 44 outward and 36 home, and had made 770 miles, reaching a distance of 300 miles from the ship. Their rate was 10½ miles a day, and they were detained 2½ days by gales.

Thus was Captain Austin's extensive scheme of search ably and completely carried out by the officers who served under him, with exemplary fortitude, zeal, and intelligence. There were only three amputations of toes, and one death from frost-bite. Of all Arctic expeditions, Captain Austin's was perhaps the happiest, the healthiest, the best administered, and the most successful. Its sledge travellers covered 7025 miles on foot, dragging the sledges themselves, and discovered 1225 miles of new land.

It was necessary to cut and blast lanes for the ships to reach open water. Lieut. Mecham ably conducted the blasting operations. The ships were free on the 11th of August, after having been frozen up for eleven months. Captain Austin then proceeded to search Jones Sound in the *Pioneer* as far as the ice would admit, while the *Assistance* visited the Cary Islands in Baffin's Bay. The *Intrepid* had an unprecedented experience. She had been up Jones Sound in company with the

Pioneer and was making for the rendezvous on August 27th when the ice closed round, and she was obliged to make fast to a floe. Soon the floe was in motion and moving rapidly towards a large grounded iceberg. Before the vessel could be extricated she was driven with a frightful crash against the berg at 5 P.M. The vessel rose to the heavy pressure and two whaleboats and the dinghy were at once got out on the floe. Soon the vessel's taffrail was 40 feet and her bow 30 feet up the side of the berg, the masses of ice rising nearly 10 feet above the bulwark. The crew prevented huge pieces from falling on board with capstan bars. Then the pressure ceased, the piled-up masses sank from alongside, and the ship was left suspended on the side of the berg by two small wedge-pieces, one at the stern post the other at the bow. It seemed inevitable that she must fall over on her broadside and be smashed. At 2 A.M. the pressure began again, the ice piling up in a frightful manner, and crushing the boats on the floe to atoms. It was blowing hard from S.E. If the vessel had fallen over, Lieut. Cator knew that all must perish. But at 2 P.M. the pressure ceased quite suddenly, and the ship shot down into the water, and was safe. This is probably the most extraordinary and appalling danger that any ship ever went through in the Arctic regions.

The squadron returned to England on October 4th. Captain Austin had conducted the expedition with exceptional ability and success. M'Clintock had gained more Arctic experience. He had been first lieutenant of the best-administered and happiest ship that ever crossed the Arctic Circle, he had made life-long friendships, and his genius had created Arctic sledge travelling.

Sherard Osborn, enthusiastic, accomplished, and a perfect leader of men, was the complement of M'Clintock, of whom he was a friend through life. Mecham possessed the qualities of both, and some which were specially his own, a very true and perfect gentleman. Vesey Hamilton was thoroughly to be depended upon to do all that was expected from him and to do it well. All were genial friends and the best of messmates. These were the rising Arctic men when Austin's expedition returned[131].

Disappointed with Captain Forsyth's return, Lady Franklin sent out the *Prince Albert* again with orders to search to the south of North Somerset. She alone seems to have had an intuition of the right direction. She gave the command to Mr William Kennedy of the mercantile marine, who was accompanied by Lieut. Bellot, a distinguished young French naval officer. The *Prince Albert* wintered in Batty Bay on the north-east coast of North Somerset, and a sledge journey was undertaken in the spring of 1852. Kennedy used flat-bottomed Indian sledges and dogs. After a long stay at Fury Beach he worked south and discovered a strait between North Somerset and Boothia, since named Bellot Strait, and passed through it. If he had then obeyed his instructions and gone south he would probably have discovered the fate of Franklin. He turned north, and returned to Batty Bay by the north coast of North Somerset. The exact route is uncertain, as the narrative is confused, but he was away 97 days. There seemed a fatality against the right direction being taken.

CHAPTER XXVIII

THE SEARCH FOR FRANKLIN. II.

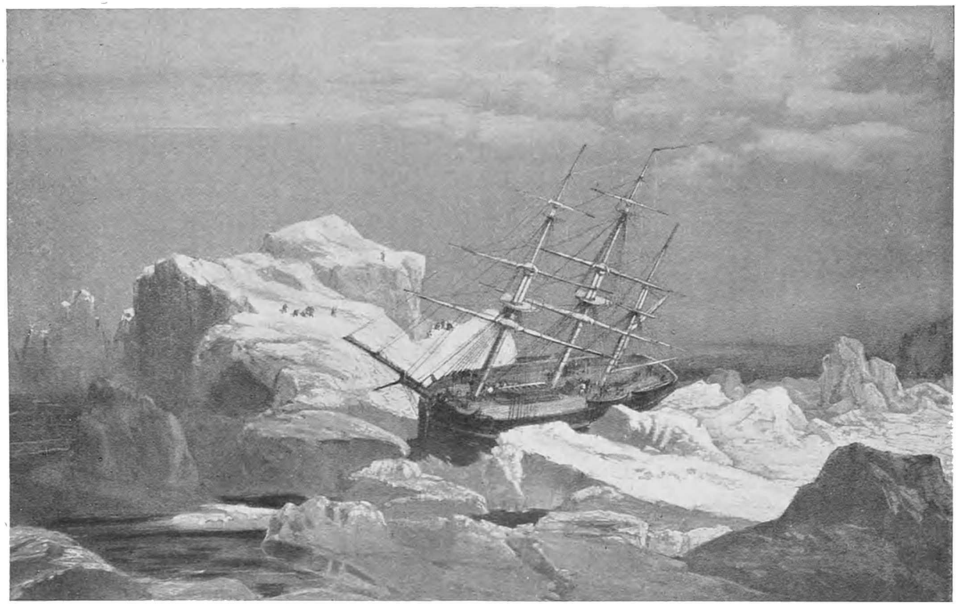
WHEN Captain Austin's expedition returned the people of England were as determined as ever that the search should continue. But the advisers of the Admiralty in Committee were quite convinced that Franklin's ships were not where they had passed two winters and were lost, and that the region where our lost countrymen had suffered and died need not be visited. A majority of them held to the fatuous notion that Franklin had gone up Wellington Channel, and was far to the north. Under these circumstances it was, they considered, really quite useless to continue the search. But the father of Lieut. Cresswell pointed out that the *Enterprise* and *Investigator* had not been heard of, that there was cause for anxiety, and that one or both might need succour.

It will be remembered that the *Enterprise* and *Investigator*, accompanied by the *Plover*, had been sent to attack the problem from the western side. Captain Collinson took the *Enterprise* through Bering Strait and made his first winter quarters in Prince Albert Sound on the west coast of Victoria Island, the *Plover* being stationed permanently as a depôt ship near Cape Barrow. In the spring Collinson himself explored the east coast of the long and narrow Prince of Wales's Strait, being absent from the ship for 51 days. Murray Parkes, a mate of the *Enterprise*, reached the northern mouth of the strait, crossed the channel, and leaving the sledge owing to heavy ice, arrived at Melville Island on foot and thus discovered a second North-West Passage. His remarkable journey had occupied 74 days. Collinson's second winter was in Cambridge Bay in Dease Strait. He thence made a journey of 49 days to Gateshead Island, where he was almost in sight of the *Erebus* and *Terror* off Cape Victory.

The *Investigator* had parted company. Captain M'Clure, who on October 20th had sighted Melville Island, wintered off the Princess Royal Isles in Prince of Wales Strait in 1850–51. The following summer the ship passed round the south of Banks Island, worked her way with great difficulty up the west coast, and wintered in a harbour on the north coast which M'Clure named the Bay of God's Mercy. From this haven she was destined never to move, the winters of 1851–2, 1852–3, being passed there. Banks Land had only been sighted by Parry at a great distance. M'Clure's discovery of the great island was an achievement of the first rank. These proceedings of Collinson and M'Clure were of course unknown in England when it was resolved to despatch the four ships again, the *Assistance* and *Pioneer* to go up Wellington Channel, the *Resolute* and *Intrepid* to press onwards to Melville Island. The Franklin search could in no way be furthered by sending in directions he could never have taken, but the relief of the *Investigator* proved to be a service of the utmost importance.

Common sense pointed to M'Clintock and Sherard Osborn as the proper leaders for the two divisions. Both possessed unequalled recent Arctic experience, both were men of tried ability, liked and respected by all who had served under them. The Admiralty, however, preferred an old officer with bad health, no Arctic experience, and the reputation of being the most unpopular man in the navy, Sir Edward Belcher. It would have been enough that he should bring misery, disaster, and failure on his own division, but both were under his orders. Sherard Osborn was with him in command of the *Pioneer*. The officer to command the second division, Captain Kellett, was also old and inexperienced, but fortunately very unlike Belcher. He had been a distinguished surveying officer in his time, and now he wisely left things to his staff. Hearty, joyous, with a charming

manner, Captain Kellett gave pleasure wherever he went. M'Clintock commanded the *Intrepid*, Mecham was Kellett's first lieutenant, Vesey Hamilton was Mecham's friend and supporter—the very cream of the rising Arctic generation.



Critical position of *H.M.S. Investigator* on the North Coast of Baring Island, Aug. 20th, 1851

The expedition left the Thames April 15, 1852, and M'Clintock acquired great skill in handling the *Intrepid* in the ice of Melville Bay, where the *Resolute* received a very severe nip, and was raised 8 feet out of the water, being for some time in great danger. The squadron reached Beechey Island August 14th, where the *North Star* was to remain as a depôt ship. Next day the two divisions parted company. The *Assistance* and *Pioneer* proceeded up Wellington Channel to winter in a harbour in 77° 52′ N., while the *Resolute* and *Intrepid* went on to Melville Island with little difficulty, where they found winter quarters in a bay sheltered by Dealy Isle, so named after a midshipman of the *Hecla*, in 74° 56′ N.

We must pause here for a moment to record a modest but successful expedition carried out in the same season of 1852 by Captain Inglefield, who in the little *Isabel*, piloted by wonderful old Abernethy, went for a summer cruise up Baffin's Bay. He reached the entrance of Smith Sound and saw that it was an important channel leading to the polar ocean—really Smith Channel. To the land on the west side, which was discovered by Baffin but not named by him, he gave the name of Ellesmere Island.

M'Clintock decided upon a system of autumn travelling for laying out depôts on a much larger scale than in the previous expedition. This time he was absent 40 days, and went over 260 miles. Four other autumn travelling parties laid out depôts, Mecham doing 212 miles in 25 days, Vesey Hamilton 84 miles in 16 days. Mecham made a very important discovery. He found a record left by Captain M'Clure of the *Investigator* on Parry's sandstone rock, in the spring of 1852. M'Clure gave the position of the ship in the Bay of Mercy, and added that if the *Investigator* was not again heard of, she would probably have been carried into the polar pack west of Melville Island, in which case

any attempt to succour him would be useless—a very noble thing for a man in his position to have written.

The plan for sledge travelling in the spring was that M'Clintock was to explore as far as possible to the north and west, Mecham to the west, and Vesey Hamilton to the north. On March 10th a sledge was sent to communicate with the *Investigator* in the Bay of Mercy, a distance of 160 miles.

M'Clintock's two large sledges, when loaded, weighed 2000 lb., or 228 lb. per man on starting. Of the sledge crew of 1851 Salmon was still well and hearty. George Green, ice quartermaster, was captain of the sledge, an excellent man; Henry Giddy, boatswain's mate, was almost equally good. May 4th, 1853, was a day to be remembered, the beginning of the greatest sledge journey but one on record. The sledges were drawn up in two lines with their banners displayed, and started. M'Clintock and his depôt sledge advanced over the land to Cape Nias. Mecham and Nares went away under sail to the westward, with a fair wind.

M'Clintock and De Bray, a young French naval officer lent to the expedition, proceeded with the depôt sledge along the north coast to Cape Fisher, the extreme point seen by Parry. Here De Bray and the depôt sledge returned, while M'Clintock turned south to make sure of connecting his work with that of Mecham. He travelled along the west coast of Melville Island and considered that it presented the most beautiful Arctic scenery he had ever seen. A great unknown land had long been in sight to the westward to which he gave the name of Prince Patrick Island. It was on May 14th, 1853, that M'Clintock landed on his new discovery at Point Wilkie, named after his old sledge captain, and geologically a place of great importance, as exhibiting a patch of has formation with fossils. The north end of Prince Patrick Island was reached on the 11th June, and M'Clintock went on to some islands which he named the Polynia Isles. In the offing there was a line of very heavy pack ice, with hummocks 35 ft. high. The most northern point reached was 77° 43′, and here, sending back the sledge to the depôt, the explorer proceeded down the western coast with a satellite sledge over flat sand-banks, with a continuous line of stupendous hummocks in the offing. They rejoined the parent sledge on the 25th June. M'Clintock's next discovery was named Emerald Isle, most of the usual Arctic plants and abundant moss being found on it. The return journey entailed terrible work owing to the water on the floes.

M'Clintock had been away 105 days and the sledge had gone over 1030 geographical miles in 99 marches, at a rate of 10½ miles a day.

The examination of bays and inlets with the satellite sledge amounted to 62½ miles, making the whole distance 1210 geographical or 1408 statute miles. The lowest temperature was -24° Fahr.; the number of positions fixed was 22. This journey was by far the greatest Arctic effort with sledges that has ever been made by men alone.

Mecham did splendid work to the eastward. Nares[132] commanded the depôt sledge, and Mecham's sledge captain was James Tullett, a capital sailor, who was in the *Assistance*. Travelling over the south-west part of Melville Island Mecham crossed a strait, and discovered an island which received the name of Eglinton, where Nares left the depôt and returned. Another journey across a strait brought Mecham to the south-west point of Prince Patrick Island. He then explored its southern and western coasts until he reached a point within 16 miles of M'Clintock's furthest, coming from the north. Mecham's principal discovery was the remains of trees. At Cape Manning, on the south coast, there were a considerable number of stems of trees with the bark on, 90 feet above the sea. Returning, Mecham crossed the land during the three last days of May and found, in a ravine, a tree protruding 8 feet, and several others with a circumference of 4 feet.

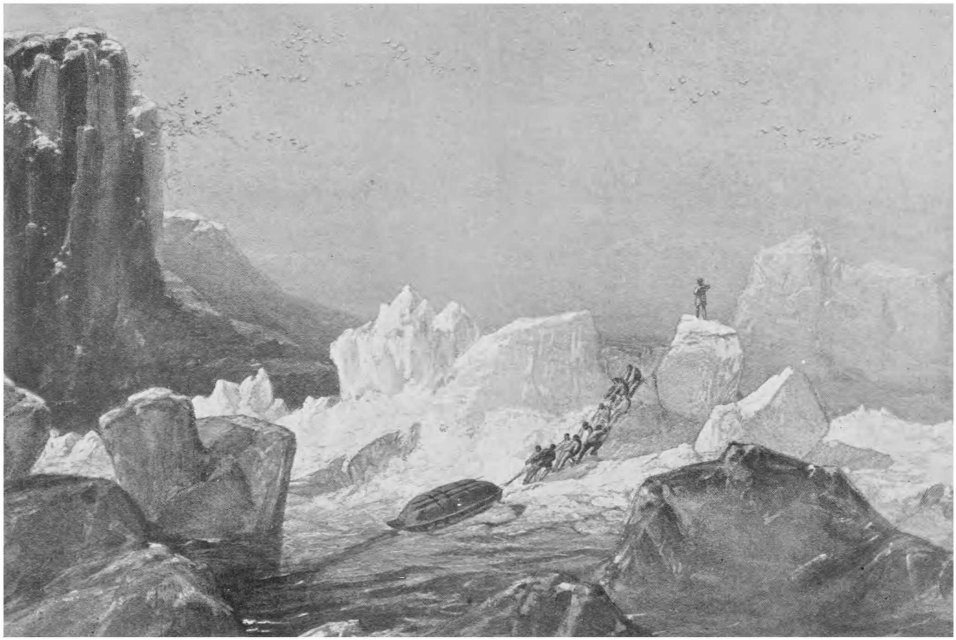
The young explorer then connected his work with that of M'Clintock on the east side of Prince Patrick Island, thus making these vast discoveries complete. He got plenty of fresh food for his people, killing four musk oxen, seven reindeer, sixteen hares, forty ptarmigan, twelve ducks and geese, and two plover. He was absent 91 days, and went over 1006 geographical or 1173 statute miles, thus averaging 12½ miles a day. His discoveries amounted to 785 miles of new country.

Vesey Hamilton explored the northern extremity of Melville Island, called the Sabine Peninsula, starting on the 27th April with a seven-man sledge and a satellite sledge. The captain of his sledge was Ice-Quartermaster George Murray, who had served in both the expeditions of Ross and Austin. He was a seaman of long experience and great ability, with literary talent of no mean order, as his contributions to the *Aurora Borealis* show. Having explored the whole eastern side of Melville Island, Hamilton crossed the channel with his satellite and two men to Bathurst Island, where he met Sherard Osborn, who had explored the northern side of this island with its two deep inlets, and sighted another large island to the north which was named after Mr Findlay, the cartographer. Hamilton then returned to his main sledge, and reaching the extreme northern point of the Sabine Peninsula, discovered two islands which were named Vesey Hamilton and Markham after his old messmates in the *Assistance*. He returned to the ship after an absence of 54 days, having covered 663 statute miles, and made some interesting discoveries. This completed the extensive explorations of 1853, comprising 1800 miles of coast line.

The officers and crew of the *Investigator* had been rescued from the fate of Franklin and his people by Mecham's discovery of M'Clure's record. On the arrival of the sledge with the good news at the Bay of Mercy, Captain M'Clure travelled to the *Resolute* to discuss arrangements with Captain Kellett. It was determined to abandon the *Investigator*, officers and crew being housed on board the *Resolute* and *Intrepid*. Thus was a third North West Passage discovered.

Lieut. Cresswell of the *Investigator* with 26 officers and men were despatched to the *North Star* at Beechey Island to be sent home at the first opportunity. The Admiralty had sent out the *Phoenix*, commanded by Captain Inglefield, and the *Breadalbane* transport, under Mr Fawckner, Master R.N., to communicate. The *Breadalbane* was crushed by the ice off Beechey Island and sank. Captain Inglefield had brought out with him Lieut. Bellot, the young French officer who had been with Kennedy. Most unfortunately the ice floe on which he was, with some men, got adrift. It was never known exactly what happened, but he must have slipped off the ice and was drowned. Lieut. Cresswell and his party went home in the *Phoenix*.

Mindful of the possibility that Captain Collinson might reach Melville Island in the *Enterprise*, Captain Kellett built a large house, 40 feet by 14, of stone with a wooden roof covered with painted canvas, in which a depôt was placed of seven months' provisions for sixty men, and a cairn was built on Dealy Island, 42 tons of stone being used in its construction.



Lieut Cresswell's party sledging over hummocky ice

In August, 1853, the *Resolute* and *Intrepid* broke out of winter quarters, but it was an ice-encumbered season, and by November 11th the two vessels were again fixed in winter quarters 26 miles S.W. of Cape Cockburn on Bathurst Island. The *Assistance* and *Pioneer* had also left their winter quarters at the west end of Grinnell Land (a prolongation of North Devon) and had attempted to come down Wellington Channel. They too, however, had been stopped by the ice, and had to winter 52 miles north of Beechey Island.

The winter passed happily enough on board the *Resolute* and *Intrepid*, but it was necessary to report to Sir Edward Belcher, and Hamilton was accordingly despatched with two men and a team of nine dogs. He brought back an order to abandon the ships. It was not explicit, however, and it assumed that Captain Kellett was of the same mind. M'Clintock then returned and tried to persuade Sir Edward Belcher not to commit what amounted to a crime. He told the intending perpetrator that there was every reason to expect that the ships would get clear, but the only result was an explicit order to abandon them!

It was mainly during these journeys that M'Clintock gained his experience in the use of dogs. He covered the distance from the *Resolute* to the *North Star* in five days, and the 52 miles thence to the *Assistance* in 24 hours. The whole distance there and back was 460 miles, occupying 15 days, an average of 31 miles per day. Wrangell, on the coast of Siberia, made an average of 29 miles a day for 22 days. M'Clintock had one man with him, and a team of twelve dogs. He found that two dogs require the same weight of food as one man, and when properly fed and not overworked, a dog can draw a man's full load for a distance about one-fourth greater than a man would. If both man and dog are lightly laden, a dog will double the distance which the man could do. The final conclusion was that for a very long period and a very long distance men are superior to dogs. At their best, dogs should be well fed and well treated, and should not be overworked. Then they are invaluable for keeping up communications to distances not exceeding 300 miles.

Belcher's disgraceful order had to be obeyed. He intended to crowd all four crews on board the *North Star*, but luckily Captain Inglefield arrived in the *Phoenix* with the old frigate *Talbot*, so that there was little crowding. The court martial was obliged to acquit Belcher because his instructions gave him such wide discretion, but his sword was returned in a silence more damning than words. Sherard Osborn, whom Belcher had placed under arrest, and Lieut. May, against whom he had reported, were both immediately promoted.

The ships would almost certainly have got free later in the season. The *Resolute* actually did drift out, was picked up by an American vessel in Davis Strait, and courteously restored by the United States to our Admiralty.

These three search expeditions effected an enormous increase in the knowledge of the Arctic regions. Thousands of miles of unknown lands were brought to light, and the diligent collecting and observations of officers enabled a good general idea to be formed of the geology of the newly-discovered region and of the tidal phenomena. The discoveries also opened a new area for exploration to the westward quite distinct from the region of the Parry Islands. Like all great discoveries Prince Patrick Island pointed to further research. It is the complete examination of the area now known as the Beaufort Sea which M'Clintock's discoveries indicate. Meanwhile the great sledge journeys stand alone and unapproached.

Mecham's final sledge journey was perhaps the most brilliant achievement. Accompanied by Krabbé, Master of the *Intrepid*, he started with two good sledge crews on April 3rd, 1854. Advancing to Cape Providence they entered the first range of heavy hummocks, and forced their way through it for five miles. As they approached Banks Island they were constantly entangled during dense fogs among intricate hummocks and deep snow. On reaching the land Krabbé parted company for the Bay of Mercy, in order to report on the condition of the *Investigator*. He found her heeling over and with her orlops full of ice, and she no doubt sank soon afterwards. He was five days landing all her stores and provisions. Mecham proceeded down Prince of Wales Strait, and arrived at Princess Royal Island on May 4th. There he found a document stating that further information would be found on an island in 72° 36′ N., and pushing on, found this second document. He then began his return journey, heard of the abandonment of the vessels, and went on to Beechey Island. In 70 days Mecham had travelled 1157 geographical, or 1336 statute miles, the average rate outwards being 18½ miles, and homewards 23½ miles a day. M'Clintock wrote —"Mecham's journey is a most splendid feat, topping all previous ones in speed as well as distance."

Frederick Mecham was promoted to the rank of Commander on the 21st October, 1854. A thorough seaman and navigator, a good officer, and an excellent messmate, he was endowed with indomitable pluck and the gift of communicating his enthusiasm to those who served under him. Musical, an actor, a good artist, and well informed, he was foremost in the work of keeping the men amused during the winter. His consideration for others and his charming manners endeared him alike to officers and men, and his sledge crews were devoted to him. Mecham was appointed to the *Vixen* on the Pacific station, and died at Honolulu on February 16th, 1858, at the early age of twenty-nine, a great loss to the navy and to his country. His Arctic achievements still remain unapproached.

CHAPTER XXIX

DISCOVERY OF THE FATE OF FRANKLIN

THE Crimean War broke out in 1854, and public attention was absorbed by it. On March 23rd of that year the names of Sir John Franklin and his officers were removed from the Navy list, but not without a protest from Lady Franklin. Suddenly, only four months later, some startling news arrived. Dr Rae of the Hudson's Bay Company reported on July 19th that, during a journey to survey the west coast of Boothia, he met some Eskimos in Pelly Bay who said that, some years before, they had seen about thirty men dragging a boat southward over the ice, and that later the bodies of several men were found on an island near the mouth of a great river. They had several articles belonging to officers of the Franklin Expedition, including nine pieces of plate and Sir John's Guelphic Order.

Public attention being occupied elsewhere, the Admiralty considered it enough to ask the Hudson's Bay Company to send someone down the Great Fish River to Montreal Island, which lies at its mouth. Mr Anderson was sent, without an Eskimo interpreter, reached Montreal Island, found some fragments of a boat and various articles, and then returned. The Admiralty thought that sufficient had been done.

Lady Franklin petitioned the Prime Minister, urging that 135 officers and men of the British Navy had laid down their lives after sufferings of unexampled severity in the service of their country, as truly as if they had fallen in action. "Surely," she added, "I may plead for such men that the bones of the dead be sought for, that their records be unearthed, that their last written words be saved from destruction. It is a sacred mission, and this final search is all I ask." The reply was a cold refusal, and Lady Franklin realised that, if anything was to be done, she must depend upon her own resources. She did not hesitate, but at once came forward herself to fulfil the duty, and M'Clintock entered upon the completion of his long and zealous efforts by accepting the mission which was to crown his Arctic achievements.

Lady Franklin had unbounded confidence in Captain M'Clintock, and gave him a perfectly free hand. She set aside £20,000 of her own fortune for the voyage, and there were subscriptions to the amount of £3000, with which she purchased the *Fox*, a steam yacht of 177 tons. The expedition was fitted out at Aberdeen, and the public departments were allowed to give some help. Lieut. W. R. Hobson, who had served in the *Plover*, got leave to go as senior executive. Captain Allen Young of the mercantile marine, young, active, energetic, and full of zeal, entered as Master and contributed £500. Dr David Walker went as surgeon, and a very great acquisition was Carl Petersen, the Dane who was Penny's dog-driver and who knew Greenland and its seas so well. The whole number of souls on board the *Fox* was twenty-four, and fifteen had served in former search expeditions. William Harvey, the chief petty officer, was Captain Austin's boatswain's mate in the *Resolute*, and afterwards in the *North Star*, a thorough seaman and a first-rate sledge traveller. One great advantage to M'Clintock was that Captain Austin was at Deptford and could give him much assistance.

On July 1st, 1857, the *Fox* was well on her way to Greenland. Ten dogs were obtained at Lievely, and two young Eskimos were engaged as seal hunters and dog-drivers. M'Clintock had

already been through Melville Bay three times, but 1857 was the worst ice year on record. Constant south-east winds kept the ice closely packed.

The *Fox* had made 110 out of the 170 miles required to cross the bay, and there was hope if only a northerly wind would spring up. September came, however, and M'Clintock soon realised that their fate was inevitable—a winter in the drifting pack. It was a perilous position. The vessel drifted southwards for 1194 geographical miles in 242 days, and was liberated in April, 1858, under appalling circumstances. On the 24th the approach to the edge of the ice became evident from the swell. The ice fragments dashed against each other and against the ship. Sail was made and the *Fox* slowly bored her way through. Next day the swell had become a heavy sea, the waves thirteen feet high, dashing huge fragments of ice against the ship. Pieces of iceberg 60 or 70 feet high were dispersed through the pack, and one blow from any of them would have been instant destruction. At length, towards night, the brave little vessel ran through straggling pieces into an open sea.

After eight months of perilous drifting, finished off by two such days and nights, most people would have sought rest in a port. No one who knew M'Clintock would doubt what he would do. Without a moment's hesitation he turned the ship's head northward again. The year 1858 was much more favourable, and by August 11th the *Fox* was off Cape Riley. M'Clintock ran down Peel Sound for 25 miles, when he was stopped by unbroken ice extending from shore to shore. He therefore took the alternative route by Prince Regent's Inlet, and by the 21st the *Fox* was half-way through Bellot Strait. A few miles of pack ice barred the way, but early in September she passed right through the strait, but again there was a barrier, and finally she was obliged to be placed in winter quarters in a bay at the eastern entrance of the strait, which was named Port Kennedy. However, she was well within reach of the deeply interesting region to be examined.

It was arranged that in the spring there were to be three expeditions, each with a four-man sledge with weights reduced to 200 lb. at starting, and one dog sledge with driver and a team of seven, dragging 100 lb. per dog at starting. The small number of men made the dogs necessary. Hobson was to examine the north coast of King William Island, cross to Gateshead Island, and connect Collinson's with Wynniatt's furthest, thus completing the outline of Victoria Island. Allen Young was to discover the southern side of Prince of Wales Island. M'Clintock himself with Petersen was to search the estuary of Back's Fish River and the whole coast of King William Island.

Depôts were laid out during the autumn, and by Allen Young in the depth of winter. M'Clintock undertook a winter journey with temperature -33° to -48° Fahr., intending to build snow huts instead of taking a tent; but it took two hours to build them. His object was to fall in with Eskimos and obtain information, which he did; nearly all having some plunder from the *Erebus* or *Terror*. One of them stated that a ship had been crushed by the ice out at sea. The journey of 26 days in the depth of winter embraced 360 miles and completed the discovery of the coast line of North America. It also revealed the only north-west passage for ships between Boothia and King William Island.

April 2nd was the appointed day for starting on the long journeys. Petersen was to drive M'Clintock's dog sledge. M'Clintock and Hobson travelled together as far as Cape Victoria, when the latter crossed to Cape Felix, M'Clintock pressing onwards to the Great Fish River. On meeting his Eskimo friends again he was told—what was concealed before—-that a second ship had been driven on shore. Many more relics were seen in their possession.

Hobson landed at Cape Felix on King William Island and found the remains of an encampment which had been hastily abandoned, for tents and clothes were left behind. Marching onwards he came to the large cairn with a quantity of gear strewn round it, and a tin cylinder containing the famous document written by Fitzjames, which announced the fate of Franklin and the expedition.

Hobson, stricken with scurvy, felt unable to carry out the rest of his instructions, but two of his men went on and discovered a large boat. The return journey was then commenced and the *Fox* was reached on June 14th after an absence of 74 days. Latterly Hobson had to be carried on the sledge. He left in a cairn for M'Clintock a report and lists of all the articles seen.

M'Clintock continued his advance to the south, obtaining from the natives several spoons and articles of plate belonging to officers, and other relics. They said that many white men had dropped by the way as they marched, and that some had been buried and others not. On the 15th May M'Clintock reached Montreal Island. It was thoroughly searched, but nothing of importance was found. On the 24th M'Clintock again crossed the frozen sea to King William Island and followed the shore along which the retreating crews must have marched. On the 25th a human skeleton, with some fragments of clothing which were those of an officer's steward, was found on a gravel ridge. The pockets had contained a brush, a comb, and a pocket-book. The shroud of snow no doubt concealed many other skeletons. On reaching Cape Herschel M'Clintock was full of hope that Simpson's cairn might contain a record, but there was nothing. On May 29th he reached the extreme western point of King William Island (69° 8′ N. and 100° 8′ W.) which he named Cape Crozier.

M'Clintock had now arrived on Hobson's tracks. The coast was a series of limestone ridges, and to seaward there was a rugged surface of crushed-up pack. On the 30th May the camp was formed alongside the boat found by Hobson about 50 miles from Point Victory. M'Clintock has given a most interesting account of it and its contents. It contained two skeletons and was full of relics of all kinds[133]. On June 2nd M'Clintock reached the cairn at Point Victory, and realised the whole sad story. "All the coast-line," he wrote, "along which the retreating crews performed their fearful march must be sacred to their names alone."

M'Clintock had completed his immortal work. For ten years he had devoted all his energies and all the powers of his mind, first to the rescue of the lost explorers, then to ascertain their fate. Success had now crowned his efforts and the mystery of the sad fate of Franklin's expedition was at last made clear to the world. M'Clintock and his party had marched round King William Island. They returned to the ship on June 19th after an absence of 76 days, having travelled over 920 miles and discovered 800 miles of new coast line, and the only navigable North West Passage.

Allen Young commenced his journey on April 7th, with old Harvey as captain of his sledge, Hobday and Haselton seamen, and Florance, a stoker, as crew. He also took a dog-sledge. Crossing the Franklin Channel, so named by M'Clintock, he landed at Cape Eyre on Prince of Wales Island and proceeded to explore the low and desolate southern coast. Finding that he had not sufficient provisions to reach Osborn's furthest and so complete the exploration of the great island with all his men, he sent back the rest with the sledge, in charge of Harvey, to Cape Eyre. He and Hobday went on with the dog-sledge, and on May 7th reached the table-topped hills seen by Sherard Osborn in 1851, and so completed the discovery. Young then made a gallant attempt to cross the channel to Victoria Island, but this was impossible, it being a mass of stupendous hummocks with deep fissures between them, and a retreat was therefore made to the sledge at Cape Eyre. He then completed the discovery of the eastern shore of Prince of Wales Island as far as Browne's furthest in 1851. Next he crossed the channel to Ross's furthest, and completed the discovery of the west side of North Somerset thence to Bellot Strait, taking frequent observations for latitude and longitude. He and his men were nearly worn out by the long period of hardships when they were met by M'Clintock on June 27th. It was a splendid journey, rich in geographical discovery.

The *Fox* was now got ready to return. The engines had been taken to pieces for the winter, the engineer had died, and the stokers knew nothing about the machinery. So M'Clintock tucked up his

sleeves, went down into the engine room, and got the engines into working order with his own hands. There was no one else on board who could have done it. On August 10th, 1859, the *Fox* was freed from winter quarters, M'Clintock working the engines himself for several days, until the vessel was got under sail. She arrived in the Thames and was taken into the dock at Blackwall on September 23rd.

The whole nation was full of admiration at the way in which this great and memorable success had been achieved. Lady Franklin was more than satisfied at the result of the expedition, and felt unable to express her admiration and gratitude for its Commander. His officers and men were devoted to him, and presented him with a gold chronometer, "reminding him of that perfect harmony, that mutual esteem and good will, which made our ship's company a happy little community, and contributed materially to the success of the expedition."

The Queen conferred upon M'Clintock the honour of knighthood, but the great explorer could not even then be spared from Arctic work. The Admiralty undertook to run a line of deep sea soundings from the Faroes, by Iceland and Greenland, to Labrador. This important duty was entrusted to Sir Leopold M'Clintock in command of the *Bulldog*, and was thoroughly well done, during the severe Arctic summer of 1860.

At last Sir Leopold returned to the regular naval service, hoisting his flag twice, and after his retirement became a very active Elder Brother of the Trinity House. After serving his country for an unbroken active period of seventy-seven years, he died in harness on November 17th, 1907, at the age of 89, one of the best and greatest of Arctic explorers.

CHAPTER XXX

THE EAST COAST OF GREENLAND. SCORESBY—CLAVERING—GRAAH—KOLDEWEY

THE east coast of Greenland is difficult of access owing to the great flow of ice from the polar basin. Until the days of Scoresby it was only sighted from a distance. Henry Hudson was the first to discover it, and give it the quaint name of "Hudson's Hold with Hope" in 73° N. On the old Dutch maps of Peter Plancius (1666) and Van Keulen (1707) we find "Land van Lambert" as far north as 78° 20′; "Land van Edam" in 77° 10′ N., seen in 1655; "Gael Hamke" in 74°, seen in 1654. Cape Bruer Ruys and Bontekoe Island on the Dutch chart were identified by Clavering, as well as Gael Hamke Bay. These were merely the sighting of high land at a distance. In the summer of 1822 the younger Scoresby, in his Liverpool ship, resolved to combine whaling with geographical discovery. He forced his way through the ice into open water near the coast in company with two other whalers, one commanded by his father. This eminent Arctic navigator completed a careful survey, landing at several points, from Gael Hamke Bay to as far south as 69° N. He made botanical and geological collections, and completed a chart of his discoveries.

In the very next year Scoresby was followed by one of the most promising of Arctic voyagers who, like Mecham, was cut off in his prime. Douglas Clavering was the eldest son of General Clavering by Lady Augusta Campbell, daughter of the fifth Duke of Argyll. Born at Holyrood House in 1794 he served as a midshipman under Captain Broke in the famous action between the *Shannon* and *Chesapeake*. But young Clavering's bent was in the direction of the scientific branches of his profession, and the friendship he formed with Captain Sabine led that distinguished officer to apply for the *Pheasant* for his pendulum observations in the tropical zones because Clavering commanded her. These were successfully taken and useful observations were also made with reference to the equatorial currents.

The Board of Admiralty then decided that Sabine should swing the seconds pendulum in Norway, Spitsbergen, and, if possible, on the east coast of Greenland. For this service Clavering, then a Fellow of the Royal Society, received command of the *Griper*, the old gun brig of Parry's first voyage. Sabine completed his pendulum observations in Norway and Spitsbergen, and Captain Clavering proceeded to the difficult service of forcing the *Griper* through the heavy ice drift to the East Greenland coast. First he tried to force the ship through in Lat. 77° 30′ N. but found an unbroken field 200 miles across. Then he tried vainly again in 75° 30′, but finally reached the coast water in 74° 5′ S., and found an island where his friend Sabine could establish his observatory[134]. While the pendulum was being swung, Clavering was intent on geographical discovery and on completing a survey. His furthest northern points were two rocks called Ailsa and Haystack. The island they had first discovered, and one of its headlands, recalled memories of the *Chesapeake* action, and were named Shannon Island and Cape Philip Broke. A great bay was identified as Gael Hamke's, but the most important result of Clavering's expedition was the discovery of natives as far north as this bay, in 74° N. This position is an immense distance from those in the southern part of the east coast where Eskimos were afterwards found, and no natives have ever been met with since anywhere near the place where Clavering fell in with them. It was on the 18th of August, 1823, that he and his small party came across a seal-skin tent pitched on the beach, on the north side of Gael Hamke Bay. This tent was 12 feet in circumference and five feet high, the frame being of wood and

whale's bone. There were also a small seal-skin canoe, harpoons, and spears tipped with what appeared to be meteoric iron. The natives fled and hid behind rocks, but eventually they returned and became friendly. They were clothed in seal-skin with the hair inwards. Men, women, and children all told, only numbered twelve.

It is very improbable that this small family of Eskimos had worked their way northwards over the immense distance from the settlements near Cape Farewell. The alternative is that they were descendants of the emigrants who found their way to the upper reaches of Sir Thomas Smith's Channel many centuries ago. One branch went south bringing with it the tradition of the *uminmak* or musk ox; the other, still following the *uminmak*, reached the east coast, and slowly took a long road to extinction. Nearly fifty years passed away between Clavering's voyage and the next visit to this part of the east coast, and in the interval the dwellers in Gael Hamke Bay had become extinct, leaving many vestiges.

On August 20th Captain Sabine's tents and instruments were embarked; the *Griper* was in sight of Scoresby's discoveries further south until the 13th September, when there was a gale which drifted her to the southward amongst heavy floes and loose ice. They lost three ice anchors and the kedge, but Clavering bored his way through the ice into the open sea, where he encountered a series of heavy gales, making the coast of Norway on the 23rd. Pendulum observations were taken at Trondhjem, and the *Griper* reached Deptford on the 19th of December, 1823[135].

The next attempt to explore the east coast of Greenland was from the extreme south. Captain Graah of the Danish navy organised an expedition in March, 1829, at Nenortalik, the nearest settlement to Cape Farewell on the west side[136]. It consisted of four native boats, two being kayaks and two the larger women's boats. On reaching the east side the masses of ice piled on the beach rendered their progress very slow. Graah went on with one boat, sending the rest back on June 23rd, and by the 28th he had advanced as far north as 65° 18′ N. where he was stopped by an insurmountable barrier of ice. He went back to a place called Nugarlik in 63° 22′ N., where he wintered. On this coast between 60° and 65° N. Graah found 500 to 600 inhabitants. He returned to the settlements on the west side of Greenland in 1830. His object was to find the lost colony, for it was not then understood that the East Bygd was on the west side[137].

The distance from Graah's furthest to the southern point of Scoresby's survey remained undiscovered, and its exploration was reserved for Danish seamen. Dr Petermann had long been urging his countrymen to join the noble band of Arctic explorers, and in the spring of 1868 he fitted out a small vessel at his own risk, with Karl Koldewey, a native of Hoya in Hanover, in command. Unable to approach the east coast of Greenland, that able navigator made for the Spitsbergen seas, attaining a latitude of 81° 5′ N., sailing down Hinlopen Strait, sighting Wiche's Land, and returning to Bergen on September 30th, 1868.

Interest in Arctic work was thus aroused in Germany, a committee was formed, and it was resolved again to despatch an expedition under Koldewey to the east coast of Greenland. A vessel of 143 tons was built at Bremershaven, at a cost of £3150, and named the *Germania*. The schooner *Hansa*, of only 76¾ tons, was bought as a consort, with Captain Hegeman of Oldenburg in command.

Captain Koldewey's expedition sailed from Bremershaven on the 15th June, 1869, and reached the edge of the ice in 74° 47′ N. On September 14th the *Hansa* was closely beset and drifted south all through the winter until she was destroyed by the ice. Officers and crew then took to their three boats and eventually reached the Danish settlement of Friedrichsthal. Meanwhile the *Germania* worked her way through the ice, and reaching land on the 5th August, her winter quarters were

finally fixed in a small bay in one of Clavering's Pendulum Islands, in 74° 24′ N. Julius Payer, a Lieutenant in the Austrian army who was born at Teplitz in 1842, was the moving spirit of the expedition in the work of sledge-travelling and in the ascent of glaciers and mountains. He made one journey in September, but the principal work was undertaken after the winter was over. The details were not thought out with that close attention and full knowledge of all that has gone before which alone can secure great results; nevertheless, all being quite new to the work, the journey was highly creditable, as the ice surface was very bad. Captain Koldewey and Lieutenant Payer were the leaders, and starting on the 24th March they reached their furthest point in 77° N. on the 15th April. A lofty cape in 76° 47′ N. was named Cape Bismarck. Then, as there were no depôts and provisions were running short, the return journey was commenced, and they reached the ship on the 27th April. The distance covered, there and back, was about 300 miles and took 35 days, during eight of which they were confined to the tent by gales. Omitting these, their rate was a little over ten miles a day. Four other short sledge journeys were made. As soon as the vessel was freed from her winter quarters, exploration was commenced along the coast and a branching fjord was discovered in 73° 15′ N. extending far into the interior of Greenland. It received the name "Franz Josef." Along its shores two peaks, 7218 and 11,417 feet high respectively, were named after Petermann and Payer. The scenery was described as magnificent, exceeding in beauty, says Payer, anything to be seen in the Alps. After the discovery of this large fjord the *Germania* returned to Bremen in September, 1870.

Some years before, Messrs Anthony Gibbs & Co. employed Mr T. W. Tayler, a chemist and an enthusiast who believed in the lost colony, to form a settlement on the east coast in 63° N. He made two attempts, in 1863 and 1864. The failure to penetrate through the ice in 1863 was attributed to the vessels being unsuitable. In 1864 Mr Tayler had the *Erik* whaler of 412 tons, a well-fortified ship. She forced her way through the ice for some distance, but eventually had to give up the attempt and the project was abandoned.

About 1870 and following years eight British whalers frequented the Spitsbergen seas, and occasionally approached the east coast of Greenland. The most enterprising whaling captains on this side were David Gray in the *Eclipse* of 295 tons, and his brother John Gray in the *Hope* of 350 tons; both steamers built by Messrs Hall of Aberdeen. The *Active* 380 tons, *Jan Mayen* 337, *Mazanthien* 408, and Windward 320 tons, were old sailing vessels converted into screw steamers; while the *Pole Star* and *Queen* were sailing vessels. Captain David Gray was especially zealous in his efforts to combine geographical work with his whaling.

CHAPTER XXXI

SPITSBERGEN EXPEDITIONS BEFORE 1872

We have seen how flourishing the Spitsbergen whale fishery became and how admirably its history was written, the Dutch by Zorgdrager, and the English by Scoresby. But when the annual slaughter began to make these animals scarce there was eagerness to discover new fishing ground.

Theunis Ys was one of the most experienced navigators in the ice to the eastward, and one of the first who sought for whales in that direction. Captain Willem de Vlamingh followed him in 1664 and even rounded the northern point of Novaya Zemlya, reaching a latitude of 82° 10′ N. Along the north coast of Spitsbergen the Dutch whalers never went east of the Seven Islands, which they discovered, or of Hinlopen Strait. This is conclusive from the evidence of Martens in 1671, a most reliable authority as regards the seventeenth century. But early in the eighteenth century, two Dutch captains, Cornelis Giles and Outger Rep, went far to the eastward and Giles or Gillis sighted what has since been called Gillis Land. He also found that what is now known as Hinlopen Strait was not an inlet as had been supposed but a navigable strait[138].

The Russians took the lead in Spitsbergen in the eighteenth century, their plan being to form a depôt in Bell Sound. In 1764 Lieut. Nemtinoff was sent to build houses and to land stores there, to form a base whence to push through the ice to the Pacific. In the following year the expedition under Captain Vassili Tschitschagoff, of which Nemtinoff's voyage was the precursor, left Archangel. But Tschitschagoff had the misfortune to meet with a bad ice year and did little or nothing. He tried again in 1766 and got as far north as 80° 28′, but he was stopped by the ice, and the project was given up as hopeless. A party of Russians in charge of stores had twice wintered in Bell Sound.

For a century the eastern side of Spitsbergen remained almost unknown. It is to the Norwegian sealing captains, and to Professor Mohn of Christiania, who watched over and utilised their work, that most of our knowledge of this side is due. The Norwegian fishery dates from about 1820, but for many years they kept on the west side, only by degrees working along the north coast to the eastward. In 1863, however, the adventurous Captain Carlsen completed the circumnavigation of Spitsbergen for the first time. In the next year Captains Tobiesen, Aarström, and Mathilas were not so fortunate. They made their way down the east coast, but, becoming closely beset, were obliged to abandon their vessels and retreat in boats up Hinlopen Strait, traversing 700 miles before they were picked up. In 1872 Captain Altman sailed up the east side from the south, and sighted Wyche's Land, which was discovered by the English in 1617. It proved to be composed of three islands. Captain Nils Johnsen succeeded in landing on one of these islands, and named a lofty cliff Cape Nordenskiöld. In 1872 Captain Nilsen in the *Freia* also sighted the Wyche Islands, naming a high mountain Harfagrehangen, it being the thousandth anniversary of Norway's union into one kingdom.

The scientific researches of the Swedes in Spitsbergen were begun in 1858. They were undertaken to institute a preliminary survey for measuring an arc of meridian, and also for geological and biological collections. In 1864 Nordenskiöld and Duner took astronomical observations at eighty different positions on shore, and fixed the heights of numerous mountain peaks. In 1868 the Swedes, in the steamer *Sofia*, reached the latitude of 81° 42′ N. and in 1870

Baron von Heuglin and Count Zeil, in a vessel commanded by the Norwegian captain Nils Isaksen, explored Edge and Barentsz Islands, and Freeman strait, which divides them. They found a vast accumulation of drift-wood on the southern shore of the strait.

English yachts have also frequented the Spitsbergen seas, since Mr Lamont set the example in 1858. In 1864 the yachting voyage of Mr Birkbeck was of interest, because he was accompanied by the distinguished ornithologist Professor Newton of Cambridge. One of the greatest of Arctic yachtsmen as a scientific explorer was Mr Benjamin Leigh Smith, who in 1871 explored the north coast of Spitsbergen, the Seven Islands, and North-east Land, and attained the high latitude of 81° 24′ N. in 18° E. He also made voyages to Spitsbergen in 1872 and 1873. In the latter year he was in the *Diana* yacht with several friends, while Captain Walker took the *Sampson* to Cobbe Bay, to fall back upon in case of accidents. He also took several deep sea soundings, and did most useful work in relieving the Swedish expedition. Leigh Smith's enthusiasm lay deep, and he was not without inventive talent. The result of his practice as a navigator was the invention of an instrument to facilitate the computation of time at sea from the usual sights taken for that purpose, and also to act as a check on errors when the time has been computed in the usual manner[139]. Such a man was likely to leave his mark. He did so. By his observations he corrected the longitudes, and considerably extended the north coast of North-east Land to the eastward.

The Swedish expedition of 1872, under Professor Nordenskiöld, was composed of the steamer *Polhem*, the brig *Gladan*, and the steamer *Onkel Adam*. The *Polhem* was commanded by Lieut. Palander. He, with other officers and professors, were to remain through the winter at Mossel Bay in a dwelling-house of six rooms, taken out in pieces. Sledges and 40 reindeer were shipped at Tromsö, with 3000 sacks of reindeer moss. Unluckily the animals all escaped soon after they were landed, and the two other vessels, detained by the ice, were obliged to winter with the *Polhem*. Six fishing vessels were also frozen in. In April Nordenskiöld and Palander started on a sledge journey with 14 men. Rounding Cape Platen on North-east Land, they struck inland, and marched across the snow-covered hills to Hinlopen Strait which they crossed, and so got back to Mossel Bay. They were away 60 days. In the summer Leigh Smith arrived in the *Diana* and supplied the crews with fresh provisions. The Swedish expedition returned to Tromsö on August 6th, 1873.

One other Spitsbergen expedition must be mentioned. Lieut. Payer, who had been the moving spirit in the sledge journeys of Koldewey's expedition, was bent on continuing his Arctic explorations. He found a coadjutor in Lieut. Weyprecht of the Austrian Navy, an officer of very high scientific attainments. They hired a small vessel of 70 tons, the *Isbjörn*, at Tromsö with the idea of following the Gulf Stream into an imaginary polar basin, by keeping to the eastward of Spitsbergen. Attempting to reach Gillis Land they found the fogs very frequent, preventing observations, and, on August 31st, 1871, they were in Lat. 78° 41′ N. Then sailing east they sighted Novaya Zemlya and returned to Tromsö in October.

Meanwhile the Norwegian sealers began to frequent Novaya Zemlya. Carlsen had reached the mouth of the Obi in 1869. In 1870 about sixty Norwegian sailing vessels went to the seas round Novaya Zemlya. Captain Johannesen circumnavigated these islands, and Captain Carlsen did the same in 1871. The information collected by the Norwegian fishermen induced Payer and Weyprecht to select this route for an expedition they had projected.

CHAPTER XXXII

FRANZ JOSEF LAND AND ITS EXPLORERS

THE cruise in the *Isbjörn* was preparatory to a successful effort on the part of Lieutenants Payer and Weyprecht to raise funds for an Arctic expedition. Their plan was to round the north end of Novaya Zemlya and make discoveries to the eastward. Their vessel, the *Tegethoff*, fitted out at Bremershaven, was a steamer of 200 tons and 100 h.-p., with a crew of 22 men. They left Bremershaven on the 13th June, 1872, and sighted Novaya Zemlya on the 3rd August. By October the *Tegethoff* was closely and hopelessly beset, drifting about at the mercy of wind and tide, to the north of Novaya Zemlya. In the summer of 1873 the crew were fully engaged in seal hunting; and on the 30th August an entirely unknown land was sighted in 79° 43′ N. and 59° 33′ E. In November an island was reached by a party from the ship, and then the explorers entered upon their second winter of 1873–74.

Weyprecht cared most for his meteorological and magnetic observations, but Payer was very eager to explore the newly-discovered land, which received the name of Franz Josef Land. Payer paid a just tribute to M'Clintock in attributing such success as he attained to following the great sledge traveller's advice. He prepared for a month's journey, taking four sacks of provisions each containing sufficient for seven days for seven men, and they succeeded in obtaining some bear meat. He is clear as to the comfort of hot grog in the intense cold of the night. The sledging party, with dogs as auxiliaries, started on March 25th, and on April 12th, 1874, the furthest point was reached in 82° 5′ N., 165 miles from the ship. They returned to the *Tegethoff* on the 25th April, and some shorter excursions were afterwards made.

Payer's general idea of this great discovery was that Franz Josef Land consisted of two masses of land, which were named Zichy and Wilczek after the two chief supporters of the expedition, separated by a channel which was named Austria Sound. It was afterwards found to consist of an archipelago of smaller and more numerous islands than Payer supposed. His furthest point was Cape Fligely, but the land he thought he saw further north, and called Petermann Land, has since been found not to exist.

As the ship remained immoveable in the summer of 1874, it was found necessary to abandon her and retreat in the boats. After a long journey over the ice, they launched the three boats on the open sea, were picked up by a Russian schooner, and arrived safely at Tromsö on the 3rd September. Lieut. Payer was an accomplished artist, as well as a sledge traveller; and in after years he painted several fine pictures illustrating some of the last and most pathetic scenes connected with the Franklin expedition.

The next addition to our knowledge of Franz Josef Land was supplied by that enterprising and persevering yachtsman Leigh Smith. He had a vessel built, suitable for ice navigation, which he named the *Eira*. She was a steamer of 360 tons and 50 h.-p., 150 ft. long by 25 ft. beam, manned by 25 men all told. Leigh Smith's companions were Lofley the master, the surgeon Dr Neale, and Mr W. G. A. Grant. The great problem which Leigh Smith had to determine was whether there was a practicable route across the ice-laden Barentsz Sea, between Spitsbergen and Novaya Zemlya, to Franz Josef Land. Leigh Smith forced his way through the pack and sighted land on the 14th August, 1880—a new part of Franz Josef Land to the westward.

There were many large icebergs, but they were quite unlike those of Davis Strait, being flat masses like the Antarctic bergs. Leigh Smith and Grant landed at several places, making collections of the flora and of rock specimens. The extent of the new coast line discovered and explored was 110 miles, and of that seen 150 miles. There was great abundance of walrus and seals. This was one of the most important summer cruises ever made in the Arctic regions.



Julius Payer

The second cruise of the *Eira* in 1881 was disastrous. No less than ten days of ice navigation, towards the end of July, were required to reach the coast, the floes being closely packed together. Gun-cotton was found to be very useful in blasting the ice. Franz Josef Land was sighted on the 23rd July, and the *Eira* reached a point further west than was possible in the previous year, Cape Lofley being the extreme western point discovered. Some days were then spent at Cape Flora dredging and collecting plants and fossils.

On the 21st August the pack ice came in with the tide, and the *Eira*, caught and crushed between it and the ground floe, at once filled and went down. Her yards, catching on the ice, held her for a few seconds, but they soon broke in the slings with a loud crash as she settled. She sank in 11 fathoms, and looking down from the ice, she could be seen quite distinctly. All hands had been employed getting provisions out on the ice and saving everything that could be got at until just before she sank. Some spars and planking floated up and were secured. During the rest of August the men were busily engaged in building a hut of turf and stones, collecting drift-wood, and shooting walrus, bears, and looms, for their existence depended on obtaining sufficient fresh animal food. During the autumn 21 walrus, 13 bears, and 1200 looms were shot. They had saved from the vessel 1500 lb. of flour, 400 lb. of bread, a barrel of salt meat, 1000 lb. of preserved meat, 800 tins of soups, besides preserved vegetables, tobacco, some cases of whisky and brandy, and 7 cwt. of coal. All hands kept in perfect health throughout the winter, a fact which reflects great credit on Dr Neale.

On the 21st June, 1884, Leigh Smith and his party set out on their perilous voyage in four boats, and after 42 days the shipwrecked sailors sighted the coast of Novaya Zemlya on August 2nd. Near the entrance to the Matyushin Shar they met the *Hope*, under the command of Sir Allen Young, who had come out to search for the missing crew, and all returned home in safety.

There was an interval of ten years before the investigation of Franz Josef Land was resumed. Its next explorer, Frederick G. Jackson, was destined to do good work there. He began by a preliminary journey in the country of the Samoyeds and the Lapps in 1893, carefully studying their dress and equipments, and to some extent adopting them. Mr. Harmsworth, the newspaper proprietor, having found the funds, the *Windward*, an old whaler, was bought, and an expedition fitted out. Jackson was a keen sportsman, and a man of original mind, ready to adopt the well-tried methods of his predecessors, but quite as ready to invent new contrivances, or to make improvements as experience suggested. He had with him Lieut. Armitage, an excellent officer of the P. and O. service, as surveyor and astronomer, Dr Koettlitz as surgeon and geologist, and three other men of science. As the *Windward* was to land the party and return, a log house was taken in pieces, besides four ponies and sixteen dogs for sledge work, and three years' provisions.

The house was built on Northbrook Island, where there was likely to be a supply of walrus and bear, as strong currents prevented the formation of permanent ice. Unfortunately the *Windward* was obliged to winter also, and scurvy broke out, but she returned in the following summer. After a short preliminary run of a week, the important journey northwards was commenced on the 16th April, 1895, with three ponies drawing six sledges, and provisions for 63 days; but the journey actually only occupied 26 days. The sledges were 9 ft. 6 in. long, with a width of only 18 in., which is much too narrow. The allowance of food per man per day was 3 lb.—about the same as M'Clintock's scale. Their aluminium cooking apparatus (5½ lb.) was an invention of Jackson's, and they provided themselves against an arrest of progress on meeting water by taking an aluminium boat (150 lb.) and a canvas kayak.

The clothing was an imitation of that worn by the Lapps—*militzas* or loose frocks with the fur inside, and *tobacks* or hay-stuffed boots for the feet. Jackson wore knee breeches of warm cloth, a loose jumper of thick woollen stuff, a close-fitting cap covering ears and back of the neck, a cloth mask, and a light linen covering. The tent was a low cone, difficult to pitch in a gale. It was pitched for luncheon, and warm tea was made, with biscuit, cheese, and bacon. They had no sleeping-bags. The great trouble was the slushy condition of the snow and the frequent snowstorms. This first journey established the fact that the western half of Franz Josef Land was not one land but an archipelago, and that a channel passed up to a wide northern sea. Two hundred and seventy miles of new coast line were discovered. In the second season Jackson had the great pleasure of rescuing Nansen and Johansen from their perilous, indeed almost hopeless position. In the third season a longer journey was undertaken, part of it over the glacier of the western island. Only one pony had survived; this died on the journey, and the deaths of dogs reduced the number to five. Again the snow was soft and slushy, and the snowstorms so frequent that during the whole journey of 55 days only thirteen were fine. At its conclusion they had explored 250 miles in a direct line, probably travelling nearly 500—a very remarkable journey. The results were important. The western islands of the group were discovered and explored, the most western point was ascertained, and its distance from Spitsbergen found to be 250 miles. After three winters the *Windward* brought the Jackson expedition safely back to England in September 1887.

We owe our knowledge of the extremely interesting Franz Josef group chiefly to the labours of Payer, Leigh Smith, and Jackson. Nansen discovered the furthest portion north, and the group has been used as a base to attempt journeys to the Pole. Cagni, Wellman, and Captain Fiala of the

Ziegler Expedition (1903–1906) have also added to our information, the latter by a careful survey and map. We can now take a general view of the results of these discoveries.

The Franz Josef group of over fifty large and small islands extends for 270 miles from west to east between the meridians of 42° and 64° E. and for 140 miles from south to north between 79° 50′ and 82° 5′ N. The group rises from the same submarine plateau as Spitsbergen, forming part of the same system, though the land mass is further to the north than that of Spitsbergen. The northern coast of the North-east Land of Spitsbergen just crosses the 80th parallel, while only a few small islets of the Franz Josef group are to the south of it.

The Franz Josef archipelago is divided by the Austria Sound of Payer and the British Channel of Jackson into three groups, named respectively the Wilczek, Zichy, and Alexandra groups. East of Austria Sound there are two large islands, Wilczek and Graham Bell, forming the eastern limit of the group. The Wullerstorf mountain on Wilczek Island rises to a height of 2409 ft. To the north of Graham Bell Island are the small islets discovered by Nansen, who named them Hoitland.

West of Austria Sound are the numerous islands, large and small, which form the Zichy group; while to the north is Kronprinz Rudolf Island with its Middendorf glacier. The northern point of Kronprinz Rudolf, called Cape Fligely, is the northern extremity of the whole group[140].

On the west side of the British Channel are Northbrook, Bruce, Isabel, and Bell Islands. At the west end of Northbrook Island is Cape Flora, where was “Elmwood,” Jackson’s winter quarters; and between Mabel and Bell Islands is Eira Harbour, where Leigh Smith wintered. Westward are the two large islands of Prince George and Alexandra. The former, 90 miles long by 68, is almost covered with glaciers, and forms the western shore of the British Channel, with the Armitage, Arthur Harmsworth, and Albert Edward Islands to the north. On the northern horizon Jackson reported open water, which he named Queen Victoria Sea. The westernmost island, believed to be separated from Prince George Island by Cambridge Bay or Strait, is called Alexandra Island, and is also nearly covered with glaciers, but with low land along its northern shore. It is 120 miles long by some 50 miles wide.

Payer describes the lands seen from Austria Sound as covered with fields of ice, while rows of basaltic columns, rising tier above tier, stand out as if crystallized, but the natural colour of the rock is not visible, even the steepest walls of rock being covered with ice. The mountains are table-shaped and rise to heights of from 2000 to 3000 feet, and the predominating formation resembles the dolerite of Greenland, though coarser grained and of a dark yellowish-green colour. Payer also observed terraced beaches covered with débris containing organic remains. The small snow-covered islets reached by Nansen from the north are composed of a coarse-grained basalt. The western half of the Franz Josef group was more thoroughly explored by Jackson and Armitage, with the aid of their able and accomplished companions, during four summers and three winter seasons 1894–97.

Dr Koettlitz, the geologist of Mr Jackson’s expedition, from the results of three years of observation combined with the reports of Payer and Leigh Smith, has been able to give a fairly good general view of the past history and present appearance of the Franz Josef group. He looks upon the numerous islands as the fragments of an old table-land, doubtless connected with other lands from which it is now separated by wide seas, and he places the existence of this continental land in the Jurassic period. But the principal feature of the group, as was also observed by Payer, is the basalt or the dolerite of which the plateau formation consists. This basaltic rock formation is from 500 to 600 feet in perpendicular height, and Dr Koettlitz dates it from Jurassic times; in which case all strata that may have been laid down after this period have disappeared through denudation, or are buried under the ice sheets. When the hills were clothed with those plants of the Jurassic age

which have been recognised among the fossils that have been brought home, the climate must have been mild and genial, and the land was connected with Spitsbergen.

The present flora of Franz Josef Land is almost confined to terraces or slopes with a southern aspect, and is poor as compared with that of Spitsbergen. But it gives some little colouring to the dreary summer landscape, and in the neighbourhood of loomeries there are many bright-coloured mosses[141].

There are very few mammals on these desolate islands. Polar bears, however, frequent the neighbouring floes in considerable numbers, and wander about all the winter. The Austrians shot over 60, Nansen 19, and 120 were seen by the Jackson-Harmsworth expedition. The Arctic hare was not met with, and foxes were very rarely seen at "Elmwood," though they made themselves at home at Nansen's winter quarters. Bones and antlers of deer were found on the raised beaches, and it is not easy to account for their presence. They might possibly have come with drift-wood. White whales, narwhals, and three kinds of seals were seen, and walruses were abundant[142].

The snowy owl is a frequenter of Franz Josef Land, suggesting the presence of its favourite food, but lemmings were not met with. Snow buntings are widely spread over the islands, and remain from April to October, and the Lapland bunting also comes in smaller numbers in May, as well as the shore lark. Brent geese arrive in June, but the eider duck is rare. There are ptarmigan, first seen by members of the Zeigler expedition. The wading birds comprise turnstones, sanderlings, and two sandpipers. The very rare Ross's gull was found by Nansen breeding in considerable numbers. The glaucous gull, fulmar, kittiwake, and arctic tern also visit the group, and the ivory gulls breed there abundantly. The red-throated diver comes, but is rare. Looms and dovekies visit the southern coast, and the little-auks are numerous. The whole number of species of birds visiting Franz Josef Land is 23, against 33 in Spitsbergen, and 43 in Novaya Zemlya.

The Franz Josef group of islands may be considered geologically as part of Spitsbergen, both being fragments of the same continental land of Jurassic times[143]. The 143 miles of ice-covered sea between Cape Mary Harmsworth, the northernmost point of Alexandra Land, and Cape Leigh Smith on North-east Land has not yet been explored. The sea to the east of Wilczek and Graham Bell Islands is also unknown.

During the period from August 1872 to the following February the *Tegethoff* was drifted in a north-easterly direction from Cape Nassau of Novaya Zemlya, which is in longitude 62° E., to 71° 38′ E., a distance of about 125 miles, and from February to the next October, in latitude 79° N., she drifted westward until she reached the land ice on the south coast of Franz Josef. These drifts appear to have been due to the prevailing winds.

The sea to the south of Franz Josef Land, between Spitsbergen and Novaya Zemlya, has received the name of the Barentsz Sea. Its greatest depth is 230 fathoms, and over the greater part of the area the depth is not more than 100 fathoms. The ice is always kept well out of sight of the European coast by the Atlantic current, and when the line of the pack is met with in about 74° N., it is found to be sufficiently loose for navigation northwards during some part of the summer, the general drift being to the westward, but varying with the winds.

CHAPTER XXXIII

THE ROUTE BY SMITH SOUND.
KANE—HAYES—HALL—NARES—MARKHAM

WHEN my old messmate Admiral Sherard Osborn and I resolved to agitate until the Government was induced to dispatch another Arctic expedition, we selected the route of Sir Thomas Smith's Channel as the one most likely to afford valuable scientific results. We strongly deprecated a mere rush for the North Pole, as not only useless in itself, but also as hindering important geographical work.

The Northern Sound seen by Baffin in 1616 was discovered by Captain Inglefield in 1852 to be a wide channel leading to the polar ocean, and the land on its western side, facing Greenland—also discovered, but not named, by Baffin—received the name of Ellesmere Island from Inglefield. He found the entrance of Smith Sound to be 36 miles across. His extreme northern point was 78° 28′ 21″ N.

In 1853 the American, Dr Kane, in the little brig *Advance* of 120 tons, with a crew of 17 men, started for Smith Sound very poorly equipped[144]. He had some thought of completing the search for Franklin in this direction, but his main idea was to push his way as far north as possible in the brig until he reached the (imaginary) open polar sea. The *Advance* was stopped by the ice only nine miles north of Inglefield's most northern position, and there Kane was forced to winter, in a place which he named Rensselaer Harbour, on the east side of the Sound in 78° 37′ N. The coast consists of precipitous cliffs 800 to 1200 feet high, with a belt of ice about 18 feet thick resting on the beach[145].

Some short sledge journeys were undertaken in the spring, and Dr Kane himself went as far as a large discharging glacier, to which he gave the name of Humboldt. His steward, a man named Morton, with the Eskimo Hans Hendrik and a team of dogs, crossed the front of the glacier, and saw some open water caused by a strong current, the extent of which he exaggerated. Unable to extricate the *Advance*, Dr Kane and his people had to face a second winter, unprovided either with fuel or with anything but salt provisions. Scurvy soon attacked them, but they were saved by the kindly natives, who shared with them the proceeds of their hunting. Half the brig being burnt for fuel and the provisions nearly spent, Dr Kane abandoned her on May 17th, 1855, and the whole party retreated to the Danish settlement of Upernivik, which they reached on August 6th, 83 days after abandoning the brig. The story of their hardships and sufferings, as told in the charming narrative of the accomplished leader, is very interesting. His work contains the best account of the Arctic Highlanders, from whom they received so much kindness and hospitality. It is, however, to be regretted that from the exaggerated story of his steward, Dr Kane should have built up such an untenable theory as that of an open polar sea, for it misled many persons for a long time.

Dr Hayes, the surgeon of the *Advance*, obtained funds for an expedition to follow in the wake of Dr Kane. He sailed from Boston on July 10th, 1860, in the *United States*, a schooner of 133 tons, with a crew of 15 men. The little craft was blown out of Smith Sound three times before she was at last fixed in winter quarters, ten miles north-east of Cape Alexander, the western portal of the Sound, and 20 miles south of Kane's winter quarters. Dr Hayes began his sledge travelling on April 4th in the following year. He started with 12 men, 14 dogs, and a metallic boat on runners; but the

latter was sent back, and the party was reduced to four men and two dog sledges. Crossing the Sound, they reached the coast of Ellesmere Island on May 10th, and travelled northwards until the 18th. There was great abundance of animal life and consequent exemption from scurvy at his winter quarters, which he called Port Foulke. The schooner was broken out of the ice on July 10th and returned safely to Boston in October, 1861.

Ten years afterwards an expedition in the same direction was undertaken by an American named Hall. He was not a seaman, and possessed no scientific attainments, but he was endowed with undaunted persistence and enthusiasm and a very interesting personality. He was most deeply impressed with the sad story of the Franklin expedition, and for five consecutive years sought for relics along the south coast of King William Island, living with the Eskimos. In 1870 he began his agitation for an expedition to reach the North Pole, and the Navy Department handed over to him a river gunboat called the *Periwinkle*, of 387 tons. Hall changed her name to the *Polaris*[146].

A seaman was necessary to command the vessel, and Captain Buddington of New London, who had made thirteen whaling voyages, was selected, Captain Tyson being his chief mate. Dr Emil Bessels, who had been with the German expedition of 1869, had charge of the scientific work. Morton and the Eskimo, Hans Hendrik, who were with Dr Kane, joined, also three other Eskimos, friends of Hall, named Joe, Hannah, and their daughter Silvie. The outward voyage was fortunate. During August of 1871, Hall sailed up Sir Thomas Smith's Channel with little difficulty from the ice until he reached a latitude of 82° 16′ N., on August 30th. The winter quarters were in a harbour on the Greenland side, named Thank God Bay, in 81° 38′ N.

Hall, with his dogs, went for a short autumn journey as far as an inlet which he named Newman Bay, its northern cape, called Brevoort, being in 82° 2′ N. and 61° 20′ W. He was taken ill on his return, became partially paralyzed, and died on November 8th. He was buried on shore, and a monument has been erected to his memory. Captain Buddington resolved upon returning without attempting anything further. On August 12th, 1872, the ship was again free, but once more became beset, and drifted out of Smith Sound by the current. On October 15th she was again beset, and so severely nipped that boats and provisions were got out on the ice. Suddenly the ice eased off, but Tyson and seventeen others, including several Eskimos, were left on the floe. This ice floe continued to drift to the south, but the means of building snow shelters were found on it, many birds were shot, and the Eskimo, Hans Hendrik, killed more seals than the whole party could consume. After a long drift down Baffin's Bay, the forlorn people were picked up in 53° 35′ N. by the *Tigress*, Captain Bartlett, who took them to St John's, Newfoundland, in good health.

Meanwhile the *Polaris* was driven to the north again by a southerly gale, and ran on shore at Littleton Island near the entrance of Smith Sound. Here the fourteen remaining men passed a second winter, plentifully supplied with fresh provisions by the friendly Arctic Highlanders. They built two boats, and began a southern voyage in July, 1873, until they were picked up by the English whaler *Ravenscraig*, whence they were transferred a few days later to the whaler *Arctic* (on which Capt. A. H. Markham was at the time) and brought to England. All the journals were in charge of Dr Bessels, himself an accomplished naturalist and good observer, and his results were afterwards published.

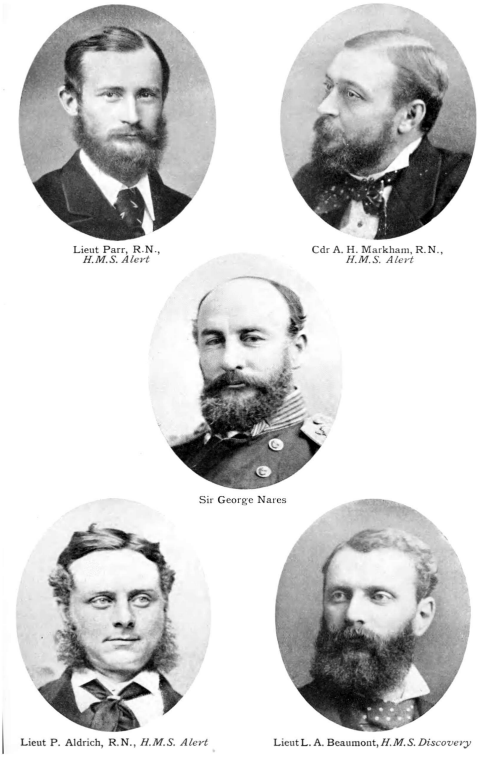
This is all that was then known of the route by Sir Thomas Smith's Channel. Inglefield announced the opening to the Polar Sea, and Hall's river steamer found her way through the ice to the further end. But here again many were misled, for the chart that was first produced made the land on the west side continue to trend due north towards the pole. Correct information from Dr Bessels, however, prevented Sherard Osborn and myself from being deceived by the chart, and our

conclusion was that the most valuable Arctic work would be to discover and explore the coasts facing the polar ocean.

On January 23rd, 1865, Sherard Osborn had read his able paper advocating the renewal of Arctic research before a very crowded meeting of the Geographical Society. All the survivors of the old expeditions who could possibly come were there, and many other men of distinction in the scientific world. All were impressed by the eloquence of the gallant sailor, as well known for his great service in the Sea of Azof as for his Arctic work. All were convinced. The Government must once more undertake the duty. It was a most encouraging beginning, but in March Osborn was obliged to leave England, handing over to me the onerous duty of continuing the fight single-handed.

On the 10th April, 1865, I read a paper at a meeting of the Geographical Society on the best route for Arctic exploration, but Sir Roderick Murchison caused a letter from Dr Petermann assailing my position to be read at the same time, and advocating a route north of Spitsbergen, long known to be impracticable. This apple of discord threw back the good cause for several years, but I continued to work hard at the propaganda, and not without success. Sherard Osborn returned to England in 1872, and read a paper before the Geographical Society on April 22nd, pointing out Dr Petermann's errors and quoting Nordenskiöld, Payer, and his own man Koldewey against him. The Spitsbergen route was no more heard of, but great delay had been caused.

We grew more hopeful, and in December, 1872, a deputation waited on Mr Lowe and Mr Goschen. It met with a very unsatisfactory reception, but the idea was getting a firm grip of the public mind, which was shown in several ways. My work, *The Threshold of the Unknown Region*, which dealt with the subject, went through four editions in two years, and was translated into French. It was thought desirable that a naval officer should make a preliminary cruise and observe the change that steam power had made in ice navigation. Valuable information would thus be acquired and the published narrative of such a voyage would keep up the interest of the public in Arctic work. Commander Albert H. Markham volunteered for this service, and embarking on board the Dundee whaler *Arctic*, Captain Adams, sailed from that port in May 1873.



Lieut Parr, R.N.,
H.M.S. Alert

Cdr A. H. Markham, R.N.,
H.M.S. Alert

Sir George Nares

Lieut P. Aldrich, R.N.,
H.M.S. Alert

Lieut L. A. Beaumont,
H.M.S. Discovery

When the whalers were all sailing vessels there was usually much detention, and sometimes considerable loss, in passing through Melville Bay. In 1850 the ice offered such opposition to progress that the whole fleet gave it up in despair. In 1830 the whole whaling fleet was nipped against the land floe 40 miles south of Cape York, the floes overlapping each other. Nineteen ships were destroyed, but a few escaped by digging deep docks in the land ice. A thousand men were encamped on the floes, and the loss amounted to £142,000.

Commander Markham found a very different state of things in 1873. The whaling fleet consisted of ten ships, the largest being the *Arctic* of 439 tons. She made a very quick passage through Melville Bay, reaching the north water on June 9th. This enabled Commander Markham to visit Port Leopold, Fury Beach, and Prince Regent's Inlet as far as Cape Garry, as well as to learn

all the mysteries of the industry, and take his share in the pursuit and capture of whales. The *Arctic* returned after the capture of twenty-eight whales, yielding nearly 15 tons of bone and 265 tons of oil, worth £18,925. The publication of Commander Markham's most interesting narrative much increased the feeling in favour of Arctic enterprise. The battle had indeed been a hard and long-contested one, but victory was in sight. On November 17th, 1874, the Prime Minister, Lord Beaconsfield, announced that the Government would despatch an Arctic expedition for the encouragement of maritime enterprise, and for the exploration of the region round the North Pole. Nothing could be more satisfactory. We had deprecated a mere rush to the Pole itself as useless, but we had been constantly urging the exploration of the region round the Pole for twelve long years. But the matter passed into the hands of the Admiralty, and all our arguments, supported by those of the various learned Societies, were totally disregarded. It was announced that the main object of the expedition was to attain the highest latitude and, if possible, to reach the North Pole!

Fortunately, Sir Leopold M'Clintock was the Admiral Superintendent at Portsmouth dockyard, where the expedition was fitted out, Dr Lyall and Mr Lewis of the *Assistance* (1852–54) being responsible for the provisions. The *Alert*, a 17-gun sloop, was strengthened and prepared for Arctic service[147]; and by my advice a sealer, built at Dundee in 1873 and named the *Bloodhound*, was purchased for the second ship. She was the best possible model for a vessel for Arctic service[148]. Captain Nares, who had served on board the *Resolute* in 1852–54, when he was in charge of Mecham's depôt sledge, was recalled from the *Challenger* to take command of the expedition. The Captain of the second ship was Captain Stephenson, Albert Markham being Commander of the *Alert*, and Lewis Beaumont first lieutenant of the *Bloodhound*, whose name was changed to the *Discovery*. The officers Aldrich, May, Parr, Giffard, Egerton, Archer, Rawson, and Conybeare, nearly all attained distinction in after life, thanks to an Arctic training. Captain Feilden was the naturalist of the *Alert*, Mr Hart of the *Discovery*. The surgeons were Drs Colan and Moss in the *Alert*, Ninnis and Coppinger with Captain Stephenson.

A volume was printed by the Geographical Society and presented to the Expedition, containing papers on Arctic geography and ethnology, and another manual was prepared by the Royal Society on various branches of science in their connection with the regions proposed to be visited. The sledge equipments were in the able and efficient hands of Sir Leopold, and were of course as perfect as it was possible to make them[149]. The provisions for ships and sledges were the same as for the search expeditions, or were intended to be the same. The *Valorous* paddle steamer was in company, to fill up the exploring ships at Disco, and take a line of deep-sea soundings across the Atlantic during her return voyage.

The immense crowd, brought by trains from all parts of England, which was assembled on Southsea Common on the 29th May, 1875, when the Arctic ships left Portsmouth Harbour, was a proof that a proper spirit had at length been aroused. Men and officers were the pick of the service, and the expedition started under most promising conditions. It encountered terrific gales, however, in crossing the Atlantic, and it was not until July 6th that the three vessels arrived at Lievely or Godhavn, on the south coast of Disco Island. The *Alert* and *Discovery* were here filled up with stores and provisions by the *Valorous*, took on board dogs, and with them a Dane named Petersen (not the great Carl Petersen) and the Eskimo Frederick. Parting company with the *Valorous* at Ritenbenk, they sailed down the Waigat fjord north of Disco, and on July 19th arrived at Proven, where the services of the veteran Hans Hendrik were secured for the *Discovery*[150].

As the season was late Captain Nares took the middle pack, and reached the north water of Baffin's Bay in 34 hours. At the end of July a small depôt was left at Cape Isabella, the western entrance of Sir Thomas Smith's Channel, but soon afterwards the ships were beset near Cape

Sabine, and detained by the ice for five days. At last there was a lead to the north, but the *Alert* was for some time in great danger of being forced up the side of a berg. There were heavy falls of snow and much danger from the drifting floes, and on August 8th they had to cut a dock in order to avoid a serious nip. At length Lady Franklin Bay was reached, and fixed upon as the winter quarters of the *Discovery*. The *Alert* pushed on, and fortunately a south-west gale drove the pack off the shore, and enabled Captain Nares to take a narrow channel along the coast, and reach "Floe-berg Beach" facing the great polar ocean, where the vessel was hauled inside some huge masses of ice, which from their size and formation, received the name of "floe bergs." Here, in 82° 30′ N., within a hundred yards of a low beach, were her winter quarters, about 50 miles from those of the *Discovery*. No ship had ever wintered so far north before. There was some autumn travelling in spite of soft snow, a depôt being laid out forty miles from the ship. A most severe winter was cheerfully faced, the men being kept interested and amused with a school, lectures, and other entertainments, while the Royal Arctic Theatre was opened again after an interval of twenty-one years. The chaplain, Mr Pullen, author of *Dame Europa's School*, was fortunately endowed both with dramatic and poetic talent, adapting plays with much literary skill and writing excellent verses; and Dr Moss was an artist of more than ordinary talent.

In other successful expeditions we have had to deal with the work of strong and healthy men. Now we have to contemplate the heroic, indeed almost miraculous efforts of men who attained great results in spite of the ravages of a terrible and deadly disease. The seeds of scurvy had taken root throughout the winter, and no one knew it. The travelling parties had started before the calamity became known, and of 121 men in the two ships there were 56 cases of scurvy, 42 in the *Alert*, but only 14 in the *Discovery*, in which ship a larger supply of fresh meat was obtained from musk oxen.

Captain Nares had now to consider how to carry out his instructions. He was ordered to reach the highest latitude, and if possible the Pole itself. Exploration was to be quite secondary. Before him was a frozen sea consisting of huge ice masses and lines of heavy crushed-up ice, and he expected the pack to break up and be in movement in the spring. He did not think that an important advance could be made unless a coast-line could be found trending north. He accordingly determined to send out three sledge parties, one westward, another eastward, and another north over the frozen sea, though he did not expect that the latter could proceed for any great distance.



Sub-Lieut. George Le Clerc Egerton, R.N.



Lieut. Wyatt Rawson, R.N.

A preliminary journey was undertaken to open communication with the *Discovery* by the two youngest officers, Egerton and Rawson, with the Dane, Petersen, and a team of nine dogs. They had hardly gone two marches when the Dane collapsed, covered with frost bites, and suffering from cramp. The two young officers did all that was possible for him, but his condition was so serious that he had to be put on the sledge and taken back to the ship. It was found necessary to amputate both feet, but it was in vain, and he died on the 14th May. Meanwhile, on March 20th, Egerton and Rawson started again, and reached the *Discovery*[151].

The 3rd of April was the day fixed upon for the start of the main sledge parties, Markham north over the frozen sea, Aldrich west along the north coast of Ellesmere Island. Captain Nares, in compliance with his instructions, decided to send the sledge crews north dragging two boats as well as their sledge with provisions, which necessitated going over the same ground four or five times, thus allowing the travellers only to attain a very short distance from the ship. Sir Leopold M'Clintock would have put the whole strength of the expedition on the northern journey, and would

easily have achieved the distance with healthy men. No boats would have been taken, but the sledges would have been made convertible into boats in the event of lanes of water barring progress. There could be no depôts, but supporting sledges would have been used to advance the main sledge to the pole, and to meet it in returning. The distance to the Pole and back was much shorter than some of the sledge journeys successfully made during the search expeditions. But alas! the indispensable condition of healthy men was wanting.

Commander Markham and Lieutenant Parr reached the autumn depôt at Cape Joseph Henry on the 10th April, 1876, and commenced their journey over the frozen sea with the thermometer at -33° Fahr. They encountered small floes surrounded by broad fringes of hummocks, across which roads had to be made for the sledges. Even then the sledges could only be got over by standing pulls, while the ground had to be gone over four times, dragging up the boat sledges. The work was tremendous, and the officers worked harder than the men, with less rest. Soon scurvy began to appear, the two first cases on the 16th and 17th April. On the 19th Commander Markham abandoned one of the boats. On the 24th the sledge crews were all day cutting a lane through hummocks. On the 11th May Markham reached the limit of human endurance and their furthest north in 83° 20′ 26″ N. Soundings were taken in 73 fathoms, showing that they were still on the continental shelf. On the 13th May the return journey was begun, on the 17th the second boat was abandoned, and on the 5th June the land was reached. Next day Lieutenant Parr started alone for the ship for help, for only three men, including Commander Markham, could drag the sledge. Two men were unable to walk, and were placed on the sledge; one died. The heroic resolution of all concerned enabled them to struggle on to the last in spite of difficulties and hardships, and the courage displayed while in the grip of this dread disease was magnificent. The party had gone over 600 miles.

Lieutenant Pelham Aldrich's western party had meanwhile made important discoveries along the north coast of Ellesmere Island during an absence of 84 days from the ship. He travelled over 630 miles, nearly all his sledge crew being more or less disabled by scurvy. His most northern point was 83° N., and was named Cape Columbia.

The third principal effort was to be made along the north coast of Greenland. From April 10th to 18th Egerton and Rawson crossed the channel between Greenland and Ellesmere Island to pioneer a route, returning on the latter date. Lieutenant Beaumont of the *Discovery* was to command the party. On the 16th April he and Dr Coppinger arrived at the *Alert* with two 8-man sledges. There Rawson joined them with another sledge, and on the 20th they all crossed the channel to Greenland, with a fourth depôt sledge. On May 5th Coppinger parted company, and on the 11th Rawson followed with a man on his sledge who had shown symptoms of scurvy.

Beaumont proceeded along the Greenland north coast, a new discovery. On May 19th he reached his turning point, naming a distant cape to the north-east Cape Britannia. His furthest point was in 82° 18′ N. and 50° 40′ W.

Soon after the return journey was commenced the whole sledge crew was attacked with scurvy. Three only, including Beaumont himself, were able to drag the sledge, the others being carried forward by relays. A dreadful disaster seemed imminent, but thanks to the foresight and energy of Rawson, Coppinger, and the Eskimo, Hans Hendrik, it was averted. They pushed forward to the rescue, and when they reached Polaris Bay only the officers were able to drag. Here there was a long rest, while the stricken men were revived on fresh seal meat. On August 8th Beaumont and Coppinger started to cross the channel to the *Discovery* with the now convalescent men, in a 15-ft. ice boat. After a most arduous and perilous voyage over the drifting ice, the ship was reached on the 15th. Beaumont had been away 132 days.

Meanwhile, Lieutenant Archer had discovered and surveyed a long and narrow fjord running south from Lady Franklin Bay. This was an admirable piece of work, but the most important discovery was that of a deposit of coal of the Miocene period, with many impressions of plants, near the winter quarters of the *Discovery*.

The outbreak of scurvy led Captain Nares to return to England, and although the geographical work fell far short of what would have been achieved had they escaped the disease, it was still of great interest and value, while the other scientific results were of the highest importance. The ships reached Portsmouth 2nd November, 1876.

The geographical results were the discovery of 300 miles of coast-line facing the polar ocean, valuable observations on the structure of the ice in this region, and, through the tidal observations, the discovery of the insularity of Greenland[152]. The important magnetic, meteorological, and tidal observations were under the immediate superintendence of Captain Nares. The great value of the other scientific results was mainly due to that very able naturalist, Captain Feilden. This officer had seen much service in India during the Mutiny, in China, and during the Civil War in North America on the Confederate side. His special study was ornithology, but he had a sound knowledge of other branches of natural history and of geology, and was indefatigable as an observer and collector.

Great as the scientific value of the collections was found to be, the conclusions to be derived from the discoveries when combined with those of former expeditions were of quite equal importance. We are able to understand the enormous pressure exerted by the ice along the newly-discovered coasts, and we see exactly the same thing as described by M'Clintock on Prince Patrick Island, by M'Clure on Banks Island, and by Collinson, in a less degree, on the coast north of America. The conclusion was inevitable that a current drives the ice across the polar ocean from east to west, with a set down the east coast of Greenland. This discovery threw a new light on the whole polar economy, and for this reason, combined with the scientific results, the Nares expedition must occupy a very high place in the annals of Arctic enterprise. My own conclusion at the time, based on the considerations above indicated, was that there was a deep ocean north of Franz Josef Land, and that a great result would be obtained by a vessel drifting across it with the current from Eastern Siberia towards Greenland.

CHAPTER XXXIV

SIR ALLEN YOUNG AND THE *PANDORA*. AMUNDSEN AND THE NORTH WEST PASSAGE.

In the same year that the English Arctic expedition was despatched, Sir Allen Young determined to see whether it was an open year for passing through the navigable north-west passage discovered by Sir Leopold M'Clintock. This depends upon the winds. If very strong winds from the north have been prevalent, the passage down Franklin Channel is choked with ice and impassable. If this has not been the case, the passage can be made. Sir Allen Young bought the gunboat *Pandora* from the Admiralty, a vessel built at Devonport for speed, and commissioned by my old friend Ruxton in 1863. She was well strengthened for Arctic work at Southampton. Allen Young bore the expense with some assistance from Lady Franklin and Lieutenant Lillingston, R.N., who went as his chief officer. The second was Navigating Lieutenant Pirie, and an ardent young Dutch naval officer named Koolemans Beynen joined as a volunteer. The *Pandora* was provided with a steam cutter, which proved very useful, three whaleboats, and four other boats.

Allen Young paid a very interesting visit to the cryolite mine in South Greenland[153] where he found his old ship, the *Fox*. He took in a supply of coals at Kudlisit in Disco, and was fortunate in passing through the ice of Melville Bay. After leaving letters for the *Alert* and *Discovery* on one of the Cary Islands, he proceeded up Lancaster Sound to examine the depôt on Beechey Island. He then went down Peel Sound in very thick weather. He was entering upon his own ground, his discoveries during the journey from the *Fox* in 1859. Then came a great disappointment. Dense pack ice extended right across the channel near Levesque Island and there was nothing to the southward but solid pack, with a strong ice-blink beyond 72° 14′ N. Cape Bird, the northern portal of Bellot Strait, was distant about 10 miles. Young ascended Roquette Island (about 200 feet) but there was nothing to be seen but unbroken pack extending from shore to shore and he inclined to the belief that the only way was by Bellot Strait. He reluctantly beat to the northward, and by September 7th was clear of Lancaster Sound. He landed again at the Cary Islands and fortunately found letters from the *Alert* and the *Discovery*. These he brought home, arriving at Spithead October 16th, 1875.

The cause of the Franklin disaster was that no provision was made against unavoidable detention or other misfortune, either by stationing a depôt ship to fall back upon, or by sending a relief ship. I represented to the Admiralty the importance of taking some such step in the case of the Nares expedition, and Sir Allen Young agreed with me. But the Admiralty authorities only awoke to the necessity when it was too late to send an expedition themselves. They therefore requested Sir Allen Young to undertake the duty with the *Pandora*, giving up his own cherished plans for the North West Passage. He felt bound to consent. This time he took Lieutenant Arbuthnot, R.N., as his second, as well as Navigating Lieutenant Pirie, Koolemans Beynen, and an Austrian naval officer, the late Admiral Alois Ritter von Becker. The *Pandora* was to take out letters to Littleton Island or Cape Isabella, and if possible bring back despatches from Captain Nares.



The *Pandora* (Captain Allen Young) in Peel Strait

Sailing in May, 1876, the *Pandora* again obtained coal at Kudlisit, and proceeded to Melville Bay, where a very different reception awaited her from the welcome she had found in the previous year. The bad time began with dense fogs. Then she encountered furious gales, being in great danger from icebergs crushing through the floes and threatening instant destruction. At one time she was so severely nipped that every preparation was made to abandon her, and take to the boats. They had no sooner got into the North Water of Baffin's Bay than a gale sprang up off the Cary Islands, which increased to a frightful storm from the south-east. No previous voyagers had ever experienced the like in that part. On the 1st of August it moderated, and a landing was effected on one of the Cary Islands, but nothing was found. The *Pandora* arrived at Littleton Island, within the entrance of Smith Sound, on the 3rd August.

Allen Young then determined to reach Cape Isabella, on the west side of Smith Sound, expecting to find despatches from the Nares expedition there. In this he was successful, and Arbuthnot and von Becker went on shore to examine the cairn which had been erected the previous year by Commander A. H. Markham on the summit of the cape. The boat had to be forced through drifting ice, but reached the shore. A record was found, dated July 29th, 1875, and signed by Nares. Next day Young began to think that a cask which Arbuthnot believed to be full of provisions ought to have been examined for letters, and determined to return to Cape Isabella to do this. As the Cape was approached, it blew so hard and the sea was so covered with drifting ice that it was not safe to send a boat, and for a whole month the vessel fought gales of wind, drifting floes, and danger in many forms, before a landing was ultimately effected. The cask was found to be empty! Nothing remained but to return home, for all possibility of making their way to the north was prevented by the solid pack. Letters were left at Cape Isabella and Littleton Island. On the voyage home a very pleasant visit was paid to the Arctic Highlanders in Whale Sound, "kind and simple people, robust and healthy, who offered us everything they had." On the 11th September the *Pandora* left

Upernivik, and on the 16th of the following month the *Alert* and *Discovery* were sighted in mid-Atlantic on their voyage home. Portsmouth was reached on November 3rd, 1876.

The two voyages of the *Pandora*, under the command of a great seaman, a great discoverer, and a most popular commander, are well worthy of record, and Sir Allen Young's admirable but modest narrative is a model of the way in which an Arctic story should be told.

Although Nordenskiöld's wonderful expedition in the *Vega* had brought the protracted struggle for the North East Passage to a successful conclusion, the North West Passage, though known throughout the greater part of its extent, still remained unconquered. It fell to a Norwegian with seven companions in a small fishing boat to accomplish this remarkable journey. The *Gjoa*, a cutter-rigged herring-boat, fitted with a 13 h.-p. motor, under command of Roald Amundsen, with a crew of seven men, sailed from Christiania June 16th, 1903, and arrived off Godhavn on July 24th. Melville Bay offered fortunate ice conditions, and they reached Dalrymple Rock, where 105 cases of stores had been left for them, on August 15th. They now had 4245 gallons of petrol aboard. Erebus Bay in Beechey I. was reached August 22nd, and the season being an exceptionally favourable one they made rapid progress, and passing down the east side of King William Land found Simpson Strait leading to the westward quite free from ice. But, though it was tempting to press on, they were on the look-out for a wintering spot for magnetic observations, and they were fortunate enough to discover an ideal situation in a small sheltered bay in the south-east part of King William Land. Here stores were landed and houses and an observatory built in mid-September. The bay was named Gjoahavn. Meanwhile Lund the mate and Hansen the astronomer were sent to an island in the middle of Simpson Strait, known to be the resort of reindeer in the autumn, and returned with twenty. At Hall Point, the southern end of King William Land, two skeletons of white men were found, which were considered to be undoubtedly those of two members of the Franklin expedition, who, it will be remembered, made their retreat southward along the western shore of King William Land. Reindeer became later very numerous even at Gjoahavn itself, as many as 13 being shot in one day by a single sportsman. Birds too, such as geese and ptarmigan, were also plentiful. Later, Eskimos appeared; they were very friendly and some remained all the winter. They were afterwards found to be very numerous.

Sledging journeys of a modest nature were made in the spring and surveys taken, etc. The summer and autumn passed and they prepared for a second winter (1904–5). Constant work was carried on at the observatories. The lowest temperature recorded this winter was -50° Fahr., and was thus much milder than the previous one, when -80° had been registered, while at the end of March the thermometer was +17° Fahr., instead of -40°. When the weather was sufficiently established Hansen and Ristvedt started by sledge with 75 days' provisions to make a rough survey, if possible, of part of the east side of Victoria Land. They took two sledges and 12 dogs with their food for 70 days, and started on April 2nd. On May 26th they reached their furthest point north on the western shore of M'Clintock Channel, and safely returned June 25th, having been successful in their object.

On August 13th, 1905, the *Gjoa* once more got under way on her westward journey. The observations, magnetic and other, had been kept continuously for 19 months, and the large number of Nechilli Eskimos who had been in their neighbourhood, or had come long distances to see them, had also given them abundant opportunity for ethnological notes on these people. Fortune still favoured the expedition, the sea proved sufficiently clear of ice, and though they had an anxious time navigating through the shoals and islands which lay between Nordenskiöld I. and the Royal Geographical Society's group, they had cleared Dease Strait on the 19th of August, and Union Strait four days later. Off Baring Land on August 26th they met the first whaler from the Bering Strait side, and had, as they thought, practically accomplished their task.

They were still a long way from having done so, however, for a few days later they encountered heavy pack at King Point, off the mouth of the Mackenzie River, and here they were reluctantly compelled to pass a third winter. There were many Eskimos here, and at Herschel I., 35 miles away, five whalers were wintering. While at King Point the magnetic observer, Wijk, died of pneumonia. Early in August, 1906, the *Gjoa* resumed her voyage, passed through Bering Strait without further incident, and arrived at Nome August 31st, thus completing a voyage of extraordinary pluck and endurance, and it must be added, of scarcely less extraordinary good fortune.

CHAPTER XXXV

WEYPRECHT'S PLAN FOR SYNCHRONOUS OBSERVATIONS. THE GREELY EXPEDITION

On the 18th September, 1875, Lieutenant Weyprecht, the colleague of Lieutenant Payer when Franz Josef Land was discovered, delivered an address to a meeting of German savants at Gratz in which he urged that, in the greed for discovery, scientific research was often neglected. The object of Arctic expeditions, he said, should be a nobler one than mapping and naming ice-bound coasts, or reaching a higher latitude than a predecessor. The North Pole, he held, had no greater significance for science than any other point in the higher latitudes. His contention was that meteorological and magnetic observations, to be really valuable to science, must be synchronous, and that they must be taken at selected stations round the Arctic regions, the instruments identical, the instructions identical, and the observations synchronous for at least a year.

Lieutenant Weyprecht's views received respectful attention, and were adopted by an international polar conference at Hamburg in 1879 and by another at St Petersburg in 1882. Proposals were then made to all the countries likely to take part, and finally the following arrangements were made to carry out Weyprecht's scheme.

The United States agreed to station Lieutenant Ray at Point Barrow, and Lieutenant Greely at Lady Franklin Bay, in Smith Sound. The Austrians sent Captain Wohlgemuth to Jan Mayen Island, and the Germans Dr Giese to Cumberland Inlet in Davis Strait. England arranged for observations to be taken at Fort Rae on the Great Slave Lake, Russia established stations at Novaya Zemlya and at the mouth of the Lena, and the Danes sent Dr Paulsen to Godthaab in Greenland. The Swedes were represented by Dr Ekholm at Ice Fjord in Spitsbergen, and the Norwegians observed at the Alten Fjord. The Dutch intended to establish a station at Port Dickson in Siberia, but unfortunately the vessel conveying the observer and his instruments was wrecked. The synchronous observations were commenced at these stations in the summer of 1882, and continued for a year, in accordance with the previously arranged plan.

One of these expeditions, the only one which concerns our subject, combined geographical discovery with the main object—that sent up Smith Sound by the United States. It was composed entirely of officers and men of the army, under the command of Lieutenant Greely of the Signal Corps. Under him the officers were Lieutenants Kislingbury and Lockwood, and Dr Pavy as surgeon and naturalist. There were five sergeants belonging to the signal corps, three of infantry, and two of cavalry, altogether ten sergeants, one corporal, nine privates, and two Eskimo hunters. The steamer *Proteus* was hired to land the party at Lady Franklin Bay, the *Discovery's* winter quarters. This was effected on August 18th, 1881, and as soon as the stores and provisions were landed and the house erected, the *Proteus* departed.

It was arranged that the *Proteus* should return to bring the observers home in the summer of 1882, but no other precaution was taken. It was quite possible that a vessel might find it impracticable to reach Lady Franklin Bay owing to ice conditions, or that she might founder, as actually happened. The commander of the expedition ought to have insisted upon a depôt being landed at Cape Sabine, or some other point in Smith Sound, complete in all respects for 24 men for

nine months; such a depôt as Captain Kellett left at Melville Island. The neglect of this precaution was disastrous.

The house at Lady Franklin Bay, which was named Conger, was comfortable, and the various observations, meteorological, magnetic, pendulum, and tidal were commenced. But unfortunately the personnel of the expedition did not form a very united family. There was resistance to the Commander's instructions for winter routine. Lieutenant Kislingbury resigned his appointment in the expedition and wished to return, but was too late. He remained as a volunteer. The surgeon was frequently insubordinate and was at last put under arrest, and later there was trouble with one of the sergeants named Cross. Lieutenant Lockwood was the life and soul of the expedition. He undertook short journeys in the autumn, laying out depôts, and upwards of a hundred musk oxen were seen, and many shot, so that fresh meat could be served out three times a week. During the dark winter months Lieutenant Lockwood edited a paper entitled *The Arctic Moon*, with illustrations by himself.

An expedition along the north coast of Greenland had been decided upon, and during March Lieutenant Lockwood undertook a preliminary journey across the channel to Thank God Harbour, visiting Hall's grave. A depôt was also placed at Cape Sumner.

On the 2nd April Lockwood's expedition started, consisting of the dog-sledge *Antoinette* with a team of eight dogs, and some supporting sledges. At Cape Britannia on the north coast of Greenland, near Beaumont's furthest, all the supporting sledges were sent back, a depôt was left, and on April 30th Lockwood proceeded with Sergeant Brainard and the Eskimo Frederick. The sledge was loaded with 25 days' rations for three persons weighing 230 lb., 300 lb. of dog pemmican, constant weights 176 lb., the sledge itself 80 lb., total 786 lb. As they advanced the snow became soft, and a portion of the load was thrown off, to be picked up on the return journey. The ice foot further on was smooth and the dogs went at a trot, the men sitting on the sledge by turns. On the 14th May they reached their furthest point, which was called Lockwood Island. On the 15th observations were taken, the result being Lat. 83° 24′ N., Long. 40° 46′ 30″ W. The return was without incident, and Conger was reached June 1st. The dogs had done well and enabled a good journey of two months to be made.

Lockwood's coast-line extends for 110 miles of longitude, or altogether 150 miles. It consists of a succession of high, rocky, and precipitous promontories, with intervening inlets, and a mass of snow-clad mountains inland. Along the shore was what was called a tidal crack, varying in width, supposed to be caused by the motion of the polar pack. Lieutenant Greely rightly concluded from the regularity of the surface in the fjords or inlets, that this was really the north coast of Greenland, and not a separate land as later alleged by Peary.

Greely himself started on an expedition inland on June 26th, and this journey, combined with a shorter one in the spring, resulted in the discovery of an extensive lake, and enabled him to obtain a clear idea of this part of the great island, his furthest point being 175 miles from Conger. A number of Eskimo bone implements and remains of sledges, of considerable antiquity, were found and brought back. But now began the first hint of the misfortunes that were to befall them. The *Proteus*, the relief vessel which was to bring the expedition home, was anxiously expected but never arrived, and a second winter had therefore to be faced.

On April 25th, 1883, Lieutenant Lockwood started for a month's exploration westward. He succeeded in crossing the island to a fjord on the west coast to which he gave the name of Greely, and down this he and Sergeant Brainard travelled for 25 miles. To the south of the fjord the country appeared to be covered by an immense ice-cap with an unbroken series of cliffs from 125 to 200 feet in height.

It was decided to commence a retreat on the 18th August, with a steam launch, a whale-boat, and two English ice-boats, carrying 50 days' provisions, to take them to Cape Dobbin, where they expected to find a ship. All the records of observations as well as the reports of sledge journeys were placed in tin cases carefully soldered. They picked up the English depôt at Cape Collinson (240 rations of meat and 120 of bread) and reached Cape Hawke with 60 days' provisions. On October 2nd they landed at Wade Point with 35 days' food for 25 men. All the boats, except one ice-boat, had been abandoned. On the 9th Sergeant Rice arrived at Cape Sabine and obtained news. The *Proteus* had foundered on the 23rd July, and her commander Lieutenant Garlington and crew had escaped to the east coast. The English depôt was found. The members of the expedition reached Cape Sabine and built a hut with the boat for a roof. Greely was obliged, on November 1st, to reduce the daily rations to the smallest amount that would support life—meat 4 oz. and biscuit 6 oz., altogether a total of only 14¼ oz. There were some instances of theft of rum and provisions, but not many. In January Sergeant Cross died. Though some of the party were indefatigable in searching for game they were not fortunate, the bag consisting only of one small seal, one bear, twenty-four foxes, fourteen ptarmigan and sixty dovekies. The last issue of rations was on May 24th, after which the deaths from starvation began, though during May Sergeant Brainard had managed to get 475 lb. of shrimps and 81 lb. of sea-weed. That gallant and loyal soldier, James Lockwood, died on the 9th April, Dr Pavy on the 16th, and Kislingbury on the 1st June. Greely was left without an officer. All the non-commissioned officers, except Brainard, fell victims of starvation, as well as six of the privates and the two Eskimos. Private Henry had been detected stealing bacon, and afterwards strips of leather. He was stronger than any of the others, and they became frightened of him, so Lieutenant Greely ordered him to be shot. This was done on June 6th, 1884. The six survivors, Greely, Brainard, Connell, Long, Fredericks, and Biederlich, were reduced to the very last extremity when on June 22nd a relief vessel arrived, commanded by Captain Sedley, and saved them.

Greely was in a most difficult position during the expedition owing to the insubordination of two out of three of his officers, which set a bad example to the men. There were possibly faults on both sides, and Greely may have been injudicious, but he conducted an exceptionally arduous and difficult service with ability and consideration for others, and to the very last did not fail in his duty to those dependent upon him.

Lieutenant (now General) Greely succeeded in bringing back the most valuable part of his work. It is published in two large quarto volumes which are admirably edited (Washington, 1888). The work opens with Greely's lucid and thoroughly honest report, and contains the reports and diaries of all the sledge travellers, and the meteorological, tidal, and magnetic observations during the whole sojourn in Lady Franklin Bay.

Lieutenant P. H. Ray carried out the Weyprecht scheme at Point Barrow with diligence and ability. His results, contained in a large quarto volume (Washington, 1885), in addition to the narrative, comprise the meteorological, magnetic, and tidal observations, together with ethnographical and linguistic studies of the natives of Point Barrow.

CHAPTER XXXVI

THE NORTH EAST PASSAGE — NORDENSKIÖLD — WIGGINS — DE LONG

NORDENSKIÖLD is a name which not only recalls much and varied Arctic work, but also most valuable researches connected with historical geography. Its bearer, the late Nils Adolf Erik, Baron Nordenskiöld, was born at Helsingfors in 1832, of an ancient and distinguished Swedish family settled in Finland. His father was a well-known man of science, and the young Nordenskiöld became a trained chemist and mineralogist. He settled at Stockholm in 1857 and soon began to turn his attention to Arctic exploration. In 1858 he was geologist in Torell's Spitsbergen expedition; in 1861, with Duner, he was taking preliminary observations for the Spitsbergen measurement of an arc of the meridian; in 1868 he reached the highest northern latitude attained by a ship; in 1870 he made his first journey over the inland ice of Greenland; and, later, he wintered in Spitsbergen and made the inland journey across North-East Island. The funds for these expeditions were to a large extent supplied by Baron Oscar Dickson, the munificent supporter of Swedish Arctic enterprise.

In 1873 Nordenskiöld turned his attention to the North East Passage by the Siberian coast, believing that it might become a highway for commerce. In that year he reached the Yenisei by the Kara Sea, and discovered an excellent harbour which he named after his generous supporter, Oscar Dickson. In 1875 he again crossed the Kara Sea in the *Ymer*. These were pioneer voyages. His great expedition, with the financial support of King Oscar, of Oscar Dickson, and of the Russian merchant Sibirikoff, was fitted out in 1878.

A ship named the *Vega*, built at Bremen in 1872, of oak with a skin of greenheart, was purchased. She was of 300 tons, 150 ft. long, by 29 ft. beam, and 16 ft. depth of hold, barque rigged, with a screw propeller and engines of 60 horse-power. The leader of the expedition was Nordenskiöld himself, the captain of the ship Lieutenant Louis Palander, a distinguished Swedish naval officer who had previously been in Spitsbergen with Nordenskiöld. The other officers were Lieutenant Brusewitz of the Swedish navy, Lieutenant Hovgaard of the Danish navy, Lieutenant Bove of the Italian navy, and Lieutenant Nordqvist of the Russian army. There were also three scientific men (one being the surgeon), two engineers, a boatswain, and 15 seamen of the Swedish navy, besides three Norwegian seal-fishers, 30 all told. The *Vega* took 300 tons of coal and two years' provisions, and was accompanied by two of Sibirikoff's cargo vessels for the Yenisei, and the *Lena* for the river of that name.

The *Vega* left Tromsö on the 21st July, 1878, with the three other vessels in company, and anchored in Pet Strait, between Waigats Island and the mainland of the Samoyeds, on the 30th. The ship stood out into the Kara Sea, and rounded White Island. There seems to be little or no risk of running ashore on the coast, for the currents from the Obi and Yenisei flow northward at a rate of two to five miles. All went well, and on the 6th August the *Vega* and *Lena* were safely anchored in Dickson Harbour, while Sibirikoff's two vessels proceeded up the Yenisei river.

From this point the exploring voyage began, and was well described in Palander's letters to me at the time. Cape Taimyr was reached on the 10th of August, and floe ice was encountered with thick fogs. It may be mentioned that very important corrections of longitude had to be made all

along the Siberian coast, and between Dickson Harbour and Cape Taimyr several islands previously unknown were discovered.

On the 19th of August the *Vega* rounded Cape Chelyuskin, the most northern point of the Old World, which was found to be in 77° 36′ N. and 103° 25′ E. Palander then stood more out to sea in hopes of finding unknown islands, but the quantity of drift ice by which the ship was soon surrounded led him to seek the coast again, and he found a navigable though narrow channel between the land and the pack. On August 28th the *Vega* was off the mouth of the Lena, and the little steamer destined for service on that river parted company.

The strong current from the river Lena sent the *Vega* 70 miles to the north. It was observed that in all the islands on the Siberian coast the northern sides were quite precipitous, while those towards the coast were low, often sloping into sand-banks. Until September 3rd there was beautiful weather with little ice, and the Bear Islands, 35 miles from the mouth of the Kolyma, were reached. Here the four basaltic pillars, 44 feet high, reported by Wrangel, were sighted, looking exactly like four lighthouses. Here also the explorers had their first snow-fall, and the ship was stopped by heavy floes cemented together, so Palander again made for the land, and found a narrow channel. This eastern part of the voyage was by far the most difficult, and very slow progress was made in shallow water, with much drift ice and fog, the steam launch being constantly ahead sounding. From the 8th to the 11th, when Cape Jakan was passed, the explorers were working through pack ice with a depth of only four fathoms. But fortune, which had hitherto been so propitious, now deserted them, and on the 28th September the *Vega*, when almost within reach of success, was forced to winter on the coast and remain for nearly ten months. Palander thought, however, that 1878 was a bad ice year, and that generally a vessel with steam power could pass from Norway to Japan in one season.

On the 18th of July, 1879, a strong south wind drifted the ice off the shore, and the *Vega* was free. On the 20th she passed East Cape, and Bering Strait was crossed several times for the purpose of taking soundings. They were at Bering Island on August 14th, and Yokohama was reached on the 2nd September, 1879. The hearty welcome that Nordenskiöld received on his return from this famous voyage was worthy of the great explorer's well-established position in the world of science.

The results of Nordenskiöld's famous voyage were the correction of the longitudes along the coast of Siberia, the numerous soundings (no less than 5000 casts of the lead having been taken), the observations and collections, and not least, the lengthened study of the Tchuktchi race which they had been able to make during the long detention in winter quarters. The two divisions of coast and reindeer Tchuktchis numbered 3000. The former daily visited the *Vega* during the winter, in parties numbering from ten to twenty, were allowed to go where they liked, and never attempted to steal anything. Palander found them good-natured, friendly, hospitable, and honest.

Nordenskiöld's activities did not cease with this, the greatest of his achievements. He made a second journey over the inland ice of Greenland, effected a landing on the east coast, and encouraged the aspirations of young men such as Björling and Kallstenius, whose melancholy fate was a cause of sorrow to him[154]. After he was ennobled Nordenskiöld lived chiefly at his beautiful country seat of Dalbyo, where I twice visited him. His latest labours, in bringing to light and publishing medieval maps and charts and portolans in two splendid volumes, were not the least important. His researches and discoveries threw much new light on the history of cartography. When he died a vast amount of knowledge died with him, and there passed away from among us an illustrious man of science, a great explorer, a great geographer, and a man of whom his countrymen may well be proud[155].

While Nordenskiöld was engaged in his Siberian labours, there was an enthusiastic English master mariner who was also filled with the idea of opening a trade with Russia by the Arctic Sea. Joseph Wiggins was born in 1832 at Norwich, between which place and London his father drove the "Nelson" coach three times a week, until railroads superseded coaches. At fourteen Joseph went to sea, and became master of a ship trading to the Mediterranean when he was twenty-one. From 1868 to 1874 he was examiner in navigation at Sunderland, and in the latter year his mind became full of ideas about opening a Russian trade by the north. He was a practical and very persevering man, with whom thought was soon followed by action. On June 3rd, 1874, he sailed in the *Diana* of 103 tons, successfully crossed the ice-bound Kara Sea to the river Obi, and returned. In 1875 he went to Archangel in a Yarmouth ship, called the *William*. In 1876, with help from the Russian merchant Sibirikoff and Mr Gardiner, he sailed in the *Thames* of 120 tons, and reached the Yenisei river. Leaving her there with the crew on board, he returned overland by way of Petrograd. He went out again to his ship, accompanied by Mr Seebohm, the distinguished ornithologist, who had long desired to investigate the bird-life of this region. They arrived at the town of Yeniseisk on April 5th, 1877, and reached the *Thames* at the Kureika, lower down the river Yenisei, on the 23rd. The crew were in good health, but the ship had to be cut out of the ice. No sooner was the *Thames* free than she ran on a sand-bank on her way down the river and was finally abandoned. The *Ibis*, a little vessel belonging to Seebohm, was uninjured, but all the crew of the *Thames* except three refused to go home in her. Mr Seebohm, who made a valuable ornithological collection, calculated that 50,000 acres of ice passed down the river in the spring, at the rate of ten to twenty miles an hour, and his description of the break-up of the ice on these great Siberian rivers is of extraordinary interest. He returned home overland, as did Wiggins and the rest of the crew of the *Thames*.

The next venture of Wiggins was very successful. In concert with Mr Oswald Cattley, who chartered the *Warkworth* of 650 tons for a voyage to the Obi, he sailed from Liverpool on August 1st, 1878, reached the Obi, and was back in the Thames by October 2nd with a cargo of wheat. In 1879 speculators rushed in and spoiled the business. Nine large steamers, all quite unfit for ice navigation, were chartered for the Obi, where 5000 tons of Siberian goods were ready for them. But the masters of the steamers were frightened of the ice and came home without cargoes, thus thoroughly discrediting the enterprise. Wiggins gave it up in disgust, but some years afterwards, encouraged by Sir Robert Morier, the English Ambassador at Petrograd, he was induced to take the *Phoenix* of 273 tons to the Yenisei, and he made several other voyages until 1896. This fine specimen of an English master mariner had become a perfect pilot of the Kara Sea, and a most worthy successor of Burrough, Pet, and Jackman. I had the pleasure of presenting him with one of the awards of the Royal Geographical Society for his excellent services in the Kara Sea, and he received other recognitions. He died, aged 73, on September 13th, 1905[156].

Another expedition, connected more or less with the voyage of Nordenskiöld and the Siberian Sea, was planned and commanded by Lieutenant George W. De Long of the United States Navy, and financed by Mr Gordon Bennett of the *New York Herald*. The expedition had the great advantage of being under naval discipline, the commander receiving instructions from the Secretary of the Navy. Mr Gordon Bennett induced Sir Allen Young to sell him the *Pandora* as the vessel for the new expedition. At this time Lieutenant De Long was in England, and I had the pleasure of making his acquaintance. He was a good seaman, a scientific officer, and an agreeable companion. Trained to the management and care of seamen De Long was undoubtedly the best of all the American arctic commanders, and he well fulfilled the trust that was placed in him. The *Pandora* was taken to San Francisco—for the object of the expedition was to make discoveries by way of Bering Strait—but, ignoring the vessel's previous fine record, and in spite of sailors' customs and beliefs, her name was changed to the *Jeannette*.

Captain De Long was accompanied by two naval lieutenants, Danenhower and Chipp, and a naval engineer, Melville, with Dr Ambler as surgeon, and the ice pilot Dunbar. The expedition, with 32 men and 40 dogs, left San Francisco on 8th July, 1879, a few days before Nordenskiöld got free from his winter quarters among the Tchuktchis. Passing through Bering Strait and sighting Herald Island, the vessel was soon afterwards beset and drifted helplessly to the north-west. De Long's hope was that she would be freed when she reached a part of the ocean far from land where the floes might disperse, but this never happened. Two winters were passed during this wearisome drift, but De Long knew how to keep up the spirits of his people by his own unfailing cheerfulness, and by promoting good-fellowship and various amusements. On March 12th, 1881, they were in 74° 54′ N., having drifted 320 miles to the north-west since sighting Herald Island, but they were still on the continental shelf, the depth being only 38 fathoms, increasing, after a month, to 85 fathoms. The rate of drift seemed to increase. From April 21st to 25th it was 47 miles, in a direction N. 69° W. On May 16th, in 76° 47′ N., a small island was sighted, and on the 24th another in 77° 8′ N. A dog sledge, under Melville, was sent to visit one of them, returning on June 5th. They were outliers of the Liakhov group, and were named Jeannette and Henrietta Islands respectively. On June 11th the depth was only 33 fathoms, and the ice was in a threatening condition. Suddenly the vessel was subjected to tremendous pressure. Provisions and everything that could be saved were at once got out on the ice together with the boats, and on June 12th, 1881, after long and faithful service on the African coast, in Baffin's Bay, Peel Sound, and Smith Sound, and lastly in this long drift, the staunch old gunboat sank to the bottom of the Siberian Sea.

De Long found himself in command of a whale-boat and two cutters, with 4950 lb. of pemmican and 1120 lb. of biscuit and 32 souls to save from death. Their position was in 77° 14′ 57″ N. and 154° 58′ E., far away from land. The boats were mounted and secured on sledges, and held ten men each, the first with De Long and Ambler, the second with Melville and Danenhower, and the third with Chipp and Dunbar. There were six tents.

De Long made for the Liakhov or New Siberian Islands, but with much soft snow and dangerous openings in the ice their progress was slow. On July 29th land was discovered in 76° 38′ 17″ N., the most northern of the New Siberian group, consisting of volcanic rock, with a vein of bituminous coal. It received the name of Bennett Island. All were then well, with 23 dogs, and 30 days' provisions, but De Long himself was suffering much from the state of his feet. From the New Siberian Islands the three boats then started for the mouth of the Lena, De Long intending to lead his people to the first Russian settlement he could find.

In crossing from the island to the Siberian coast the boats encountered a furious gale of wind and were separated. Chipp and his boat's crew were never heard of again. Melville and Danenhower, however, with their men, landed on one part of the Lena delta, and De Long on another. The latter in vain tried to find their way to a Russian settlement. Provisions failed, and all, save two, perished. Melville and Danenhower were more fortunate, reaching Yakutsk on the 30th December, 1881, and Melville at once organised a search for his lost commander.

A relief expedition had meanwhile been fitted out at San Francisco, and in June 1881 the *Rodgers* sailed under the command of Lieutenant Berry, U.S.N. That intelligent officer made a complete survey and examination of the small Wrangell Island, in sight from Cape Chelagskoi, about which Dr Petermann and others had written so inaccurately. He wintered in St Lawrence Bay, and then made his way to Yakutsk, to join Melville in the search. The bodies of De Long and Ambler were found close to each other on the island of Boren-Bjelkoi; they had died nobly, martyrs to science, and devoted to duty to the last.

De Long was a naval officer of promise, and a noble character. He impressed me greatly with his thoroughness. In his last letter to his wife he wrote: “I feel my responsibility, and I hope I appreciate the delicate position I am placed in, of leading and directing so many people of my own age. I hope God will aid me in what I have undertaken, and will bring me through it in safety and with credit.” Mrs De Long resolved to publish the whole of her husband’s copious journals, and she acted wisely, for they form one of the most interesting of Arctic books. She wrote to me—what every reader will endorse—“the journals show so convincingly the zeal, perseverance, and devotion of the leader, that I am anxious that they should have as large a circulation as possible.”

De Long’s expedition, though unfortunate, was not without useful results. The history of the drift, so carefully and accurately recorded, is valuable geographically and will always be of assistance to future explorers.

CHAPTER XXXVII

GREENLAND AND ITS INLAND ICE—NORDENSKIÖLD, NANSEN, PEARY

THE inland ice of Greenland was for centuries one of the greatest Arctic problems—an entirely unknown area of 750,000 square miles. So little was its formation understood in the first half of the eighteenth century that Governor Claus Paars, Greenland's first and only governor, took out horses with the idea of riding across it to the supposed lost colony on the east side. He was disabused when he sailed up to the end of the Amaralikfjord, reached the inland ice and, after a march of two hours, was stopped by a crevasse.

No one knew what there might be within that vast region. The Eskimos were often on its edge when hunting the reindeer, but had never ventured far. They were terrified at the mighty solitude. At last curiosity overcame fear in the case of a trader named Lars Dalager, who was at Frederikshaab, one of the most southern Greenland stations. With a few Eskimos, he went up to the head of a fjord to the south of the *iisblink* on September 2nd, 1751, and advanced for a few days over very rough ice. He noticed the extreme cold of the inland ice and sighted mountain peaks which he supposed to be on the eastern coast, but they have since been found to be *nunataks* or mountain peaks rising out of the great snowy expanse. He returned to his boat after five days. The men of science who visited Greenland somewhat later, Fabricius in the days of Krantz, and the German Geisecke in 1806–13, only reached the edge of the inland ice, though it engaged much of their attention. The well-known Alpine traveller Whymper made two attempts from Disco Bay in 1867 and 1872, but without result. Several persons, such as Steenstrup, Kornerup, and Holm, made observations on the rate of movement of the glaciers and it was found to vary in different localities.

The first really serious expeditions were those of Nordenskiöld in 1870 and 1883. In the former year the accomplished Swedish explorer selected the northern arm of the Auleitsivik fjord, twenty miles north of Godthaab, as his point of entrance into the unknown. He was accompanied by the botanist Dr Berggren. On the 19th July they reached the ice cap by a cleft, and finding the surface impassable for a sledge they abandoned it, and went on with a few necessaries on their backs. Passing the region of broken-up ice and cleft and favoured by good weather, they came to a perceptible rise, with a smoother surface, and reached their furthest point 2200 feet above the sea and 30 miles west of the Auleitsivik fjord, returning after six days. Nordenskiöld found rivers and streams on the surface. The explorers went along the bank of one great river until the whole mass of water poured down a perpendicular cleft into the depths.

In 1883 Nordenskiöld again came out to Greenland in the steamer *Sophia*, funds being supplied by Baron Oscar Dickson, that munificent supporter of Arctic research. Nordenskiöld believed that the inland ice was not an unbroken mass, but that there were islands with bare rocks and some vegetation, the abode of reindeer and ptarmigan. He started from the same place as in 1870, with a party of ten, including two Lapps with *ski*. In 18 days they had advanced 73 miles and attained a height of 5000 feet. They were stopped by soft sludgy snow, but Nordenskiöld sent on the Lapps, who returned with a report that they had been 145 miles further, reaching a height of 5800 feet, and that there was nothing but an endless unbroken surface of snow. Yet the sight of two ravens rather confirmed Nordenskiöld in the belief that the expanse of snow was relieved by oases. The great Swedish savant was 31 days on the inland ice.



Adolf Erik Nordenskiöld

Meanwhile, Dr Rink, the learned and accomplished Danish Inspector of Greenland, had warmly advocated further research as far back as 1876. The Danish savant Steenstrup observed the rate of movement of glaciers in 1876 and 1877, and in 1878 an expedition was undertaken into the interior by Lieutenant Jensen. This was a very interesting journey and revealed the character of the inland ice in the far south. Jensen entered by the Fredrickshaab *iisblink*, and crossed the expanse of snow as far as the Nasuasak *nunatak*, which was one of the peaks seen by Dalager, 4700 feet above the sea. He had three small one-man sledges with three weeks' provisions. The ice was very rough and broken, and the men suffered from snow blindness. But the *nunataks* were reached, and Jensen ascended one of them to a height of 5000 feet, obtaining an extensive view. They are known as the Jensen *nunataks*. The journey on the inland ice occupied 31 days, from July 3rd to August 3rd.

The next attempt was made in 1886 by Peary in Disco Bay, in the same place that Whymper had previously selected. Robert Peary was a civil engineer employed in the American naval dockyard service; a very resolute and determined man who had conceived the ambition of taking a share in Arctic discovery. His companion was the Danish lieutenant Maigaard. Their point of entrance was in 69° 30′. They took thirty days' provisions, which were carried on two sledges, 9 feet long and 13 inches wide, weighing 23 lb. each, their shelter for the night being a tarpaulin between the sledges. They advanced over the inland ice for 24 days, from June 8th to July 2nd, meeting with a "fohn" wind which made the snow soft and sticky, and they were also delayed by snowstorms. In returning, the wind was at their backs, so they rigged up the tarpaulin on some alpenstocks and sailed back at great speed, 22, 27, and even more miles a day. They returned on July 24th.

The name of Fridtjof Nansen will for ever be coupled with the first crossing of the inland ice of Greenland. It was here that his genius in conceiving a great plan for discovery, his ability as a leader, and his mastery of details first began to develop. From the first he was something more than an explorer. Born on the 18th of October, 1861, young Nansen was of good lineage on both sides, and in his after life he proved the truth of Holberg's saying "Det er min tro noget i at vaere kommen af godt folk." He became a naturalist, and as his character developed its chief points were devoted patriotism, breadth of view, and love of science, above all of scientific accuracy. He had reached the age of 27, when, after a study of the labours of Jensen and Nordenskiöld, he resolved to achieve the crossing of Greenland, conceiving that science would benefit more especially by discoveries respecting the meteorology of the inland ice.

Nansen, who had determined on crossing from east to west, had already been for a cruise on the east coast of Greenland and had made acquaintance with the character of its difficult navigation. The study of the necessary equipment was undertaken with his never-failing care and intelligence. His party was to number six, and he had to consider the nature of the ground and the climate, while, as in all Arctic travelling, lightness had to be the main consideration. His sledges, of which he took five, were of ash, the upper part light and slender. They weighed 28 lb., and were 9½ feet long by 20 inches wide, the runners shod with thin steel plates. They were turned up at both ends, with a chair-back-like bow for pushing and steering, and every joint was lashed, no metal being used.

The tent was in five pieces of waterproof canvas, with two uprights and one cross pole of bamboo, the guy-ropes made fast to crampon-like hooks. The sleeping bags were of reindeer skin, with hood-shaped flaps to button over the head, each to hold three men.

Nansen rightly decided that woollen clothes were the best, as avoiding condensation. He paid specially close attention to the foot gear. Woollen stockings were worn next the skin, then thick goat's-hair socks, and over these came the *finneskos* of the Lapps with the hair outside, stuffed, as is the Lapp custom, with a grass (*Carex vesicaria*). Large woollen mitts were used, and fur caps with ear-flaps. The cooking apparatus consisted of a spirit-lamp with a copper tin-lined boiler above, tall and cylindrical, with a copper flue carried through the centre, by which the hot air passed to a broader and shallower copper vessel over the boiler to melt snow in, all cased in thick felt. With this apparatus and 12 oz. of spirits a gallon of chocolate and rather less of water was obtained in an hour. The provisions consisted of Beauvais dried meat (which contained insufficient fat), meat biscuits, chocolate with meat powder, pea soup with fat, and tea. Some luxuries such as condensed milk and whortleberry jam were taken, but Nansen was very strongly opposed to the use of spirits and tobacco, as being injurious stimulants. The instruments consisted of a theodolite and stand, a pocket sextant, artificial horizon, azimuth compass, four watches, thermometer, boiling-point thermometer, and aneroids. Four of the sledges when loaded had a weight of 200 lb. each, the fifth of 400 lb.

Nansen was a master of ski-travel. This method of winter locomotion has been used by his countrymen from time immemorial, and by himself from childhood, and truly the speed attained and the feats performed by Norwegian experts are marvellous. On very soft snow, however, the Canadian snow-shoe is preferable.

Of his five comrades Otto Sverdrup was the son of a Helgeland farmer with forest property, and was born on October 31st, 1855. He had been 17 years at sea. Olaf Dietrichsen, a surgeon and a keen sportsman, was aged 25, and Kristian Trana, aged 24, was a forester. The others were two Lapps, both young men.

The expedition started in June, 1888, and the *Jason*, a Norwegian sealer, took them to the edge of the ice on the east coast of Greenland and some distance into it. The explorers then took to their

boats, but it was long before they could reach the land. Drifted to the south, they came to an Eskimo encampment at Cape Bille, and having reached the inner lead of water on the 15th August, boats were at length hauled up on the beach and the great journey was commenced. From the 17th to the 20th they were detained by storms with heavy rain, but the 22nd saw the ascent commenced in fine weather. The ice was heavily crevassed and *nunataks* were visible here and there.

By the 26th the party had reached a height of 6000 ft., and by the end of the month the elevation was 7930 ft. Hitherto they had worn Canadian snow-shoes, but on September 2nd it was found that ski could be used, even when dragging the sledges, and the national mode of progression was gladly adopted for the remaining nineteen days. The explorers were surprised at the great difference between the temperature of day and night on this lofty plateau in September. The thermometer showed -4° in the day, and -40° Fahr. at night. Furious gales of wind were frequent.

The summit was 8250 ft. above the sea, and from September 17th there was a pronounced fall to the westward. Sail was now set on the sledges, portions of the tent being used for that purpose. This day a snow bunting was seen. The crevasses and fissures again began to appear, and on the 20th the summits of the western Greenland mountains were in sight. The *sermik suak* or inland ice thus proved to be a vast extent of smooth level snow with a margin of broken and fissured ice. The head of the Ameralik-fjord was at length reached after 40 days on the inland ice.

The explorers were still sixty miles from the Danish settlement of Godthaab, and it was decided that while Nansen and Sverdrup constructed a boat and went down the fjord the rest should proceed by land. The framework of the boat consisted of two bamboos and a ski staff. The difficulty was the ribs, which were made of the branches of the dwarf willows growing on the banks of the fjord, and the canvas covering them entailed much labour in sewing with a sailmaker's needle as they were without a "palm." The oars were bamboos with forked willow-branches with canvas stretched across. It was a fairly good boat, and only required baling every ten minutes. After a great feast on cranberries the two explorers started and managed to make their way in her to Godthaab. The others also arrived safely, and all were very hospitably received for the winter, returning to Norway in the following year.

It was a splendid achievement. The central water-parting was found to be 125 miles from the east, and 226 from the west side, the greatest elevation measured being 8970 ft. Supposing the average land surface under the ice to rise to 2000 ft., the thickness of the ice-cap would be nearly 7000 ft. The excavating power of the glaciers is enormous, and the pressure causing the melting of the snow and the discharge of an enormous quantity of water into the sea, counteracts any increase above caused by the excessive precipitation occurring from the warm winds blowing from the sea. Nansen found the moisture to be so great as to be near saturation. Out of 40 days on the inland ice there were 16 days of snow and 4 of rain. The meteorological results were the most important outcome of the expedition, because the deductions from them apply to regions far beyond the limits of Greenland. It was a fine piece of exploring work, and the name of Nansen will for all time be coupled with the first crossing of Greenland.

Peary, who, as already mentioned, had made an attempt at crossing with Maigaard in 1886, succeeded in raising funds for another expedition in 1891. His design was to traverse the inland ice from Whale Sound in the north of Baffin's Bay, where he would find the tribe of Arctic Highlanders. Here a steamer landed him, accompanied by Mrs Peary, Dr Frederick Cook, aged 26, a hunter named Gibson, a young Norwegian aged 20 named Eivind Astrup, a meteorologist named Vershoef, and Henson, a coloured man from Virginia, aged 23. Some short sledge and boat trips were made; the house, taken out in pieces, was built; and the winter was passed in preparations for the journey over the inland ice.

Peary, a man of great energy and indomitable resolution, claimed to have inaugurated a new departure in Arctic exploration. He held that only small parties can do effective work; that fur clothing is better than woollen, and indeed absolutely essential; that tents and sleeping bags are unnecessary luxuries; and finally that all traction should be by dogs, and that by killing a portion of the dogs for dogs' food the original load will last longer. But, at all events as regards the latter, few humane Englishmen will agree with him. Dogs are invaluable for keeping open communications, and for depôt work; but they ought to be well fed, well treated, and not overworked. There is a fine passage in Captain Scott's *Voyage of the Discovery* on this subject:—

"To pretend that dogs can be made greatly to increase the radius of action without pain, suffering, and death, is futile, and this sordid necessity robs sledge-travelling of much of its glory. In my mind no journey ever made with dogs can approach the height of that fine conception which is realised when a party of men go forth to face hardships, dangers, and difficulties by their own unaided efforts, and by days and weeks of hard physical labour succeed in solving some problem of the great journey."

Peary started with Astrup, Cook, and Gibson in April, 1892. By May 24th the true inland ice had been reached, and the supporting party with Cook and Gibson returned. Already the number of dogs had been reduced to 13. Peary and Astrup continued over the inland ice, reaching an elevation of 6000 ft. On June 26th they came in sight of the sea, and from July 1st they were travelling over mountainous crests and ridges until they reached a summit whence they had a view of a great bay. Musk oxen were seen and one was secured. By July 7th they were back on the inland ice, and returned on August 6th. Only five dogs had survived. Peary claims to have travelled a distance of 1400 miles in 80 days—about 17 miles a day.

Dr Cook had been getting through some useful anthropological work in the meantime, making a census of the Arctic Highlanders, taking measurements of both sexes at different ages, and recording their habits and customs.

In 1893 Peary undertook another expedition. Accompanied by Mrs Peary, with Captain Bartlett in command of his steamer *Falcon*, he made, as before, for Whale Sound. Fourteen persons were landed and the *Falcon* returned. A winter house was built and on September 12th Mrs Peary gave birth to a daughter. On March 8th, 1894, the start was made for the inland ice journey. On the 13th eight dogs were killed as food for the others. Astrup and another man broke down, and had to be sent back on sledges. The rest went on, but were stopped by a gale on March 22nd, and when it subsided two dogs were found dead, and two more men were obliged to return. In this journey tents and sleeping bags were taken, in spite of their being previously held to be "unnecessary luxuries," The party got 128 miles from Whale Sound, where a large depôt was left, at 5500 ft. above the sea, a smaller one having been deposited earlier. Here they were forced to return.

Later, Astrup made a reconnaissance of Melville Bay, and the recesses of Whale Sound were explored.

Another winter was passed at the house, and preparations were made for a second attempt at the inland ice. On April 1st, 1895, Peary started with a man named Lee, the coloured man Henson, four natives, six sledges, and sixty dogs. The first depôt could not be found, being buried under the snow, and—a far more serious blow—they also failed to find the second depôt with all their pemmican, 1400 lb. On entering the fourth week the party began the eastward slope with only 17 dogs left out of 42. The survivors had to be fed with dogs and soon only 11 were left. One cannot help feeling glad when Peary and his two comrades had to get into the drag-ropes themselves. At last they left the ice and pushed on to the land in the hope of finding musk oxen, and reaching the valley succeeded in shooting two of these animals and a hare.

When the return journey was begun on June 3rd Peary had nine dogs and fourteen days' rations for them, and thirty days' half rations of biscuits and oil, and seventeen of frozen meat for the men. On the 10th there were only six dogs, and on the 22nd one alone survived. The men had four biscuits left when they reached the house at Whale Sound.

The results which Peary claimed were the discovery of Independence Bay, of the northern end of Greenland, of a channel dividing that great mass of land from large islands to the north, and of Greenland's insularity, and for many years these features have been shown on the maps. It has now been found that he did not discover the actual north end of Greenland, and that his channel does not exist. Peary nevertheless did real good in improving the condition of the Arctic Highlanders by supplying them with canvas and improved weapons. With better means of obtaining sustenance the death rate is said to have decreased and there are signs of an increase in the population of this most interesting northern tribe. Dr Cook's census gave the number at 233. Peary discovered near Cape York, and brought home, the three great meteoric stones from which the Arctic Highlanders used to obtain the iron for their knives.

CHAPTER XXXVIII

THE TRANS-POLAR DRIFT. NANSEN AND THE VOYAGE OF THE *FRAM*

Fridtjof Nansen, our foremost living Arctic worthy, a devoted scientific enquirer and a profound student of Arctic history, had always taken a broad view of the Arctic problem, mainly with reference to currents and ocean depths. But the discovery of articles on the coast of Greenland which had drifted westward from the wreck of the *Jeanette* off the Liakhov Islands, first gave him the idea of his great enterprise[157]. Nansen conceived the project of forcing a vessel into the pack on the Siberian side, and being drifted across the polar ocean. From most Arctic experts the idea received no encouragement whatsoever, but I had a full belief, based on careful study, in the successful issue of such an expedition[158].

Every article of equipment down to the minutest detail was Nansen's own conception. Originality has always been a marked feature of his character. The matter of first importance then, in his projected enterprise, was the building of a special vessel to come out uninjured after the long Arctic drift. In Mr Colin Archer of Laurvik Nansen found a constructor, careful and resourceful as himself, with long experience in boat and ship-building. The son of a Scotch boat-builder who had settled in Norway early in the last century, Colin Archer was brought up to the craft, and he was the very man to turn Nansen's ideas into realities. The result was the *Fram*. The main points were great strength, and sides constructed in such a manner that the ship would readily rise during ice pressure. She was also to have large carrying capacity, her beam being nearly a third of her length[159]. She was provided with a triple-expansion engine, and her rig was that of a three-masted fore-and-aft schooner. But the main object of Nansen and Colin Archer was that "she should slip like an eel out of the embraces of the ice."

Nansen's friend, Baron von Toll, went to the New Siberia Islands in May 1893, and established a depôt of a month's provisions at the house he built in 1886 on the coast of Kotelnoi Island. Dogs were to be stationed at Khabarova in Pett Strait.

The crew of the *Fram* numbered 13 including the commander. Sverdrup, the companion of Nansen on the inland ice of Greenland, was the master; Sigurd Scott Hansen, a first lieutenant in the navy, went as navigator and scientific observer; Dr Blessing was surgeon.

In July 1893, the *Fram* sailed from Norway on this great and novel enterprise, and on the 29th of that month the dogs were taken on board at Khabarova. Nansen crossed the Kara Sea, and proceeded along the coast of Siberia, discovering several small islands. On September 8th, Cape Chelyuskin was rounded. On the 16th a northern course was shaped, a little to the west of the new Siberian Islands, and for some days good progress was made. It was not until the 25th of September that the *Fram* was finally frozen in and the famous drift began. Scott Hansen took astronomical observations every second day, and a snow house was built on the floe for magnetic observations. Deep sea soundings, with temperatures at various depths, were periodically taken.

In October 1893 the first great pressure was experienced. The ice was piling up around the *Fram*, tossing itself into lofty ridges, and breaking against her sides. In January 1894 matters looked

so serious that preparations were made to abandon the ship, but she withstood and rose to any pressure, thus fully confirming the correctness of Colin Archer's structural plan.

The drift during the first year, from September 1893 to September 1894, was 189 miles in a northerly direction, from 78° N. to 82° N. In the second winter Nansen resolved to leave the ship with one companion, make an attempt to reach the Pole, and return by Franz Josef Land and Spitsbergen. Sverdrup was to complete the voyage. Nansen selected Frederik Hjalmar Johansen, a native of Skien, then aged 28, as his companion. He took 28 dogs, intending to feed them on each other. His sledges—which were too narrow—were the same pattern as on the Greenland journey, the runners 3⅛ in. wide and slightly convex, covered with a thin plate of German silver, and with loose well-tarred guard-runners of maple underneath the metal ones[160]. Two kayaks were carried on the sledges, as open lanes of water were sure to be encountered. His clothing was woollen, his shoes made of the skin of the hind leg of a reindeer filled with "senegraes" or sedge (*Carex arenaria*). Leather Lapp boots were used for warmer weather. The tent was square at the base, ending in a point with a central pole, and had a canvas floor. The double sleeping-bags were of reindeer skin.

Nansen's cooking apparatus was rather complicated. Petroleum was found to generate more heat than spirit in comparison with the weight, 4 gallons lasting 100 days with two hot meals a day. The lamp, called a "Primus," was of German silver with lid and cap of aluminium, and heated two boilers and a vessel for melting snow. For food there was a sort of pemmican, fish flour, dried boiled potatoes, pea soup, butter, chocolate, and biscuit. This was no improvement on M'Clintock's scale of diet.

Starting on the 14th March, 1895, the ship being in 84° N., there was good travelling for the first week. But on the 29th ridges of hummocks commenced, and there was trouble with the sledges, which capsized, and holes were torn in the kayaks. The travelling got worse and worse, with ridge after ridge of hummocks, and occasional lanes of water only covered with thin ice. After 26 days Nansen, who had reached a latitude of 86° 28′ N., had to turn south and make for the land. It was very hard work, the dogs were much reduced both in numbers and in strength, and in May the travellers came to soft snow up to the knees. In June there was water on the floes, the lanes were opening, and the five surviving dogs were nearly starving. On the 5th June they halted for the very necessary business of repairing the kayaks. The open water stopped all progress with sledges and they were now obliged to launch the kayaks with the sledges on them. Two dogs only were left.

Land was at length sighted on the 24th July, the Hoidtenland group, as Nansen named it, consisting of Eva, Liv, and Adelaide Isles, all covered with glaciers. These little islets are specially interesting, because Ross's roseate gull (*Rhodostethia rosea*) was here found to be numerous, and the group appeared to be their breeding place.

Proceeding on their perilous voyage, Nansen and Johansen found that they could make safer and quicker progress by securing the kayaks together. On August 28th they reached an island in the Franz Josef group, where they resolved to winter. They built a hut, and having managed to shoot some walrus, they made lamps in which to burn the oil. But they were in a very precarious position, and suffered great hardships, remaining in these wretched winter quarters from August 1895 to May 1896.

On May 17th, 1896, the voyage was continued with kayaks lashed and a sail set. They were stopped twice by gales of wind. Then there was very nearly a fatal disaster. The two men were busy on shore, when Johansen suddenly cried out that the kayaks were adrift. It was too true, and their loss would be certain death. They were lashed together and drifting along. Nansen plunged into the ice-cold water with his clothes on. He swam to them but was nearly exhausted before he could get a hold. At last he tumbled on to them, stiff and half-frozen, and in paddling them back to the shore he

coolly took his gun and shot two little auks. He was, however, more dead than alive and it was long before Johansen, using all possible means, could recover him. In the end of June they again patched the kayaks, and were starting on the perilous voyage to Spitsbergen, when they had the extraordinary good fortune to be found by Jackson. They received most cordial hospitality, and embarked in Jackson's relief ship for Norway, which they reached safely in August 1896.

Meanwhile the drift of the *Fram* had been ably continued by Captain Sverdrup, with deep-sea soundings and temperatures. On the 17th August 1895 the vessel sustained another severe nip, but rose to it easily. One more winter, that of 1895–96, was passed, and on May 7th 1896 Sverdrup found that the *Fram* was in 83° 45′ N., and 12° 50′ E., with Spitsbergen to the south. He determined to force his way into open water, and in 28 days he had worked the ship through 180 miles of closely-packed ice, reaching the navigable sea to the north of Spitsbergen and sighting land after 1041 days.

The *Fram* arrived off Danes Island, where my friend Arnold Pike, who has all the makings, with opportunities, of a first-rate Arctic explorer, had built a house, wintering there in 1888–89. In 1897 he cruised east of Spitsbergen and landed on the Wiche Islands. His house in Danes Gat was used by the ill-fated Andrée when he was preparing to start in his balloon, and Sverdrup and his companions found the latter there with the steamer *Virgo*. But the season was not favourable, and Andrée returned to Sweden. In 1897 he was again at Pike's house, and on July 11th ascended with two companions in the balloon *Eagle*. They were never more heard of.

The *Fram* arrived in Norway a few days after Nansen, and the whole party were once more united, and were welcomed with unbounded enthusiasm by their countrymen at Christiania.

The drift of the *Fram*, with its continuous scientific observations, worked out exactly as Nansen hoped and expected. The results threw new light on the whole Arctic problem. Nansen lifted the veil, and his expedition was the most important in modern times. It was discovered that there was a deep ocean to the north of Spitsbergen and Franz Josef Land, extending beyond the Pole, and the whole of the vast annual harvest of ice which drifts south between Spitsbergen and Greenland comes from the north of the *Fram's* track. Nansen fixed the position of the Siberian continental shelf and found that beyond it there was an ocean with a depth of 2000 fathoms, which is covered with a continual breaking and shifting expanse of drift ice. The most striking result of the deep-sea soundings was that while the surface water was very cold, there was warmer water in the depths.

The results of the expedition were published in six folio volumes, containing reports on the biology by Professors Collett and Sars, the geology of Franz Josef Land, and the bathymetrical, astronomical, meteorological, and magnetic observations. The most valuable and interesting papers are those by Nansen himself on the bathymetrical features of the polar seas, and on the continental shelves.

At the great meeting in February 1897 in the Albert Hall Nansen received a memorable welcome from his English friends. The late King Edward, then Prince of Wales, who was present, suggested to me that, though the popular reception had been a great success, he thought that there should also be a meeting to discuss the scientific results of Nansen's expedition. Acting on this advice I called such a meeting and the result was the best discussion I have ever heard at any meeting of the Geographical Society. It appeared to me, as I stated at the time, that the light thrown upon the Arctic problem by Nansen not only extended our knowledge positively, but had the effect of piecing together what appeared before to be fragmentary, and of making detached pieces fit into their proper places and form a consistent whole.

Nansen continued the work in which he took the deepest interest—the bathymetrical features of the Norwegian Sea, his chief aim being the greatest attainable accuracy in the construction of instruments and the working out of results[161]. In 1914 he accompanied a Russian expedition through the Kara Sea to the Yenisei, and went by land across Siberia as far as Vladivostok. The result was a most interesting narrative, but it is the appendix which will prove most valuable to polar students and navigators. He here gives a list of all the Kara Sea expeditions from Stephen Burrough in 1556 to the date at which he wrote, with the results of their voyages; and then, with the information derived both from books and from his own experience, he explains the causes of the prevalence of obstructive ice and of its absence. His conclusion is that steamers should very rarely fail to get through the ice of the Kara Sea[162].

The great literary achievement of Fridtjof Nansen was the publication of the valuable work entitled *In Northern Mists—Arctic Exploration in Early Times* (1911). It is a monumental work, entailing an incredible amount of careful research, and the materials are put together and presented with the skill and judgment of a master hand. In his deeply interesting introduction, Nansen answers the question "What were they seeking in the ice and cold," by a quotation from the old Norse chronicle, the *King's Mirror*:—

> If you wish to know what men seek in this land, or why men journey thither in so great danger of their lives, then it is the threefold nature of man that draws him thither. One part of him is emulation and desire of fame, for it is a man's nature to go where there is likelihood of great danger, and to make himself famous thereby. Another part is the desire of knowledge, for it is man's nature to wish to know and see those parts of which he has heard, and to find out whether they are as it was told him or not. The third part is the desire of gain, seeing that men seek after riches in every place where they learn that profit is to be had, even though there is great danger in it.

Nansen himself puts it more tersely yet scarcely less impressively. "From first to last the history of polar exploration is a single mighty manifestation of the power of the unknown over the mind of man."

CHAPTER XXXIX

THE PARRY ARCHIPELAGO—SVERDRUP

THE very important voyage of Captain Sverdrup may be looked upon as a sequel to the voyage of Nansen. The same generous patrons of Arctic enterprise, Axel Heiberg and the brothers Ringnes, resolved to equip another Arctic expedition and, by the advice of Nansen, the command was offered to Sverdrup, the selection of the route being left to the commander.

Sverdrup accepted; the *Fram* was lent by the Government, and a crew of sixteen selected. Victor Braumann, a first lieutenant in the Royal Norwegian Navy, aged 28, was Sverdrup's second. The cartographer was a lieutenant of cavalry named Gunnerius Ingvald Isachsen, and the mate Olaf Roanes of the Lofoten Islands. A Swede named Simmons went as botanist, Edward Buy as biologist, and Schei as geologist.

The *Fram* sailed from Laurvik (where Colin Archer had made some repairs) on the 25th June 1898, obtained dogs at Lievely, and proceeded to Smith Channel, where she was stopped by impenetrable ice just north of Cape Sabine. On August 18th she anchored in Rice Strait, which became her winter quarters. A visit was received from an Arctic Highlander named Kolotangva. Excellent exploring work was done during the spring of 1899. Sverdrup himself crossed an isthmus rich in musk oxen and other game, and discovered the western shore of Ellesmere Island. Isachsen was on the inland ice, and Schei did some excellent geological work.

In the summer Sverdrup found the ice in Sir Thomas Smith's Channel closely packed, and therefore resolved to attempt discoveries up the channel named by Baffin after Sir Francis Jones, taking with him an abundant supply of walrus meat. Jones Sound had previously been visited by whalers, and in August 1851 Captain Austin had entered it with the *Pioneer* and *Intrepid* and proceeded up it until he was stopped by ice extending from shore to shore. Captain Inglefield had the same experience in 1852. Sverdrup was more fortunate, and on September 3rd found winter quarters on the northern shore, at a place which was named Havnfjord.

The autumn travelling during October was devoted to laying out depôts. Sverdrup had two-man tents, double-lined, 6 ft. by 5 ft. and 5 ft. high in the middle, the lower part of the sides being vertical for a foot. There was just room for two men and the cooking apparatus. They had a capital smith and metal-worker on board, named Olsen, who made odometers for the sledges. The diet for travelling was unusually varied. Besides pemmican, biscuit, cocoa, and sugar, which are necessaries, there were coffee, butter, pea-soup, vegetables, dried fruit, egg powder, groats, potatoes, meat fat, golden syrup, and fish flour.

The main depôt was at a place which was named Björnberg. The spring travelling parties, with 55 dogs in splendid condition, started in March, limited parties accompanying them to Björnberg and beyond. There were three extended parties, Sverdrup and Fosheim; Isachsen and Hassel; and the geologist Schei and Hendricksen, who had been in the *Fram* with Nansen. Very interesting discoveries were made. The west coast of Ellesmere Island was found to be indented with deep winding fjords, afterwards explored by the scientific staff. The great island named after Consul Axel Heiberg was discovered, and as islands were seen to the westward, the two extended parties separated, Sverdrup going north and Isachsen west. Axel Heiberg Island consists of high precipitous cliffs, and there were pressed-up hummocks off the coast of extraordinary height. The two islands

discovered by Isachsen and named after the brothers Ringnes were of low altitude. The extended parties made very fine journeys, resulting in important discoveries. Sverdrup was 76 days away, Isachsen 92 days, and the scientific party 78 days.

When the *Fram* got out of her winter quarters Sverdrup proceeded westward up Jones Sound. Its western end is blocked by land with two narrow channels leading to the Polar Sea. Some of the names are those of Sir Edward Belcher, who made a journey in 1853 along the north coast of Grinnell Peninsula, from the winter quarters of the *Assistance* in Northumberland Inlet. The coast of North Devon turns north, forming the Colin Archer Peninsula, followed by North Kent Island with Cardigan Strait on the North Devon side, and what Sverdrup called Hell Gate on the Ellesmere Island side. Both these straits lead north and south.

The *Fram* entered Cardigan Strait and reached the north end against a strong current. She was ultimately drifted out of the strait, and excellent winter quarters were found near Hell Gate on the north side of Jones Sound, a long narrow inlet free of ice which was named Gaasefjord. Around it there were grassy stretches with small tarns and a lake three miles long, and the country abounded in game. The third winter passed with all in good health. As many as 20 walrus and 18 musk oxen had been obtained.

The travellers started on the 1st April to continue their very important discoveries. This time Sverdrup had Schei the geologist with him as a companion, while Isachsen again took Hassel. Sverdrup discovered the whole west coast of Ellesmere Island to within a short distance of Aldrich's furthest on the north coast, naming the north-west point Lands Lowk. He also discovered the whole east coast of Axel Heiberg Island, and the northern point facing the Polar Sea was named Svartevæg. The channel between these two points was named after Fridtjof Nansen. Isachsen explored Ellef Ringnes and Asmund Ringnes Islands, as well as the west coast of Axel Heiberg Island.

The travelling parties returned in June, but the ice blocked up the Gaasefjord and the *Fram* was far up. A few months hard work blasting and cutting enabled them to get the ship several miles nearer the water, but six miles still remained when they realised that their work was in vain. The boats were accordingly sent away for walrus meat, and a fourth winter had to be faced.

When the spring once more returned, Captain Sverdrup decided upon sending a party down Wellington Channel to examine the state of the depôts at Beechey Island. They found the house in ruins, old Sir John Ross's boat wantonly injured, and the depôt robbed. Isachsen and Buy meanwhile explored the south coast of Jones Sound, and all the parties had returned to the ship by July.

This year the ice cleared out of the fjord and the *Fram* was soon beyond Gaasefjord on her return home, after four winters. The explorers arrived in Christiania in September 1902. Captain Sverdrup had very ably conducted a most successful expedition, Lieut. Isachsen had specially distinguished himself as a sledge traveller. Meteorological, magnetic, and tidal observations were regularly taken throughout the long period, and the biological and geological collections were of quite exceptional interest.

The discoveries of Sverdrup and Isachsen complete the delineation of the great Parry Archipelago, for Axel Heiberg and the Ringnes Islands must be included in it, especially from a geological point of view. Ellesmere Island, North Devon, and Baffin Island stand apart as more allied to Greenland in character. The Parry Archipelago presents quite a different aspect, both geologically and physiographically, and is fairly uniform in structure, with similar strata representing different geological periods, when wanting in one place supplemented in another. Thus

the indications of the has formations discovered by M'Clintock on Prince Patrick Island, and by Sherard Osborn on the north point of Bathurst Island, were repeated in the discoveries of Sverdrup's expedition. On the other hand in Baumann Sound, on the west coast of Ellesmere Island, there was a coal field and impressions of tertiary plants such as are found on Disco Island and the Noursoak Peninsula in Greenland.

On the whole it may be said that the Sverdrup expedition made the largest addition to our Arctic knowledge of any other since the return of the Franklin search expeditions.

Captain Gunnar Isachsen continued his affection for Arctic work, and took special interest in bathymetrical researches. He made further valuable oceanographical investigations during his Spitsbergen expedition in 1910.

CHAPTER XL

ATTEMPTS TO REACH THE NORTH POLE. CAGNI—COOK—PEARY

THE present writer, throughout the sixty years and more of his connection with polar research, has always deprecated the diverting of exploring energy to dashes for the Pole, if this be the sole object.

In former days the enterprise of reaching the Pole was looked upon as including important discoveries, and the opening of a route to the east. It was for these objects that John Davis made his attempt; that the Government in the eighteenth century offered a reward for reaching 89° N.; that Phipps, Buchan, and Scoresby tried how far north it was possible to go in a ship, and Parry with boats and sledges. Sir George Nares was ordered to attempt an approach to the Pole in the erroneous belief, inspired by Hall's map, that the land trended north, in which case such a journey would have useful results. But since Nansen's discovery that the Pole is in an ice-covered sea there was no longer any special object to be attained in going there, except for magnetic observations.

Nansen made an interesting journey northwards which showed the character of the ice to be crossed. As the floes are in motion during a great part of the year, and there is danger from the lanes of water that form and much obstruction from the lines of hummocks thrown up by ice pressure, progress is difficult and uncertain. Nansen wisely took kayaks with him, capable of carrying the sledges across lanes of water.

The Duke of the Abruzzi was bitten with the idea of reaching the Pole by way of Franz Josef Land, following Nansen's route and adopting his plans for sledge, tent, and other travelling equipage. He bought a Norwegian sealer and was fortunate in reaching the northern part of Franz Josef Land (near Cape Fligely) for winter quarters. But a severe frost-bite, necessitating the amputation of a finger, prevented him from leading the main journey. His place was ably filled by his second in command, Captain Cagni of the Italian Navy.

Captain Cagni arranged his scheme for travelling with great care. His sledges and tents were on Nansen's pattern, but he altered the reindeer-skin sleeping bags so as to have room for three persons. Three limited parties of four sledges each were to enable the fourth extended party to start full after the 45th day. The sledges constantly required repairs, and were in worse condition every day. Captain Cagni encountered the same difficulties as Nansen from lines of pressed-up hummocks and lanes of water. He succeeded in getting a few miles beyond Nansen's furthest to 86° 33′ N.

Detentions by gales of wind and other misfortunes threw out the original scheme, but the most important lesson taught by Cagni's journey is the danger of steering in a wrong direction, and the absolute necessity for frequent observations to obtain true bearings. As he approached the land again he found that he was fifty miles out in longitude. This shows the necessity for taking amplitude observations of the sun whenever it is possible. In going *towards* the Pole it is still more essential, for to attempt to reach a point like the Pole without a true course constantly verified must inevitably lead to error. Cagni and his party suffered great hardships before they succeeded in reaching the ship again.

Peary commenced the first of his three attempts to reach the North Pole in 1896, when he reported having been to 85° N., travelling from the north coast of Ellesmere Island. His plan was to hire the sledges and dogs of the Arctic Highlanders and to get the natives to drive, so that the white man merely has to walk alongside. The Danes have always travelled in this way; indeed it is a necessity when the white man has no companion or only one or two, and nothing could be better for journeys along the Greenland coast or over the inland ice. Peary, who holds that the fewer white men in an expedition the greater its chance of success, also thinks that the Eskimo dress of furs is the best, but there is much difference of opinion on this point.

The Arctic Highlanders, whose sledges and dogs and skill as drivers enabled Peary to make his journeys, deserve the greatest credit. All explorers speak warmly of their generosity, their hospitality and trustworthiness, as well as of their prowess in hunting. Such praise is well deserved[163]. Kane, who has given the best account of the Arctic Highlanders, was indebted to them for much kind assistance, and Allen Young bore similar testimony.

Peary, who was a man of exceptional perseverance and indomitable energy, was well backed financially, and was able to proceed to his third attempt on the Pole in a well-found steamer. The most northern accessible coast—the north coast of Ellesmere Island—is of course the best point of departure. Great ranges of pressed-up hummocks and open lanes of water were to be expected, with the danger of being drifted with the pack. Both Nansen and Cagni provided themselves with kayaks, and M'Clintock was always prepared for the necessity of having to cross water. Peary, however, appears to have made no such provision. He reported having reached 87° N. in 1906, but he was in great danger from inability to cross the open lanes of water, and from miscalculations. He returned with the intention of making another attempt.

He was preceded by a similar attempt, made with much smaller means, by his former colleague Dr Cook. In July 1907 a schooner yacht belonging to a Mr Bradley arrived at Etah, near the entrance to Smith Sound. Stores were landed at Anoatok, 25 miles from Etah, and Mr Bradley departed, leaving Dr Cook and Mr Rudolf Francke at Anoatok, where they built a house of packing-cases with a roof of shingles. Dr Cook had been ethnologist in Peary's first expedition and had acquired the Eskimo language as spoken by the Arctic Highlanders. He had also served in the Belgian Antarctic expedition.

Anoatok, which lies in lat. 78° 20′ N., is the most northern settlement of the Arctic Highlanders, and here 250 Eskimos were established with their dogs. During the winter Cook was busy making sledges. These were of hickory, 12 ft. in length and only 2½ ft. wide, the width of runner 1⅛ in. The dress adopted was much the same as that of the Eskimos. The principal food was to be pemmican made by Armour of Chicago. A 10 ft. collapsible canvas boat with wooden frame was considered essential. The party which started from Anoatok on February 19th, 1908, consisted of Cook, Francke, nine Arctic Highlanders, and 103 dogs in prime condition, with 11 sledges carrying 4000 lbs. of supplies.

The party crossed Smith Sound to Cape Sabine, and then took the route discovered by Sverdrup across Ellesmere Island and proceeded up the west coast of that island. Abundance of game was met with, and Svartevæg, the most northern point of Axel Heiberg Island, was reached. This was to be Cook's point of departure for the Pole. He took leave of his Arctic Highlanders, only retaining two lads of about 20, named Etukishuk and Ahwilak, as his companions, and proceeded with two sledges, 26 dogs, and the collapsible boat. Francke had already returned. The provisions were almost untouched, as the party had been able to live on the game its members had shot during the journey of 400 miles from Anoatok. An important depôt was left at Svartevæg.

The final start was made on March 18th, 1908, the travelling being difficult owing to the lines of hummocks caused by ice pressure and the lanes of water. On March 30th Cook sighted land to the westward in 84° 50′ N. which he named Bradley Land, but he did not alter his course to examine it. On April 21st he reports having taken a sun's meridian altitude which gave a latitude of 89° 57′, but he must have been mistaken, both overrating his distances and failing to make sure of his direction by observations. He doubtless did make a long journey over the ice, in a more or less northerly direction; but without observations to obtain true bearings, no reliance can be placed upon his positions.

Cook's instruments were a sextant and a glass artificial horizon adjusted by screws and spirit levels. He also relied on shadow observations, and on an odometer fitted to his sledge. But there is no mention of any observations for true bearing of the sun and that he made none is conclusively proved by the fact that in returning he was unable to follow his outward tracks and his route was consequently far to the west of Svartevæg, until at length he found himself in Hassel Strait between the two Ringnes Islands, unable to reach his depôt.

Cook was in great difficulties, but eventually he found his way to Jones Sound, thanks to the collapsible boat and to the efficiency and resourcefulness of the two Eskimo lads. The party wintered at Cape Sparbo in Jones Sound on the north-west coast of North Devon. Cartridges had run out and they had no native weapons. It was due to the wonderful skill and energy of the two young Arctic Highlanders that weapons were contrived out of unpromising materials, and sufficient game obtained to enable them to live through the winter. In the spring they had to make the long journey from Jones Sound to Anoatok, a great part of the route being over new ground. Eventually Cook returned by a Danish ship, having gone from Smith Sound across Melville Bay to Upernivik. He left his instruments and some notes behind to be taken back in the next ship, considering that there was danger of losing them if he had taken them with him on his long journey.

Peary, with strong financial support, fitted out a well-found steamer, the *Roosevelt*, in the following year, with Captain Bartlett, a native of Newfoundland, as Master. With him went his secretary, Ross Marvin, Dr Goodsell as surgeon, two volunteers named Macmillan and Borup, and his negro servant Henson. There were 22 men all told when the steamer started in July 1908, and at Etah 22 Eskimo men, 17 women, and 246 dogs were taken on board. On August 18th the voyage was resumed, and on September 4th the neighbourhood of the *Alert's* winter quarters was reached, and autumn parties were sent forward to Cape Colombia to form a depôt, this being Peary's starting-point for the Pole.

In order that the expedition might be of some use, the American Coast and Geodetic Survey officials arranged that there should be tidal observations, and that soundings to fix the position of the continental shelf should be taken. Tidal observations had already been taken and discussed by the *Alert* and the *Discovery*. The *Roosevelt* observations also included 29 days at Cape Aldrich. The continental shelf with a depth of 100 fathoms extends for about 46 miles from the land. In latitude 85° 23′ N. the sounding was only 310 fathoms.

The distance from Cape Colombia to the Pole and back is 826 miles, a distance which had been greatly exceeded in the sledge journeys of the British officers of the Franklin search expeditions. M'Clintock made a journey of 1210 miles in 99 days without the help of dogs, and Lieut. Mecham travelled over 1336 miles, the average rate outwards being 18½ miles, and on the return journey 23½ miles per diem; a feat that has never been beaten by dog-sledging. The peculiar difficulty of Peary's undertaking was caused by the drift and by the open lanes of water. Against the latter formidable obstacle he again appears to have taken no precautions.

In February 1909 the sledging parties proceeded to Cape Colombia, Bartlett starting on the 15th, and Peary with two Arctic Highlanders, two sledges, and 16 dogs on the 22nd. On the last day of February Bartlett started for the north, as a pioneer party to cut leads through the ridges of hummocks, and thus make the route easier for the sledges that were to follow. On March 1st Peary started with his own sledges and the limited sledges—24 men, 19 sledges, and 133 dogs. Iglus were used instead of tents, which was a mistake, and the scale of diet was practically much the same as M'Clintock's, the great master of Arctic sledge travelling.

On the 5th March they came to a lane of open water, which detained them for several days owing to lack of means for crossing it. "During five days Peary paced up and down deploring his luck." Afterwards they crossed seven lanes of water on young ice. Bartlett was the last to return, after taking an observation with the resulting latitude of 87° 46′ 49″ N. Thus 280 miles had been traversed in a month and they were 133 miles from the Pole. The speed had been calculated at under 15 miles a day.

From this spot Peary went on for the Pole with only his negro servant and four Eskimos, five sledges and 40 dogs. It was a great mistake to enter upon what he considered the most important part of his journey without any white companion, more especially as bearings and distances do not appear to have been ascertained by observations. For help in making these rough estimates, and for such observations as were taken, a colleague was imperatively necessary.

Directly Peary parted from Bartlett his estimated distances were more than doubled, and the course was assumed to be due north. Peary refers to the meridian of Cape Colombia as if he had never deviated from that meridian during the whole journey. Yet there is no record of the latitude and longitude of Cape Colombia having been fixed[164], and no mention of any observations for amplitude during the whole journey. Without such observations it would not be possible to keep on the same meridian. Yet, after journeys during four days estimated at from 25 to 30 miles a day, a meridian altitude of the sun was taken which gave a latitude of 89° 25′ N. or 97 miles due north from the position where Bartlett observed. Without amplitude observations this would not be possible, so that there must be mistakes in the observations for this and subsequent meridian altitudes. The sun was very near the horizon at noon at that time of the year. The distances were, perhaps naturally, over-estimated. Peary was very fortunate in being able to follow his tracks during his return journey, in spite of a furious gale which might have obliterated them.

It is to be hoped, in the interests of geographical discovery and of science, that there will now be an end of the North Pole except as a necessary point on maps of the world, and that the energies of explorers will hereafter be turned to more useful work. A complete series of magnetic observations at the 90th degree of north latitude would, however, be important in the opinion of those who believe that terrestrial magnetism is connected with the earth's axis.

CHAPTER XLI

KOOLEMANS BEYNEN AND THE VOYAGES OF THE *WILLEM BARENTSZ*. SIR MARTIN CONWAY AND SPITSBERGEN. CAPTAIN BERNIER AND CANADIAN ARCTIC LANDS

The voyages of Sir Allen Young in the *Pandora* had as one result the training of the character of an enthusiastic young Arctic navigator whose brief career was so brilliant and impressive that no Arctic history would be complete without some account of it.

Laurens Rijnhart Koolemans Beynen was born at the Hague on the 11th March 1852, and became a midshipman in the Royal Dutch Navy in 1871. He saw service in the North Sea, on the coast of Guinea, and in Sumatra, returning home and obtaining his Lieutenant's commission in 1874. Beynen had read much of the former glories of the Dutch navy, and had thought over the possibility of restoring them. He felt that, owing to exclusive steamer service in well-known seas, and to enervating work in the Indian Archipelago, Dutch seamen had lost much of their skill and spirit. He therefore desired to see new fields of enterprise occupied by his seafaring countrymen, to serve as a counterpoise to the less instructive service in the Dutch Indies. Above all, he considered voyages of discovery in the Arctic seas to be the most fitted to call forth a new spirit among Dutch seamen. Full of these ideas young Beynen called upon Commodore Jansen, with whom he was not previously acquainted, as the officer who was most likely to sympathise with them[165]. It so happened that Jansen had just received a letter from Captain Allen Young, and another from myself, asking whether a young Dutch naval officer could not be appointed to serve in the *Pandora*. Jansen warmly sympathised with the aspirations of the young officer, and he received permission to join the vessel.

Beynen could not fail to learn much under such a splendid seaman as Allen Young, and he became acquainted with ice navigation in its many phases during the season of 1875, returning with much knowledge and increased enthusiasm. In the winter of 1876, at my request, he undertook to edit a second edition of the voyages of Barentsz for the Hakluyt Society. The work entailed much research, and he accomplished it with diligence and considerable literary ability. It is a standard work which is frequently referred to. Beynen then served under Allen Young in the second voyage of the *Pandora* and proved himself to be very useful in peculiarly trying circumstances[166].

Beynen was for a short time in the training ship for boys, cruising in the North Sea, and he then devoted himself heart and soul to the Arctic propaganda, delivering lectures all over the country. His bright enthusiasm was infectious, and an influential Arctic Committee was formed[167]. Sufficient funds were collected to enable the committee to build a small schooner at Amsterdam, specially strengthened for ice navigation. She was launched on April 6th, 1878, and named the *Willem Barentsz*. Lieut. A. de Bruyne received the command and Koolemans Beynen went as his second, with Lieut. Speilman for the magnetic observations, and an adventurous young Englishman W. J. A. Grant—an Oxford undergraduate, who had also served with Leigh Smith—as photographer. Commodore Jansen drew up the instructions. He considered that the Barentsz Sea would make an excellent training ground for Dutch seamen, but that the first voyage should be confined within the limits of what is easily attainable. He thought that, by yearly increasing knowledge and experience, his countrymen might in time be in a position to undertake more hazardous and difficult voyages.

The *Willem Barentsz* went direct to Amsterdam Island, near the north-west point of Spitsbergen, and the Dutch explorers visited the site of Smeerenburg, repairing some of the tombstones. They then dredged and sounded over the Barentsz Sea. In Beynen's words they made "a scientific examination of the sea that bears the name of the greatest of our mariners." Beynen in his letters, describes with a graphic pen the incidents of the voyage, and the various encounters with the ice.

On the little schooner's return the young officer who had been the mainstay of the expedition was ordered to the East Indies and died of fever at Macassar. His loss was deeply felt by many friends, for there was a charm about the young enthusiast which endeared him to all. But none mourned for the youth so full of promise, cut off before he reached his prime, more deeply than Admiral Jansen, who looked upon him almost as a son.

In 1879 Sir Henry Gore-Booth and Captain A. H. Markham, R.N., chartered the little Norwegian cutter *Isbjörn*, and made an extensive exploration of the shores of Novaya Zemlya, and the Kara Sea, with the object of reporting on the state of the ice and other important matters of a similar nature in those waters. They were in company with the *Willem Barentsz* for some days in the Matyushin Strait.

The Arctic voyages of the *Willem Barentsz* were continued for six more years. In 1879 Lieut. A. de Bruyne again commanded, with Lieut. H. van Brockhuyzen as his second. In this voyage Franz Josef Land was sighted and large and valuable collections were made. The voyages of 1880 and 1881 were commanded by van Brockhuyzen, but in 1880 the *Willem Barentsz* was driven on shore and the work of the season lost. She was re-floated and thoroughly repaired, and Lieut. Hoffmann conducted the voyage of 1882. The two last voyages in 1883 and 1884 were commanded by Lieut. Dalen. The impetus that Koolemans Beynen had given to Dutch Arctic enterprise must have been great, seeing that these voyages were continued for six years after his death[168]. Useful scientific work was done during all the voyages, and it is much to be regretted that the good work was not continued and its scope extended by the people of the Netherlands.

* * * * *

Although the scientific exploration of a country such as Spitsbergen after its discovery and the delineation of its coasts, mountain ranges, and islands, hardly comes within the scope of the present work, mention of some important work in this group cannot be omitted. In 1898 the Swedish and Russian expeditions began the measurement of an arc of meridian in Spitsbergen, which was completed in 1890. In 1890 also, Dr Nathorst made an important circumnavigation of the Spitsbergen group, thoroughly exploring Giles Land, and the Wiche Islands. There have been numerous visits of yachts, as well as vessels coming with scientific objects; even a company has been formed to work the veins of coal discovered. But the most important recent Spitsbergen work has been the expedition in 1896 to cross the main island for the first time. Up to that time the interior of Spitsbergen was practically unknown.

Sir Martin Conway undertook this achievement with four companions—Mr. Garwood, a mountaineer and geologist; Dr Gregory, the author of *The Great Rift Valley of Africa*; Mr. Trevor Battye, who had previously made a very thorough survey of Kolguev Island in 1894[169], as geologist; and Sir Martin's cousin, Mr. H. E. Conway, as the artist. The expedition was quite successful and a valuable and very interesting narrative describing the interior of Spitsbergen was the result. The route was from Advent Bay to Agadh Bay on the east coast. The party also visited the north coast and Walden Island, and passed down Hinlopen Strait. In the following year Sir Martin Conway and Mr. Garwood explored the interior between Klaas Bille and Wijde Bays, and made an ascent of the Horn-sands-tind. This is not all, however, that Arctic students owe to Sir Martin Conway. Besides his *First Crossing of Spitsbergen* he has published a History of Spitsbergen from its discovery to the beginning of the scientific exploration of the country, with a complete discussion of the nomenclature—a most

useful feature, as the English and Dutch were discovering and naming at the same time, and overlapping each other[170]. Sir Martin has also edited some early Spitsbergen voyages for the Hakluyt Society.

* * * * *

One of the most recent Arctic events is the transfer to the Dominion Government of all the islands north of America previously forming part of the territories of the British Crown. These islands consist of Baffin Island, North Devon, Ellesmere Island, and the whole of the Parry Archipelago.

The Dominion Government resolved to fit out and send a steamer to take formal possession. The *Gauss* was bought, which had been specially built at Kiel for Antarctic service in 1900, a vessel of 436 tons net, with a length of 165 and a width of 37 ft. The command was given to Captain Bernier, who in 1902 had endeavoured to obtain funds for a vessel to drift across the Pole, taking deep sea soundings,—an able and efficient commander who had made a preliminary voyage up Barrow Strait in 1907.

Commander Bernier had three executive officers, two engineers, a purser, surgeon, historiographer, meteorologist, geologist, naturalist, and 31 men; 43 all told. Leaving Quebec in July 1908, the *Gauss* proceeded up Davis Strait and Baffin Bay to Etah in Smith Sound. Bernier then entered Lancaster Sound, and went up Barrow Strait, Melville Sound, and M'Clure Strait, examining the *Resolute's* large depôt at Dealy Island. He wintered in Parry's Winter Harbour, sending two parties across to annex Banks Island and Victoria Island. Leaving Winter Harbour on August 12th, 1909, he proceeded to sound Byam Martin and Austin Channels, and sailed down Barrow Strait to Navy Board Inlet, which he entered, passing down the channels and coming out at Pond's Bay. He returned to Canada after completing a well planned and most successful voyage.

The geographic board of Canada have done excellent service to Arctic geography by taking in hand the question of nomenclature, making a complete list of place names, and giving single names to islands which had previously been covered with names like an advertisement hoarding, without reference to geographical features.

CHAPTER XLII

EAST COAST OF GREENLAND—DANISH EXPEDITIONS

THE discovery of the east coast of Greenland by the Danes should take an important place in the history of Arctic enterprise. Their objects were most praiseworthy, the work was done with thoroughness, dangers and difficulties were faced with dauntless courage, and the history was told with ability, and above all with modesty. Finally success crowned their efforts. There is a dramatic unity in the whole story which is fascinating.

We have seen that some pioneer work had been done by Scoresby, Clavering, and Koldewey on part of this coast, and the Danish Captain Graah had made an important voyage in 1828–30. Otherwise the whole of the eastern coast, from Cape Farewell to 82° 30′ N. where the northern coast begins, remained to be discovered and explored. The Danes undertook this great work with splendid resolution and zeal, and went steadily on until it was completed[171].

The great work was commenced in 1879 with the despatch of the schooner *Ingulf* of the Royal Danish Navy, with Commander Mourier and Lieut. Wandel on board, to make a careful examination of the edge of the ice on the east Greenland coast from latitudes 65° to 69°. After this preliminary expedition another was despatched in 1883 under Lieut. Gustav Holm, with Lieut. Garde as second, both of the Royal Danish Navy, who were to follow in the track of their distinguished predecessor, Captain Graah, and penetrate beyond the furthest point reached by him. The expedition left Copenhagen on the 3rd May 1883, and arrived on the 18th July at Nanortalik, where head-quarters were to be established, a short distance west of Cape Farewell. Lieut. Holm arranged to use the Eskimo *umiaks* or women's boats, which are made of a light wooden frame with seal-skin covering, flat-bottomed, easy to haul up on the ice, to carry, or to repair, and at the same time capable of taking a fairly good load. While the huts for winter quarters were being constructed at Nanortalik, Lieut. Holm was forming a large depôt, exploring the most southern fjords, and establishing pleasant relations with the east coast natives. He returned on the 16th of September, and found the winter quarters ready.

The main expedition, consisting of four *umiaks* with five women rowers, and seven kayaks, started from Nanortalik on the 5th May 1884; but found progress very slow through the ice, and there was much detention. On the 27th June a gale of wind scattered the floes near the shore and some progress was made. Towards the end of July it was arranged that Garde, with a young scientific student named Peter Eberlin, should return to Nanortalik, making collections by the way, while Holm, with Hans Knudsen (another scientific assistant) and the very intelligent interpreter Johan Petersen, pushed onwards to the north with two *umiaks*, six Eskimo men and two women, and a year's provisions.

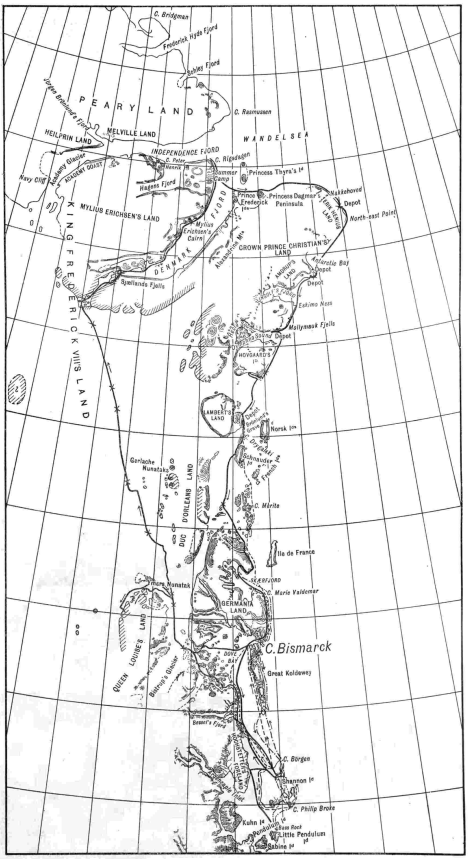
The furthest point attained by Captain Graah—the Dannebrog Islands in 65° 18′ N.—was reached on the 25th August, the entrance to the Sermilik Fjord was next passed, and Tasuisarsik reached in 65° 37′ N., where Holm determined to pass the winter.

This proved to be an important base whence the explorers could examine the intricate fjords and islands of a district known to the natives by the name of Angmagsalik, and all the winter they had constant communication with a hitherto unknown tribe of Eskimo. Lieut. Holm explored the chief part of the great Sermilik Fjord, and during the winter, with the aid of the interpreter Petersen,

he was able to study the traditions and folk-lore of the natives and to make a large and important ethnographic collection. He also investigated the ice movements, and came to the conclusion that Angmagsalik was the most accessible position along the east Greenland coast. The reason for this appears to be that the numerous islands, obstructing and dividing the current, cause it to increase its force, so that here the ice floes are dispersed in July and August. Lieut. Holm began his return journey in July, was met by Lieut. Garde, who had made many excursions up the numerous fjords, and finally arrived at Copenhagen on October 3rd, 1885.

The most important result of Holm's admirable exploring work was the discovery of the district of Angmagsalik, whence there could be annual communication with Denmark. Baron Nordenskiöld, in the *Sofia*, had penetrated the ice belt in 1883, and landed on September 4th in 65° 36′ N., remaining until the next day, thus confirming the conclusions of Lieut. Holm. In 1894 Holm, who had now attained the rank of Captain, had the great satisfaction of selecting a site, and founding the settlement of Angmagsalik in 65° 30′ N. It is situated on the slope of a hill, on the east side of a large island in the Tasuisarsik Fjord. The first colonial manager was Captain Holm's old comrade Johan Petersen, who has conducted the combined civilising and commercial undertaking with eminent ability for twenty years, in co-operation with two missionaries. The natives have concentrated their stations round the Danish settlement and have received help during periods of want and hunger. Nearly the whole East Greenland population, numbering 550, have now been baptized, and the people have adapted themselves to the use of the articles the Danish store contains. South of Angmagsalik the whole of this coast is depopulated, the last Eskimo in the extreme south having moved in 1900 to the west coast.

The botanist H. C. Kruuse, with his wife, wintered at Angmagsalik in 1901–2, and has since published an exhaustive work on the flora of East Greenland[172]: and Hr W. Thalbitzer, also with his wife, passed the winter of 1905–6 at the same settlement, devoting himself to ethnological and linguistic researches and the study of Eskimo folk-lore[173]. In co-operation with Hr Thuren, he has also given an account of the melodies of the Eskimos of the east coast.



East Coast of Greenland

The next important work was the discovery of the coast between Holm's furthest and the part surveyed by Scoresby. In 1891 the *Hecla*, a sealing vessel of Tronsberg, was hired, and an expedition commanded by Lieut. C. Ryder of the Royal Danish Navy left Copenhagen on the 7th June. Two months later she steamed into Scoresby Sound and anchored about a hundred miles beyond the entrance; whence several excursions were made in boats. Ryder wintered in Scoresby Sound, and the whole of that complicated system of long branching fjords was discovered and explored. In the next season all progress southward near the coast was stopped by masses of floe ice along the shore. Ryder was obliged to work his way out to sea and, after touching at the point where Nordenskiöld had landed, he returned to Denmark, the portion of coast south of Scoresby Sound alone remaining to be discovered. Excellent scientific work was done by his expedition.

The next Danish work of exploration, by which at length the discovery of East Greenland from Cape Farewell to Cape Bismarck was completed, is known as the Carlsbergfondet Expedition[174]. It was commanded by Lieut. G. Amdrup of the Royal Danish Navy. On a previous occasion, in 1884, Amdrup had reached Angmagsalik, where he wintered and did some good exploring work to the north in the following spring, examining the great Ikersuak glacier. On the 19th July, 1885, having mapped a considerable length of coast-line, and made large geological and ethnological collections,

he had reached Agga Island in 67° 32′, so that it would be between this point and Scoresby Sound that he had to extend his survey.

Lieut. Amdrup, in addition to the advantages of experience, had a very talented and efficient staff. Hartz, who had been botanist with Ryder, was to take command when Amdrup was away on the boat voyage. The rest of the scientific staff consisted of Kruuse, another botanist, with Deichmann and Jensen as zoologists, Lieut. Koch of the Danish Army as surveyor and draughtsman, and Otto Nordenskiöld, nephew of the great Arctic explorer, as geologist. The instructions for the expedition were signed by Admiral Wandel and Captain Holm.

On the 14th June, 1900, the *Antarctic* sailed from Copenhagen with Amdrup and his scientific staff[175]. Amdrup was to complete the survey from Scoresby Sound to Angmagsalik in a boat, while Hartz continued the researches connected with the region round Scoresby Sound. On arriving off Cape Dalton in 69° 25′ N., Lieut. Amdrup left the ship, and set out on his boat voyage on July 21st accompanied by young Mikkelsen and two seamen. The voyage occupied 44 days, and on September 2nd Angmagsalik was reached. Meanwhile Hartz, in the ship, explored the coast from Cape Dalton to Scoresby Sound, thence proceeding to Angmagsalik to pick up Amdrup and his party. Large and valuable collections were made, excellent series of observations were taken, and the work was brought to a most successful conclusion. The Amdrup expedition marks a period in Arctic history. It completed the discovery and mapping of the whole of the east coast of Greenland from Cape Farewell to Cape Bismarck.

A far more dangerous and difficult enterprise now faced the gallant Danish explorers, namely the discovery of the unknown region from Cape Bismarck to the furthest north, a distance, of 400 miles[176].

The American explorer Peary, using Eskimos and their dogs, had been working to reach the north coast of Greenland from 1898 to 1902. His first winter was at Cape Dobbin on the west coast of Ellesmere Island, another was passed at Etah, whence, starting on the 4th March, 1900, he made his way to the *Discovery's* winter quarters in Lady Franklin Bay. Setting out from that position on April 15th, he travelled along the north coast of Greenland, passing the discoveries of Beaumont and Lockwood. From Lockwood Island in 83° 34′ N., which he reached on May 8th, he went onwards to a latitude of 83° 39′ N., which appears to be the most northern point of Greenland. On the 19th he passed a promontory which he named Cape Bridgman, and his furthest point was called Cape Clarence Wycloff in Lat. 82° 57′ 7″ N. and Long. 23° 9′ W., where a cairn was built. He had his man Henson and an Eskimo with him, and a team of dogs. During the last two days he was enveloped in a dense fog. He began his return on May 22nd and reached the *Discovery's* winter quarters on June 10th. The cairn in 82° 57′ N. would, therefore, be the point the Danes would have to reach in order to complete the discovery of the east coast.

The great work was undertaken by a young Dane named Mylius Erichsen, who was born at Viborg in Jutland in 1872. He had visited the Danish settlements on the west coast of Greenland, had crossed Melville Bay, and wintered at Cape York; and he was now filled with the patriotic desire to place the crown on the edifice of Danish discovery. The task had become a sacred one for him, and with such an impulse he thought the goal must be reached if human power could attain it.

The Duc d'Orléans had shown how far north a ship might go, and the advice of experienced Arctic explorers was that Erichsen should winter on board ship, in a position to the north of Cape Bismarck, if possible. The necessary funds were raised, with help from the Government and the Carlsberg Fund, and a Norwegian sealer of 450 tons was bought and named the *Danmark*. She was built at Peterhead in 1885, was well fortified against the ice, and had been fitted with a screw

propeller in 1892. A spacious laboratory was built before the main hatchway; and besides four others, she took two motor boats. Most of the sledges, which were fitted with odometers, were made on board from Eskimo models, and 100 dogs were brought from West Greenland. A motor carriage was also taken.

Erichsen was chief of the expedition, and Lieut. Trolle of the Royal Danish Navy second in command and captain of the ship. The cartographer was Lieut. Höeg Hagen of the Danish Army, and Lieut. Johan Peter Koch of the General Staff of the Danish Army, who had done excellent surveying and cartographic work in the Amdrup expedition as well as in Iceland, and who had experience as a seaman, having qualified as master of small ships, was the surveyor. The geologist was Jarner, Johansen marine zoologist, Lindhard surgeon, Lundager botanist, Manniche ornithologist, Wegener meteorologist and physicist. The first mate was Lieut. Bistrup of the Royal Danish Navy, the second and third mates Christian and Gustav Trostrup, two artists Bertelsen and Frus went as engineers, and such was the enthusiasm felt for the expedition that two university students, Freuchen[177] aged 20 and Hagerup a Norwegian, volunteered as stokers, as well as Knudsen who was carpenter of the ship. An ice pilot, Karl Ring, a steward, and four seamen completed the complement. In addition there were the three Eskimo dog drivers Brönlund (who had been a curate at Jacobhavn), Tobias Gabrielsen, and Olsen from Ritenbenk—27 all told.

The expedition, which was known as the Danmark Expedition, left Copenhagen on the 24th June, 1906, and after a long struggle with the ice the *Danmark* was off Koldewey Island on the 13th August. Proceeding northwards a large depôt was landed at Cape Marie Valdemar. Winter quarters were established near Cape Bismarck in Lat. 76° 46′ N., Long. 18° 37′ W., in a sheltered bay which was named Danmark Havn. The explorers were thus on the very threshold of an undiscovered region. During the following two years constant journeys were made for various scientific purposes, for laying out depôts, surveying, collecting specimens, etc. The neighbourhood of Cape Bismarck was thus most thoroughly explored and surveyed.

Meanwhile there were diligent preparations during the winter for the great northern journeys. There were two extended sledge parties and two depôt sledge parties, each with a team of 8 or 9 dogs and a load of 810 lb. This was to give two months' provisions for men, and one for dogs. The first sledge had Erichsen, Hagen, and the dog driver Brönlund; the second, Koch, the artist Bertelsen, and the dog driver Tobias Gabrielsen. The auxiliary sledges were under Wegener and Trostrup. The departure took place on the 28th March, Trostrup going back on the 22nd April and Wegener on the 26th. The explorers adopted an excellent plan of placing strips of walrus hide on the runners of the sledges with the hair outwards. Water was then poured along the hide, which becoming ice, was held in place by the hair. This was found to be an immense help to the dogs in dragging.

Erichsen and Koch went on in company until the 1st May, when they separated. Koch was to go north to Peary's furthest, and Erichsen to explore the channel, which Peary stated to exist, separating Greenland from the so-called Peary Land. The travelling had been bad, with many snow-covered fissures dangerous for the dogs, and lines of heavy pressed-up ice. A depôt sufficient to bring both sledges back safely had been left in what was called Lambert Land, from that name occurring on some old Dutch charts in 78° N. The land projected much further east than was shown on the map, which increased the distance by 180 miles[178].

When Erichsen and Koch parted they each had 15 days' provisions for men, the same for dogs and 25 of petroleum for fuel. Koch's way was difficult, over hummocks and soft snow very ill suited for dogs. Land was not in sight. A course was shaped for the land, and it was reached on the 7th May, six musk oxen being obtained on the same day. On the 12th Peary's cairn was found in 82°

57′ N., and the discovery of the east coast of Greenland was completed. Koch continued to advance as far as Cape Bridgman, which was reached on May 21st. He was much hindered by dense fogs, but was able to carry out the exploration of Hyde Fjord. On the 21st, in spite of strict economy, the fuel ran out, but the supply left at the depôt was afterwards found. Both Koch and his companion, the artist Bertelsen, suffered seriously from living on musk ox meat. On the 27th of May they quite unexpectedly met Erichsen and Hagen. Erichsen's party had shot 21 musk oxen, which had caused a good deal of delay. They had explored Danmark's Fjord, and Hagen had made excellent sketches of this inlet. The inland ice was bounded by cliffs of great height, and apparently inaccessible. On the 28th Erichsen drove west into what was called Independence Sound, while Koch began the return journey, seeing that the depôts were in order for Erichsen as he passed them. On June 23rd Koch's party reached the ship after an absence of 88 days, the distance covered being 1200 miles measured by odometer. This approaches the achievements of M'Clintock and Mecham, but with the difference that while the English did all the work themselves, the Danes had the work done for them by dogs and dog drivers. Tobias, the Eskimo, however, had made the finest dog-sledge journey on record.

But tragedy was at hand; Erichsen, Hagen, and Brönlund did not return. Relief expeditions were sent out in the autumn but found no signs of them. The second winter passed in sorrow and anxiety: it was felt that they must have perished.

Several sledge journeys were undertaken during the winter to lay out depôts, and also with geographical and other scientific objects. The most important, consisting of four men, Bertelsen (in command), Wegener, Weinschank, and Lindhard, was conducted in the good old British way by men dragging their own sledge. They started on the 1st March with a load of 180 lb. per man. On the 9th they commenced the ascent of the inland ice, which they found rough, with a surface like that of an undulating sea. On the 13th they determined to take the tent and sledge no further, and Wegener and Weinschank went on to the great "nunatak" or snow-free land seen in the distance. They found that the inland ice ended in a vertical wall 90 feet high, but they succeeded in finding a place to descend, and thus landed on this extensive "nunatak," an important discovery. It received the name of "Dronning Luisa Land." The distance across the inland ice to the "nunatak" was 24 miles. The party returned on the 3rd of April with collections of plants, rocks, and fossils.

The expedition in search of their lost leader and his comrades started March 10th. It consisted of Captain Koch and Tobias, each with a sledge and team of ten dogs, and on March 19th they reached the depôt on Lambert Land with great difficulty owing to fog, a head wind, and drifting snow. They found the snow-covered entrance to a small cave, and when some snow had been removed they could distinguish the outlines of a human being in a reindeer coat. It was Brönlund. At his feet was a bottle with his diary, and the chart sketches drawn by Hagen. The diary was in Eskimo and a single page was written in Danish. It announced that the two others perished in November in Seventy-nine Fjord after an attempt to return by the inland ice. "I arrived here," it ran, "by waning moon, and can go no further owing to frost-bites on feet and the darkness. Hagen died on the 15th of November, and Mylius about ten (two?) days later." Koch returned to the ship on March 26th.

Brönlund's diary was translated by Dr Christian Rasmussen, lecturer in Greenlandic at Copenhagen, and, with the two records found by Mikkelsen, the story of the fatal but fruitful journey of the heroic Danes can be pretty clearly made out. They had been misled by Peary's erroneous map. On parting with Koch they drove away to the land in about 82° N. and first discovered a long fjord turning S.W. for nearly 150 miles which they named Danmark Fjord. They then entered another narrow fjord of about the same length running west and ending near the

position where Peary placed his "Navy Cliff[179]." As there was no Independence Bay, Erichsen called this fjord "Independence Sound." He discovered that it ended, and that the channel across Greenland was imaginary. The Danish explorers arrived at the head of this fjord on June 8th and remained there, mapping and exploring, for several days. Two branch fjords were discovered, one to the south named after Hagen, and one to the north after Brönlund.

In the Arctic regions the summer has not the extreme cold of the Antarctic summer, but it brings greater suffering to the explorer. Water forms on the floes, often more than knee deep, open water suddenly appears cutting off communications, and long delays are caused before young ice will bear. To these obstacles the gallant Danish explorers were exposed, though they were fortunately able to obtain a certain amount of game. The summer was the cause of their destruction. It was passed near the entrance of Danmark Fjord from June to August. The snow was soft and deep, and water-making, and at last there was no ice across the fjord. They had to travel over the hills to reach a fresh hunting ground at Sjellands Sletten. Here musk oxen, hares, brent geese, and ptarmigan were obtained. But the dogs were failing, and much reduced in number. Foot-gear was wearing out, and Hagen, with Brönlund's help, tried to make boots out of the leather bag for the sextant. Fuel was all used, but there was some driftwood, and one of the sledges was broken up. At length, in October, the ice bore, and the return journey was commenced along the coast to Lambert Land depôt. But their troubles continued. They were stopped by open water at Antarctic Bay, and had no alternative but to take to the inland ice. Nearly exhausted, with few dogs left, it took them four days to drag the sledge up to the ice cap. They continued to work their way south, dying men, but unconquered and resolute to the last. They were not perishing from want of food, but from frost-bites, illness, misery, and exhaustion. They descended into Seventy-nine Fjord on their way to the Lambert Land depôt, and then the end came. It had been a terrible journey. Hagen died on the 15th of November, Erichsen two days afterwards. Taking his diary and Hagen's maps and drawings, Brönlund staggered on to the depôt, where as we have seen, his body was found by Koch. The bodies of the two noble explorers rest in the midst of their vast discoveries.

Erichsen had organised and conducted the expedition with great energy and quite exceptional ability. His last great journey was splendid in its conception, in its scientific results, and in its heroic end. He was an ideal leader and beloved by his companions. Hagen, too, was no less a loss to science, an observer of the first rank and a dauntless enthusiast.

Lieut. Trolle succeeded to the command of the expedition. The energy and unceasing activity of its members was marvellous, and a mere list even of the various expeditions would need more space than can be given here. One of the most important, led by the geologist Jarner, was the complete survey and exploration of Clavering's Ardencaple Inlet, which was examined and mapped up to the two upper branches during 42 days in the spring, large collections of plants and fossils being made, and men and dogs returning in excellent condition.

For the extent of discoveries made, and for the continuous activity of all its members during two winters and three working seasons the Danmark Expedition has few equals. Its members did much scientific work, and did it thoroughly, bringing home valuable observations and large collections. The winter quarters were left on July 21st, and the ship finally arrived at Copenhagen on the 23rd August, 1908.

CHAPTER XLIII

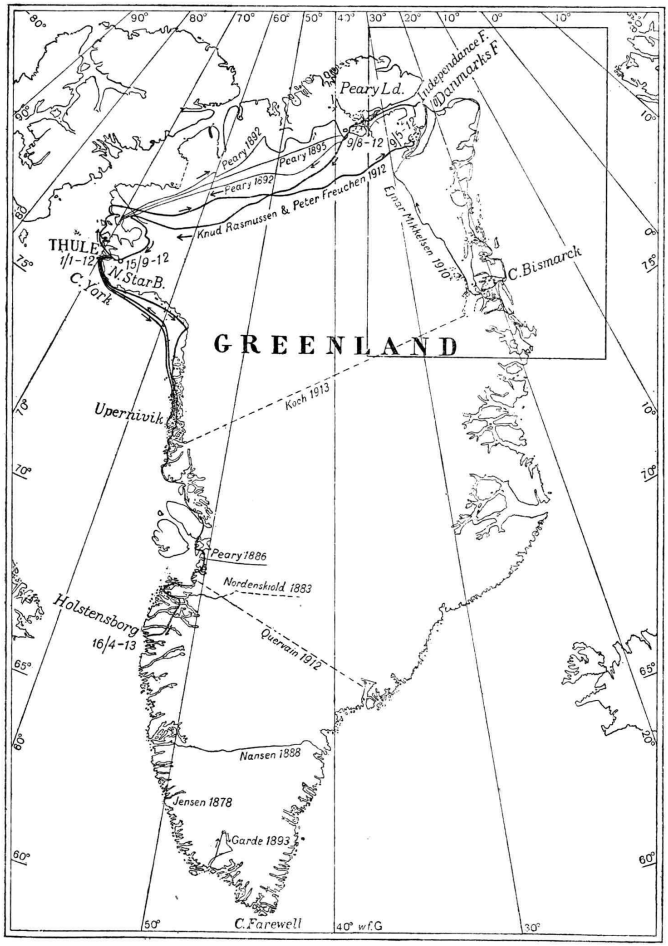
LATER GREENLAND EXPLORATIONS—MIKKELSEN, RASMUSSEN—KOCH

MIKKELSEN

The quest of any further information respecting the Erichsen expedition was a worthy object, and it called forth the zealous enthusiasm of Einar Mikkelsen, the gallant young explorer who had already served in the expedition of Captain Amdrup, and had later won fame from his fine effort in the Beaufort Sea. He received the warm encouragement of his former chief Amdrup, of Captain Holm, and others; a Committee was formed, a fund was raised, half contributed by the Danish Government, and the *Alabama* of Stavanger (only 40 tons) was bought, strengthened, equipped, and supplied with 18 months' provisions. Dogs were obtained in Greenland. Mikkelsen had with him Lieut. Laub of the Danish Navy, Lieut. Jorgensen of the Danish army, Iver Iversen, a naval engineer, Olsen and Paulsen, mates, and the carpenter, Carl Unger.

The *Alabama* sailed from Copenhagen on the 20th of June, 1909, and after many difficulties and much danger from the ice arrived safely off Shannon Island. An autumn journey was made to the place where Brönlund died, which proved a most dangerous undertaking. It was indeed a race for life against water, thin ice, and darkness. The body was found, a grave was built over it, and memorials were deposited. The party returned on December 18th, 1909, after an absence of 95 days, one of the most remarkable autumn Arctic journeys on record.

During the first winter, in the hope of finding documents, Mikkelsen resolved to undertake a journey to Danmark Sound by crossing the glacial land, a novel and hazardous undertaking. He made direct for the head of the fjord, and for part of the way was accompanied by Lieut. Laub with another dog sledge. Mikkelsen had only one companion, the engineer Iver Iversen, a good cook, an expert dog driver, and a man of many accomplishments. The two sledges carried respectively 600 and 650 lb. of provisions and were drawn one by nine and the other by eleven dogs.



Greenland

On April 1st Mikkelsen and Laub found that they were by observation no less than 15 miles south of their dead reckoning, much to their surprise and dismay—only another proof of the uselessness of dead reckoning unless checked by astronomical observations. It was intended that Laub should travel round the west side of the large nunatak called Dronning Luisa's Land and then return round the south end. At the north end of the land there was a little moss here and there, but no sign of any living thing. Bad weather, excessively difficult marching, and shortage of provisions obliged Laub and his two companions to return by the way they came, and on reaching the winter quarters they found that the *Alabama* had filled and sunk, and their shipmates were in a tent. Eventually, however, they were able to build a house with some of the ship's timbers.

Meanwhile Captain Mikkelsen and his companion Iversen continued their march, making a very remarkable and difficult journey across the inland ice direct to the head of the Danmark Fjord which, it will be remembered, had been discovered by Erichsen. On May 18th they reached the head of the fjord. Several remains of Erichsen's party were found, then a record, and ultimately a second record. Erichsen recorded this discovery of the long fjord, at the head of which was Peary's

furthest point, with two fjords branching from it. He had also found that Peary's strait across Greenland had no existence. This information was important, as Mikkelsen had intended to return by the imaginary channel and the west coast of Greenland, in which case he and his companion would probably have perished. As it was, the return by the coast with the dogs worn out, deep soft snow, and much surface water, was a sufficiently dangerous undertaking. Mikkelsen was for some time unable to walk, and the explorers went through great hardships.

At length, after terrible sufferings, the two men returned to the winter quarters, only to find that their ship had sunk and that all their companions had gone home in a vessel that arrived in the summer. A house, needing much repair and full of snow, had been built out of timber from the wreck, and there were provisions. In view of the paucity of game, their companions considered that they would serve the absent men best by returning when there was a chance, thus avoiding the consumption of the remaining provisions. "They were all persuaded that Captain Mikkelsen would succeed in fighting his way through, armed as he was with iron energy and great Arctic knowledge, and with a companion who would stick to him through thick and thin."

At last a vessel arrived to rescue them, after three winters, and the two heroic explorers were brought safely back to Copenhagen. This expedition, with its aspirations accomplished and its valuable results, stands high in the polar record. Mikkelsen's reward was the appreciation of his work by the scientific geographers of all countries. His interesting narrative is contained in the *Story of the Alabama Expedition, 1909–1912*.

Rasmussen

The expedition across Greenland led by Knud Rasmussen, a Dane born in Greenland, is of very special interest because it inaugurates what is intended to be a permanent system of exploring work, which at the same time undertakes the protection of the Arctic Highlanders, that most interesting tribe, quite uncontaminated by contact with civilisation when first discovered by Sir John Ross in 1818 and visited by the writer in 1850. Under modern conditions the protection of the Danish Government is much needed by these well-intentioned but simple and isolated people.

With this most laudable object Rasmussen in July 1910 formed a settlement among these people in Wolstenholme Sound, which he called "Thule." In the following year, becoming anxious for the safety of Mikkelsen and his companion, he organised an expedition to cross Greenland with the hope of relieving them. This was the main object, discovery being secondary.

Rasmussen's expedition was a thoroughly efficient one. He was accompanied by two Eskimos and by young Freuchen who had served with Erichsen, a joyous comrade, a cartographer, and possessed of hardihood and great endurance. With four sledges and 54 dogs they started from the Clements Markham glacier, a little to the north of Whale Sound, on the 19th of April, 1912. They soon found that tents were much better than snow huts, and the walrus meat they took with them kept the dogs in good condition. The highest part of Greenland on this meridian was found to be 7300 feet. In descending into the Danmark Fjord of Erichsen some dogs fell over precipices, but otherwise all were in good condition. Their rate of travelling was fast, 17 journeys bringing them to Danmark Fjord, 504 miles. Rasmussen travelled down Danmark Fjord for 72 miles, until he reached the sea, and then proceeded up another fjord of great length, running nearly east and west. This was all Erichsen's ground. It was found that the coasts of the fjord were more frequented by game and had more vegetation on the north than on the south side. On June 17th the head of the long fjord was reached, some extensive ice-free land was discovered, and a glacier leading to the inland ice.

Peary's record was found by Freuchen, on a height quite at the end of the fjord. His incomplete observations, as already stated, caused the recording of a non-existent channel from the east to the west coast of Greenland, and the publication of quite erroneous maps for many years.

At the end of the long fjord discovered by Erichsen, which he called Independence Fjord, Rasmussen found a steep glacier, and on the north side a valley full of flowers, which he named Valmuedalen, or the valley of poppies. Here the party rested for a few days and shot several musk oxen. The return was commenced on August 8th by ascending the glacier with great difficulty. They still had 27 dogs; and Thule was safely reached on September 15th, 1912. The return journey alone covered 621 miles, the double journey 1200 miles—the finest ever performed by dogs.

By this remarkable and well-conducted journey Rasmussen corrected the errors on our maps and made important discoveries. It is his intention, while guarding the interests and looking after the welfare of the Arctic Highlanders from his station at Thule in Wolstenholme Sound, to undertake further exploring expeditions.

In the same year Dr de Quervain, a Swiss, made a journey over the inland ice of Greenland, much further south, from Jacobshavn in Disco Bay, on a S.E. course to Angmagssalik on the east coast. His highest point was 8200 feet.

Koch

The latest journey across Greenland from the east to the west coast was specially interesting because ponies were used instead of dogs. Captain Koch, the accomplished companion of Mylius Erichsen, when he decided upon undertaking a much more northern crossing, resolved to attempt the difficult enterprise with ponies. Sixteen of these were landed, but unfortunately there was a stampede and only ten ponies were recaptured. The companions of Captain Koch were three Danes named Larsen, Wegener, and Vigfus. The intention was to winter at the interesting Dronning Luisa nunatak, but after two months of hard work it was found that the complete ascent could not be made before winter set in, and it became necessary to establish winter quarters on the icy ascent. To add to their misfortune Captain Koch fell down a crevasse and broke his leg. They had brought the materials for a house, which was duly erected, and served its purpose well during the winter, though —72° Fahr. was registered. Several ponies died and others were used for food.

By the spring Captain Koch had recovered from his very serious accident and the march across Greenland, a distance of 700 miles on this meridian, was commenced on April 20th with five ponies and five sledges. Violent storms had to be faced and the ponies suffered severely from exhaustion and snow blindness. No land was seen from May 6th until July 2nd. A height of nearly 9800 ft. was attained in 43° W. and 74° 30′ N. On July 4th the margin of the ice on the west side was reached, and the last remaining pony was killed. The descent was made, and a fjord called Lax (salmon) Fjord was crossed on a raft constructed of the sledge and poles. They were then weather-bound without food for 35 hours. The party was ultimately rescued by a sailing boat, which took them to the Danish settlement of Proven.

The difficulties encountered, the dangers faced and overcome, the sufferings bravely endured, the scientific work throwing light on the climatic conditions and physiography of the Greenland interior, place all these Danish enterprises very high in the glorious record of polar discovery.

CHAPTER XLIV

CONCLUSION

THE long and glorious story of Arctic discovery is drawing to a close. Two unknown areas of unequal importance remain. One is the extensive region now known as Baffin Island, which needs thorough exploration, and will doubtless receive it from the Dominion Government in due time. The other is the part known as the Beaufort Sea, a much more extensive unknown area from Prince Patrick and Baring or Banks Islands westwards to the Liakhov Island between the 70th and 80th parallels of North Latitude, and indeed much further to the north. Future explorers have still before them the problem of the distribution of land and water over this unknown region. Ever since I collected vestiges of Eskimo encampments along the shores of the Parry Islands and became convinced that the wanderers came from the west, I have been inclined to expect the discovery of land in this area. The description of the ice off the west coast of Banks Island confirmed me in the belief of a land-locked sea. Deductions from the additional knowledge furnished by the Nares Expedition rather shook my belief on some grounds, but the apparent impossibility, if there is no land, of all the ice over so vast an ocean escaping between Spitsbergen and Greenland was an argument on the other side. Professor Spencer and Dr Harris support the view that there is undiscovered land northward over the Beaufort Sea on grounds connected with tidal phenomena. Dr Harris's view is that this land is of great extent, stretching away far to the north. The existence of an archipelago, of continental land, or of a continuous ocean is the problem to be solved—the remaining Arctic achievement of the future.

Impressed with this conviction I read a paper at a meeting of the Royal Geographical Society on November 13th, 1905, on "The Next Great Arctic Discovery," and subsequently Einar Mikkelsen very gallantly undertook the enterprise, but with inadequate means. He was only able to show his pluck, energy, and resourcefulness. He made a fine journey over the ice to the northward of the Alaska coast, and ascertained the position of the edge of the continental shelf. He encountered a wide lane of water stopping his return, but at once set to work to contrive a means of crossing, and succeeded. The difficulties Mikkelsen overcame by his resourcefulness and the way in which he met disasters proved that, with funds at his command, he was fitted for the leadership of a large expedition. At the same time that the gallant young Dane was struggling with adversity, including the loss of his little vessel, Mr. Harrison was doing excellent geographical work in the delta of the Mackenzie River and making himself thoroughly acquainted with the Eskimo inhabitants. The discovery of this region was later undertaken by the Government of Canada, but the expedition ended in failure.

We may now look back on all the expeditions, extending over more than a thousand years, that we have passed in review, and sum up the result as regards Arctic lands. The islands on the continental shelves and the bordering continental lands must be regarded as comprising the whole of the terrestrial Arctic Regions, and geographers should look upon problems connected with those regions from that point of view. On the Siberian side the shelf is described to us from careful personal observation by Nansen. We see the group of New Siberian Islands rising from it, with their mammoth ivory and cliffs of fossil wood. We then contemplate the land masses of Novaya Zemlya, Franz Josef Land, and Spitsbergen rising from the Barentsz and Kara Seas, with the marvellous tale they tell of the former condition of the region in recent geological times. Next, on the further side of

the great southerly ice-stream, is the continental mass of Greenland, with its glaciation only surpassed in grandeur and extent by the Antarctic ice-cap. Then come the somewhat analogous land masses of Baffin and Ellesmere Islands, with the separating straits and channels, and finally the intricate Parry Archipelago to the north of the American continent. These lands bordering on or rising from the continental shelf form the Arctic Regions as we know them. But between the Parry Archipelago and the Siberian shelf there is the vast area in and to the north of the Beaufort Sea, to which I have just referred and of which we know almost nothing. Our knowledge of the Arctic regions will remain incomplete until this area has been discovered and explored.

When we now look back on the history of Arctic enterprise from the earliest times it is impossible not to be struck with the high qualities it brought so frequently to light, and the fine record of courage and endurance it presents for our admiration. The objects have differed, but there has throughout been the same splendid contempt for danger and hardship, and the same resourcefulness and habit of quick decision brought out by the nature of the work on which the explorers were engaged.

The Norsemen, and afterwards the Danes, have been the colonisers, undertaking the hardest and most difficult work of all, and they furnish a record of commercial success and civilising influence on the natives which places them in the first rank among Arctic labourers in a hard but fruitful field. Next come the English adventurers seeking for a shorter route to India by the north-west, the north-east or the north; and thereafter the period of fishers and trappers, when it was shown of what immense value were the products of the Arctic regions. First the Dutch established whale-fisheries in Spitsbergen and Davis Strait, and then the English who, in the person of Scoresby, combined commercial profit with scientific research. The labours of these daring whale-fishers enriched and gave prosperity to numerous communities, while beginning later, but working contemporaneously, we see the Hudson's Bay Company opening up the wilderness, accumulating wealth, and largely influencing Europeans and natives for good.

The Russians, too, achieved a great work in delineating the whole northern coast of Siberia. Then came the great era of Ross, Parry, and Franklin; a time of heroic effort, of vast discoveries, and above all of the ceaseless training of men in ice-work, the training of men, that is, alike for science and for war. In this Arctic work we see the nursery of a Nelson, a Riou, a Nias, a Sherard Osborn, and such men as Sabine, Beechey, and Foster.

The expeditions in search of Sir John Franklin and his gallant companions raised Arctic work to the highest plane it has yet attained. The motive was the highest that has ever actuated polar or any other discovery, the cause of humanity. Very extensive discoveries were made and the art of sledge travelling with men was brought nearly to perfection.

After the completion of the Franklin search and the return of the Nares expedition, Americans, Norwegians, Swedes, and Austro-Hungarians stepped in. The best of the American Arctic leaders were Greeley and De Long, although their expeditions ended in misfortune, for they were instructed officers, with a strong feeling of responsibility and of the obligations of duty. The work they did was well done and reliable. The expeditions of Nordenskiöld and Nansen stand by themselves owing to the personality of those leaders. The Swede was a man of high scientific and literary attainments, the Norwegian alike a man of action and a profound student, an unusual combination. He is endowed with rare gifts. His ideas almost amounted to prescience, and he was equally sagacious in working them out to practical conclusions. He drew back the veil which had concealed the Arctic secret. Although the English occupy the first place in Arctic discovery, yet it was begun and was completed by Scandinavians—by Erik the Red and Fridtjof Nansen.

In the history of mankind since the Christian era, the annals of Arctic discovery occupy a very glorious place. They run like a bright silver thread through the darker tales of war and crime, for the most part showing the nobler side of the qualities of our race.

PART II

THE ANTARCTIC REGIONS

CHAPTER XLV

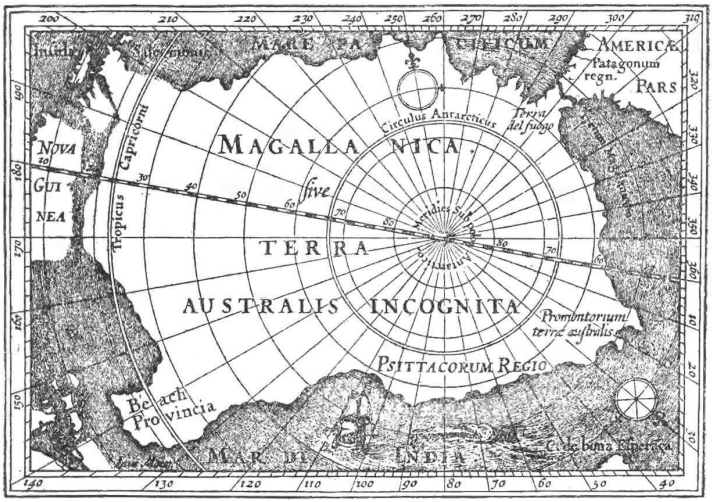
THE GREAT SOUTHERN CONTINENT

THE Far South waited much longer for the attention of mankind than the Arctic regions. Antarctica has had no dwellers on the threshold, no demigod clearing its circle on Sleipner or any other fabled horse, no Norsemen daring its icy solitudes, scarcely even a tradition; although the anonymous Franciscan, in the fourteenth century, when he was in Prester John's country, heard that the four rivers of Paradise flowed from an inaccessible mountain of great height at the south pole[180].

The Antarctic regions were first approached by Europeans by following the coast line of the continent which stretches furthest south. Magellan, with that indomitable perseverance which characterised him, continued, in spite of all difficulties, to force his way south until he discovered the strait which led him into the Pacific Ocean. After that it was the contrary winds, driving ships to the south, which led to further discoveries in an Antarctic direction. The next Spanish fleet which passed through the Strait after Magellan was under the command of Garcia Jofre de Loaysa, with Sebastian del Cano as second in command. Seven vessels sailed from Coruña in 1525, one of the smallest being the *St Lesmes*, with Francisco de Hozes as captain. This little craft of 80 tons was blown out of the strait, and driven down as far south as 55°, sighting land, the eastern end of Staten Island. Adverse gales also drove Sir Francis Drake to new discoveries. In October, 1578, he thus unintentionally fell in with "the uttermost part of lands towards the South Pole." The latitude was 56° S. and "there was no maine nor iland to be seen to the southwards; the Atlantic Ocean and the South Sea meeting in a most large and free scope." Drake named this southern cape of the island after the great Queen, Cape Elizabeth, the Cape Horn of the Dutch. Twenty years afterwards another discovery-causing gale produced results. An expedition of four vessels and a small pinnace left Holland in June, 1598, under the command of Jacob Mahu, whose death placed it under Simon de Cordes. The object was to visit the coasts of Chile and Peru for plunder, and then cross the Pacific. After leaving the Strait of Magellan all the ships were scattered. The flag-ship *Hope* reached Japan in April, 1600, where the pilot, an Englishman named William Adams, was detained until his death, though he was able to send home very interesting letters. The little pinnace of 18 tons named *Blijde Boodschap* (*Good News*) was driven down to 64° S., where her Captain, Dirk Gerritsz, saw "high land with mountains covered with snow, like the land of Norway[181]." M. Gerlache has named the islands which he discovered, and which, with Graham Land form the Gerlache channel—"Dirk Gerritsz Archipelago," for his latitude shows that this was possibly the land he sighted. Returning northwards in search of his consorts, Dirk Gerritsz put into Valparaiso, where his ship was taken by the Spaniards and he was wounded. He was sent a prisoner to Lima, but news of his proceedings reached Holland, though not of his fate.

On June 14th, 1615, an expedition left Holland apparently with the object of finding a way to the Pacific to the south of Magellan's Strait. Willem Cornelisz Schouten of Hoorn commanded the *Eendracht* of 220 tons, with Jacob le Maire, a son of the owner, as principal merchant. In January, 1616, Schouten discovered the strait between Tierra del Fuego and an island which he named Staaten Island. The strait was named after Le Maire. He thought the island was part of the Antarctic Continent. On the 29th the most southern land was sighted—the Cape Elizabeth of Drake—and named Cape Horn. When the Spanish Government heard of these proceedings they fitted out an

expedition to verify the Dutch discoveries. It consisted of two caravels commanded by two brothers named Nodal. They carried out their instructions with ability and success from September, 1618 to July, 1620, passing through the Strait of Le Maire, rounding Cape Horn, and being the first to circumnavigate Tierra del Fuego. They gave the name of San Ildefonso to Cape Horn. Moreover they got still nearer to the Antarctic regions, discovering rocks in 56° 31′ 8″, fifty-seven miles S.W. of Cape Horn, which they named Diego Ramirez after their pilot.



Ortelius' Map of the World

While the explorers, by the action of adverse gales, were thus painfully making discoveries in the far south, the map-makers were presenting geographical students with a vast southern continent. In the map of the world by Ortelius (Antwerp, 1570) the outline of this "Terra Australis" is carried round the world as far north, in some places, as the tropic of Capricorn. Australia is included in it, but New Guinea is an island. There is the mysterious gold-yielding province called Beach, on a peninsula near Java Minor. In the G. de Jode's map of 1578, New Guinea is made part of Terra Australis. Mercator, in his Duisburg map of 1587, has the Beach province and Java Minor, following Ortelius. The map of 1589 makes New Guinea an island again. The southern continent is shown in the same way on the Molyneux globe. The Mercator Atlas, published by Hondius at Amsterdam in 1623, represents the Terra Australis in the same way as Ortelius, as does the Hexham Atlas, even after the return of Schouten and Le Maire. All these maps treat Tierra del Fuego as a promontory of the great Terra Australis. This vast continent of the map-makers originated in some idea that the amount of land in the two hemispheres should balance each other. Its effect was, on the whole, useful, for it led to a desire among men of action to look for and discover the unknown land, and it is always a good thing when anyone undertakes to look for anything.

It was while serving with Mendaña, in his second voyage, that Pedro Fernandez de Quiros conceived his grand project, after studying and pondering over the maps of the world with their great southern continent. He thought that here might be a discovery as famous as that achieved by Columbus or Da Gama. After long waiting he at length obtained an order from Philip III to the Viceroy of Peru, to fit out an expedition with himself in command, for the discovery of the Antarctic continent. Quiros proceeded to Lima in 1603, but it was two years before the two small vessels were equipped and ready for sea. The plan of Quiros was to steer E.S.E. from Callao until

he reached the latitude of 30° S., when he fully expected to have arrived at the southern continent shown on the maps. He continued on this course from December 21st to January 22nd, when he was in 26° S. There was a great swell from the south, and the men became alarmed. Quiros then came to the unlucky resolution of altering course to E.N.E. His excuse was that the crew were mutinous and that he was ill in bed. If he had gone on he would have discovered New Zealand. Thus ended, rather ignominiously, the first intended Antarctic voyage. Quiros discovered the New Hebrides, and his second in command finally separated Australia from New Guinea by discovering Torres Strait, but the Antarctic project came to an end.

About this time there was a Memorial written by a Chilean lawyer named Juan Luis Arias, on the discovery of an antarctic continent and the conversion of its inhabitants. This Memorial contains the statement that Juan Fernandez, the navigator who discovered the quickest route from Callao to Valparaiso, led an expedition from Chile which discovered the coast of the southern continent, landed on it, and had communication with the natives. But the story is not authentic[182]. More than a century passed without any further thought of the reputed continent round the antarctic pole. In 1675 an English merchant named Anthony La Roche, returning from the South Pacific, discovered the land to which Captain Cook afterwards gave the name of South Georgia. In 1738, the French East India Company sent two vessels under the command of Captain Lozier Bouvet to discover a peninsula in the South Atlantic said to form part of the southern continent. Bouvet sighted land in 54° S. and 11° E., but did not ascertain whether it was a peninsula or an island. He called it Cap Circoncision[183].

Hitherto the discoveries in the far south had for the most part been accidental, and there had only been one real antarctic expedition, that of Quiros, which too soon altered course from south, hesitating near the threshold, and met with failure in consequence.

CHAPTER XLVI

CAPTAIN COOK—BELLINGSHAUSEN

It was a bright page in English history when our Government awoke to its duties in taking a lead in discovery. In the instructions, dated June 17th, 1764, to Commodore Byron, who was despatched to the Pacific in that year, that duty is recognised in a very noble passage:—

> Whereas nothing can redound more to the honour of this nation as a maritime power, to the dignity of the crown of Great Britain, and to the advancement of the trade and navigation thereof than to make discoveries of countries hitherto unknown; and whereas there is reason to believe that lands and islands of great extent, hitherto unvisited by any European Power may be found, His Majesty, conceiving no conjuncture so proper for an enterprise of this nature as a time of profound peace, which his kingdoms at present happily enjoy, has thought fit that it should now be undertaken.

In this spirit our Government resolved to despatch an expedition with the object of deciding the question of the existence of a great southern continent such as had long been delineated on maps of the world. Two vessels built at Whitby, the *Resolution* (462 tons) and *Adventure* (336 tons) were selected, and carefully fitted out at Woolwich and Deptford with great store of antiscorbutics. Captain Cook received his appointment on November 28th, 1771, with Captain Furneaux as his second, on board the *Adventure*. Cook had with him two of the Lieutenants who were in his first voyage, Clerke and Pickersgill. Another Lieutenant, James Burney, was the future Admiral and author of *Voyages to the South Sea*[184]. One of the midshipmen, Vancouver, was the future explorer and surveyor of the north-west coast of America. Johann Reinhold Forster and his son were appointed as naturalists, and the Board of Longitude sent Mr Wales to make astronomical observations. The Board also supplied four chronometers, three by Arnold, and one by Kendall on Harrison's principle[185]. This was the first British Antarctic Expedition.

On November 22nd, 1772, the expedition left the Cape with the object of examining the edge of the ice between that meridian and that of New Zealand. The course was south, the two vessels keeping company, and after some very severe weather the first iceberg was sighted on the 10th December in Lat. 50° 20′ 3″ and 2° east of the Cape. On the 14th, after passing many icebergs, the edge of the pack ice was reached. The 17th January, 1773, was a memorable day, for in the forenoon the Antarctic Circle was crossed for the first time in the history of civilised man, in 39° 35′ E. The latitude at noon was 66° 36′ 30″ S., and in the evening 30 icebergs were in sight, and much sailing ice. Captain Cook perseveringly continued to examine the edge of the ice for many days, until on March 26th, 1773, after being 122 days at sea and sailing over 3660 leagues, but never once sighting land, Dusky Bay in New Zealand was reached.

Tahiti and other islands were then visited, and on November 26th, 1773, the *Resolution* left New Zealand to resume her Antarctic work. On December 14th she was among icebergs and loose ice in 64° 55′ S. and 163° 20′ W. Captain Cook continued his course to the south and on the 20th December crossed the Antarctic Circle for the second time, surrounded by icebergs and loose pack, with very thick weather. On the 26th the sea was dotted with more than 300 bergs. A closely-packed mass of ice, extending east and west as far as could be seen, was reached on the 30th January, 1774. Captain

Cook counted 97 ice hills within the pack, many of them very large, and looking like a ridge of mountains rising one above another until they were lost in the clouds. Cook adds that a mile within the pack there was solid ice in one continuous compact body, rather low and flat, but seeming to increase in height as it was traced to the south, in which direction it extended beyond their sight. The latitude was 71° 10′ S., longitude 106° 54′ W.

Cook did not believe that it would have been impossible to force a way through this pack, but he thought that it would not be justifiable to take a ship like the *Resolution* into such danger. He therefore shaped a northern course from this point, arriving at Easter Island on the 11th March, 1774.

After making numerous important discoveries during the rest of the year 1774, the great navigator left New Zealand on November 10th and the *Resolution* sailed across the South Pacific, making for Cape Horn. On the 19th of December they anchored in a bay on the south-west coast of Tierra del Fuego, called Christmas Sound. On the 28th they resumed their voyage, rounded Cape Horn, passed through the Strait of Le Maire, and sailed along the north coast of Staten Island, of which Cook wrote an interesting account. On the 15th January, 1775, land was sighted in latitude 54°, consisting of some small islands to which the name of South Georgia was given. On the 31st another discovery was made, which received the name of Sandwich Land. The Cape was reached on March 21st. The expedition arrived at Portsmouth in July, 1775.

Captain Cook had made the circuit of the southern ocean in a high latitude, and had entirely swept away the vast and imaginary Terra Australis of the map-makers. He was, however, of opinion that there was continental land of great extent nearer the pole, and that he had seen part of it when he was at his extreme south. He was thus the first to see land within the Antarctic Circle. It was also his belief that the antarctic continent extended furthest to the north opposite the southern Atlantic and Indian Oceans owing, for one reason, to the greater degree of cold. In this he was quite correct.

* * * * *

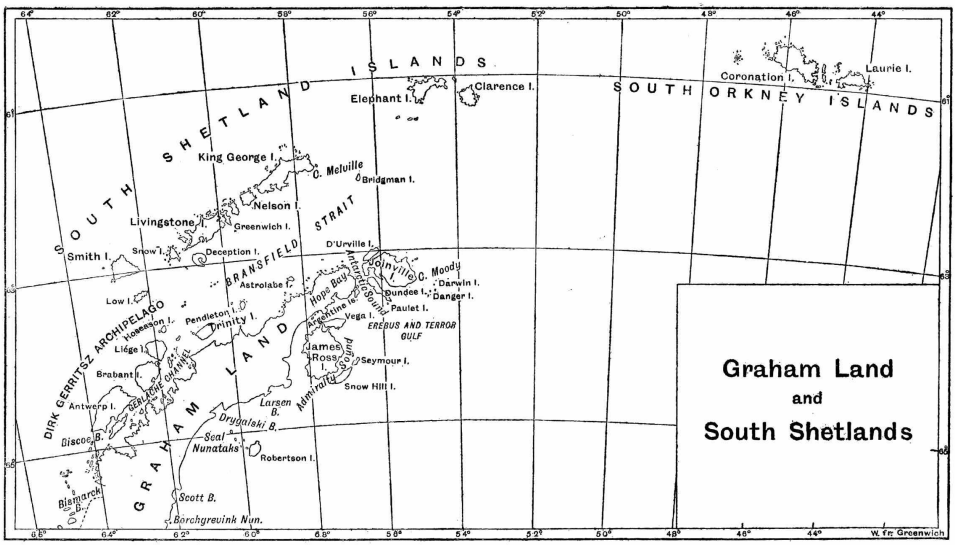
Many years passed before any further attempts at geographical discovery were made in this region. At length, however, the Russian Government, in July, 1819, sent an expedition to the southern seas, consisting of two vessels, the *Vostak* under Captain Bellingshausen, commander of the expedition, and the *Mirnyi* under Captain Lazareff. Bellingshausen, like Cook, made the circuit of the southern ocean in high latitudes. He reached the edge of the pack in 69° 30′, and in March, 1820, arrived at Van Diemen's Land. In October of the same year he again sailed and kept to a high latitude, between 60° and 67°, in the South Pacific. In January 1821 he reached 70°, his furthest south, in Long. 92° 10′ W. a short distance to the eastward of Cook's furthest, but not so far south. On the 11th of this month he discovered an island in 69° S. and 91° W., nine miles long and apparently of very considerable altitude, but he was a long way off. He named it Peter Island. The discovery is important as indicating the extension of the continental shelf to that point. Alexander Land was sighted further east, in the same high latitude, but at a distance of 40 miles. In July, 1821, Bellingshausen's expedition returned to Cronstadt.

CHAPTER XLVII

THE SOUTH SHETLANDS. FOSTER—WEDDELL

DISCOVERY south from Patagonia made very slow progress. After three hundred years knowledge had only reached Cape Horn, the rocks of Diego Ramirez, and the distant view of land in 64° seen by Dirk Gerritsz. His discovery, granting the latitude, must have been the string of islands near the north-west coast of Graham Land. At last a vessel on her way from Monte Video to Valparaiso was, like the *Good News* of Dirk Gerritsz, driven far to the south. This was a brig called the *Williams of Blythe*, commanded by Captain William Smith. She was in 61° S. when land was sighted in February, 1819, and in a subsequent voyage, in October, Captain Smith entered a bay, named by him George's Bay, in one of the largest of a group of islands. The group lay between 61° and 63° S. and 54° and 63° W. A chart was drawn by William H. Goddard, no doubt one of Captain Smith's officers, and the group was named the South Shetlands. There were twelve islands reported and innumerable rocks. A channel over 300 miles in width separates the South Shetlands from Tierra del Fuego.

When Captain Smith arrived at Valparaiso in November 1819, he found there the senior officer, Captain Shirreff, R.N., of H.M.S. *Andromache*. Captain Shirreff took a great interest in the discovery of the South Shetlands, and it was agreed that the discoverer should take Mr Bransfield, the Master of the *Andromache*, with three other officers[186] and some bluejackets to carry out an extensive survey. The agreement was dated December 16th, 1819; and Mr Bransfield received full instructions for his guidance in making a survey of the newly discovered land. The *Williams of Blythe*, with the naval surveyors, arrived at George's Bay on the 16th of January, 1820. The season was late, but Mr Bransfield surveyed the islands discovered by Smith and got as far south as 63°. He returned to Valparaiso May 27th[187].



Graham Land and South Shetlands

The South Shetlands were the breeding grounds of immense numbers of fur seals, and the news of this wealth spread with incredible rapidity, so that in the very next year there were from 30 to 50 American sealing vessels among the islands, altering Captain Smith's names, and committing ruthless destruction. The pitiless slaughter could have but one result and in two or three years the fell work was done—the seals were practically exterminated. Fanning[188], the historian of these voyages, tells us that the objects were sealing and discovery, but there can be little doubt which was the preponderating motive. It is much to be regretted that there was no authority to keep within some bounds the cupidity of the sealers. In two years 320,000 fur seals had been destroyed, besides at least 100,000 young, owing to the loss of their mothers.

In 1821, the American Captains Pendleton, Williams, Dunbar, and Palmer were at work. The volcano on Deception Island was found to be active, and some islands to the S.W. were discovered, not including Trinity Island of the Admiralty Charts, which has been called Palmer Island, in 63° 25′ S. and 57° 55′ W. Trinity Land is on Bransfield's chart. Captain Palmer continued to make sealing voyages until 1829. The South Orkney Islands were discovered by the English sealing captain Powell in 1820.

In 1829 Captain Foster came to the South Shetlands in the course of his scientific voyage, with the object of taking pendulum observations, which occupied him for two months[189]. He also explored the volcano on Deception Island. This very distinguished scientific Arctic officer, born in 1796, began his career in the *Conway* under Captain Basil Hall. He was with Clavering on the east coast of Greenland, with Parry in his third voyage, and also surveying in Spitsbergen in 1827, and his observations were so meritorious that he was elected F.R.S., and received the Copley Medal. He commissioned the *Chanticleer* in 1827 for pendulum observations and other scientific work, and made an excellent survey of Staten Island, and some of the South Shetland Islands. He was accidentally drowned in the river Chagres in 1831, and a monument was erected to his memory in the church of his native village, Woodplumpton. Some officers were serving on board the *Chanticleer* with Captain Foster who were afterwards well known in the service, Austin the

Commodore of the chief Franklin search expedition, Collinson, leader of another search expedition and Deputy Master of the Trinity House, and Kendall the eminent surveyor[190]. Dr Webster, the surgeon, wrote the narrative of the voyage of the *Chanticleer*.

Thus was discovery in the direction of the Antarctic regions, on the South American meridians, slowly prosecuted, and the South Shetland Islands were an important step in advance. But they are north of the Antarctic Circle, and thus do not strictly speaking come within the range of this book, belonging rather to the geography of South America.

The first Antarctic voyage after the return of Bellingshausen penetrated much further to the south, under a very able leader. James Weddell was born in London (or Ostend?) August 24th, 1787, and his father, who was a working upholsterer, died soon after James was born. The boy was bound apprentice in a Newcastle collier, and afterwards made several voyages in a West Indiaman until 1808, when having got into trouble owing to a disagreement with his captain, which resulted in his knocking the latter down, he was sent on board H.M.S. *Rainbow*. Here he was rated a midshipman. He read much, carefully studied navigation, and in 1810 was appointed Master of the *Firefly*, and later of the *Thalia*. In 1812 he was appointed to the brig *Avon* under Commander George (afterwards Sir George) Sartorius. After 1814 he was for three years on half pay. Sir George Sartorius spoke of Weddell as one of the most efficient and trustworthy officers he had met with in the course of his professional life.

In 1822 Mr Strachan of Leith engaged Captain Weddell to conduct a sealing adventure in the Antarctic seas in the brig *Jane* of Leith, 160 tons, with a crew of 22 officers and men. The cutter *Beaufoy* of London, 65 tons, 13 officers and men, was to be her consort, commanded by Matthew Brisbane.

Sailing from the Downs on the 17th September, 1822, Weddell proceeded direct for the Antarctic ice, and on January 12th, 1823, he was in sight of the east end of the South Orkneys. He landed there on the 15th and secured 116 sea leopard skins. Still sailing south, Weddell found himself on the 7th February among many icebergs, one of them two miles long and 250 feet high. He crossed the Antarctic Circle, and on the 14th, in Long. 68° 28′ W., there were 66 icebergs in sight. The current was flowing N. 58° E., 27 miles in four days. But on February 16th, in 70° 26′ S. the sea was smooth and the bergs had nearly disappeared. In 72° 33′ S. there was not a particle of ice to be seen. Weddell's furthest south was attained on the 20th February 1823, in 74° 15′ S. and 34° 16′ W. There were three icebergs in sight, many whales, and innumerable birds, and it was very clear weather. The sea received the name of "King George IV his Sea." In returning, Weddell met with less ice in 65° S. in the end of February than he did in the end of January. On the 12th March he sighted South Georgia (54° 2′) and anchored in Adventure Bay.

It should be remembered that Weddell was only incidentally a discoverer, and that his business was sealing. His age was 35 when he reached his furthest south. He continued to command merchant vessels, and in May, 1831, in the *Eliza*, he gave assistance to Biscoe in Tasmania. He died unmarried on September 9th, 1834, in Norfolk Street, Strand, in very straitened circumstances. In 1839 Weddell's portrait was presented to the Royal Geographical Society by Mr John Brown, the author of a work on the search for Sir John Franklin. Captain Weddell was a fine specimen of a courageous and thoroughly efficient British seaman.

CHAPTER XLVIII

ENDERBY AND HIS CAPTAINS: BISCOE—KEMPE—BALLENY

Charles Enderby is a name which should ever receive honour from geographers. Though engaged in the Antarctic sealing trade, his captains always had orders to pay as close attention to geographical research and discovery as their work permitted them, and he was well served in this respect by the able navigators in his employment. Mr Enderby was for ten years on the Council of the Royal Geographical Society, and was an old and respected friend of the present writer.

The most important Enderby voyages of discovery were under the command of Captain John Biscoe, who, like Weddell, was a naval officer. He left the Falkland Islands in 1830 in a brig named the *Tula*, with the cutter *Lively*, Captain Avery, in company, steering south, and before the end of December he was amongst pack ice and bergs. On December 29th he was off the Sandwich Land of Cook, which he was instructed to visit; but no vestige of seal or sea elephant could be found. Biscoe, therefore, continued his voyage. On the 21st of January, 1831, he crossed the Antarctic Circle. By the 25th February the *Tula* was in 66° 8′ S. and 43° 54′ W. In the morning there was appearance of land, in the intervals of snow squalls, with many bergs and ice fields round the ship. The icebergs became innumerable, and there was a strong N.E. swell. Captain Biscoe considered that he could proceed no further with safety. The land appeared to be like the North Foreland, the cliffs being about the same height, probably ice cliffs resting on land. From the fore top Captain Biscoe, with a good glass, could trace the coast for 30 or 40 miles. He made an effort to reach the land in a boat, but the ice was too closely packed. On February 28th, the latitude being 66° 7′ S., longitude 49° 6′ E., high land was again sighted, with black peaks rising above the snow. For two days an attempt was made to reach it. Biscoe named a clearly seen point Cape Ann, in 65° 25′ S. and 49° 18′ E. Next day a furious gale was encountered, lasting without intermission until the 8th of March. These gales were frequent, and scurvy broke out among the crew. In April only one man, one boy, the two mates, and Biscoe himself were able to stand, so it was thought advisable to shape a course for New Zealand. The newly discovered land received the name of Enderby Land.

The *Tula* reached the Derwent river in Tasmania, and luckily found the *Eliza*, Captain Weddell, at anchor. The veteran Antarctic navigator at once sent a boat's crew to moor the *Tula* and the sufferers from scurvy were all sent to the hospital.

On October 10th, 1831, the *Tula* and her consort sailed from Tasmania, and continued their voyage of discovery. Biscoe's plan, in crossing the South Pacific, was to pass over Captain Cook's track, and seek for land W.S.W. of the South Shetlands. On the 15th February, 1832, in Lat. 67° 15′ S., Long. 69° 29′ W., land was sighted at a distance of about three miles. Biscoe named the island after Queen Adelaide. He wrote:—

> It has a most imposing and beautiful appearance, having one very high peak running up into the clouds., occasionally appearing both above and below them. One third of the mountains, which are about 4 miles in extent from north to south, have only a thin scattering of snow over their summits. Towards the base the other two thirds are buried in a field of snow and ice of the most dazzling whiteness. This bed of snow and ice is about four miles in

extent, and slopes gradually down to cliffs 10 or 12 feet high; it is split in every direction, for at least 2 or 300 yards from its edge inwards, and appears to form icebergs, only waiting for some severe gales or other cause to break them adrift and put them in motion.

During the following days distant high mountains were in sight, and the *Tula* passed several islands. On the 19th February a small island in 65° 20′ S. and 66° 38′ W. was more closely examined, and named Pitt Island. On the 21st Biscoe went away in a boat, and explored a deep inlet of the mainland. He named the highest mountain after the king, Mount William, in 64° 45′ S., and the second highest Mount Moberly, after one of his old captains. On the 3rd March the *Tula* and her cutter were safely anchored in New Plymouth, South Shetland.

The new discovery received the name of Graham Land after the First Lord of the Admiralty. It was an island or long promontory with a lofty mountain range occupying its interior, extending from an unknown distance in the Antarctic regions across the circle, and far into the south temperate zone.

Very severe weather was encountered at the South Shetlands, and the *Tula* was in great danger, but she arrived safely at Berkeley Sound in the Falkland Islands on April 29th, 1832, with a cargo of sea-elephant skins.

Another of Enderby's captains named Kempe, on board the *Magpie* in 1832, sighted land to the eastward of Enderby Land, which has been named Kempe Land, but no journal or report has been preserved.

Enderby was not discouraged by some losses, and in 1838 he determined, in conjunction with some other merchants, to send another expedition to the south. The captain had special instructions to push as far south as possible in hopes of discovering land in a high southern latitude. There were two vessels, the schooner *Eliza Scott* of 154 tons, commanded by John Balleny, and the cutter *Sabrina*, H. Freeman, Master. We have the narratives of Captain Balleny, and of John McNab, second mate of the *Eliza Scott*. On the 3rd December the two little vessels anchored in Chalky Bay, at the S.W. extremity of the middle island of New Zealand; and on the 7th January, 1839, they proceeded on their Antarctic voyage. Running southwards through pack ice and amongst bergs, they had reached 68° S. by the 2nd February. On the 9th land was sighted in 66° 37′ S. and the captain soon made out three islands. Next day Balleny stood towards the land, and made out high perpendicular cliffs, but was prevented from a nearer approach by the ice. The observed latitude was 66° 22′ S. In the evening of the 12th Captains Balleny and Freeman approached the shore in the cutter's boat. The cliffs were perpendicular, the gullies filled with ice, and smoke was seen to be rising from the mountain peaks. Freeman jumped out and picked up a few stones, but there was no beach and he was up to his waist in water. The group consisted of five islands, three large and two small, the highest, called Young Island, rising to a peak to which the name of Freeman was given, this being the island on which he landed. The five islands were given the names of the five merchants who co-operated with Enderby in the venture—Young, Borradaile, Buckle, Sturge, and Row. The whole group was named the Balleny Islands.

Captain Balleny then steered westward near the Antarctic Circle, encountering severe weather and much ice. In the night of March 4th the two little vessels were in a hazardous position, surrounded by icebergs in thick weather, with severe snow squalls which compelled them to heave to. On March 2nd in 64° 58′ S. and 121° 8′ E. they sighted land to the southward, the vessels being surrounded by drift ice. The land was seen both by Balleny and by McNab the second mate, who thought it was not more than one mile to windward. It received the name of Sabrina Land. The

appearance of land was again seen on March 3rd. The fixed character of the ice to the south showed the proximity of land of considerable extent.

This voyage of the *Eliza Scott* and *Sabrina* is very remarkable. That such tiny little vessels should have passed along that dangerous coast, amidst fogs and snow squalls, in imminent danger of collision with bergs and heavy drift ice on all sides, speaks volumes for the seamanlike skill, watchfulness, and nerve of the navigators. They must be credited with the discovery of a third part of the coast of the southern continent.

Great credit is also due to Mr Enderby, the patriotic promoter of the expeditions which carried out this hazardous work. The discovery of Graham Land, of three points of the north coast of the Antarctic continent—Enderby Land, Kempe Land, and Sabrina Land, and of the Balleny Islands, is due to the enterprise and perseverance of one who may justly take rank with the merchant adventurers of the days of the great Queen.

CHAPTER XLIX

DUMONT D'URVILLE AND WILKES

In the year 1840 there were two exploring expeditions in the Pacific, a French and an American, and the commissions of both were drawing to a close. Both, however, intended to make runs towards the Antarctic Circle before returning home. Captain Dumont D'Urville had two ships, the *Astrolabe* and the *Zélée*, Com. Jacquinot, under his command. When he sailed southward from Hobart Town on January 1st, 1840, his intention was only to make a new exploration along the edge of the pack ice. Icebergs were first encountered on the 16th January, and on the 19th as many as 59 were counted round the ships. Their perpendicular walls towered over the masts, and the spectacle was at once grand and terrifying. D'Urville imagined himself in the narrow streets of a city of giants. Having threaded his way among the icebergs, he found the newly-discovered land only a few miles distant, covered with snow, and rising to a height of 6000 feet. D'Urville sailed along the coast to the westward, noticing some projecting headlands and shallow bays, but always faced by an ice wall which rendered all landing impossible. Some bare islets were seen, and each ship sent a boat towards them with two officers, MM. Duroch and Dubourget. After two hours' hard pulling the boats reached one of the islets and the observers landed, collected rock specimens, and hoisted the French flag. The islet was one of a group of eight or ten, separated from the nearest coast by rather less than a mile.

Dumont D'Urville gave the name of Adélie to the newly-discovered land, and Cape Découverte to a promontory sighted in the morning.

For some days the French corvettes encountered a furious gale while surrounded by icebergs, and were in considerable danger, but the wind moderated and on January 30th they came in sight of an ice cliff, varying in height from 100 to 150 feet, and forming a long line westwards. D'Urville gave it the name of the Côte Clarie.

The French expedition bade a final farewell to the polar regions on February 1st, 1840, and returned to Hobart Town. Important discoveries had been made, officers and men all vieing with each other in zeal and loyalty. It was a well conducted and successful voyage.

Dumont D'Urville had also previously surveyed part of the South Shetlands in 1838. He passed Clarence and Elephant Islands and, sailing down Bransfield Strait, discovered the north end of Graham Land without knowing it, which he named after Louis Philippe. An island to the east was named after the Prince de Joinville. He also saw a channel with the coast of Graham Land on one side, and Trinity with other islands on the other. To this he gave the name Orleans Channel.

* * * * *

The American expedition was commanded by Captain Wilkes, its object being chiefly to explore the Pacific, in a voyage of circumnavigation. Captain Wilkes concluded it with a visit to the edge of the ice south of Australia, following in the wake of Captain Balleny and also of Captain Dumont D'Urville.

The American squadron consisted of the *Vincennes*, Captain Wilkes, the *Porpoise*, *Peacock*, and *Flying Fish* tender. The tender parted company in 48° S. and went back. The *Peacock* also returned owing to severe injuries received from the ice. The *Vincennes* and *Porpoise* continued the voyage and on the 16th January they were at the edge of the ice, nearly on the Antarctic Circle and in 154° 30′ E.

Here land was reported by the *Porpoise* “mountains seen”; “two peaks distinctly seen, very clear, few clouds.” Wilkes saw some land himself, and called it Ringgold’s Knoll. Land was also visible from the *Vincennes*, “every appearance of land, believed to be such by all on board.” All this was nevertheless a mistake, due to the deceptive appearance of ice and clouds.

In 1850 Captain Tapsell, in a sealer called the *Brisk*, sighted the Balleny Islands and then sailed west to Long. 143° E., finding no land. It is now known that the coast trends S.E. from Adélie Land, and could not possibly have been sighted from Wilkes’s position. Wilkes reported having sighted land or appearance of land 3000 feet high several times, seen over the fast ice, and he was within a few miles of a coast beyond Sabrina Land, which he called Knox Land. He then stood to the north and reported land ahead trending north in 64°, which he called Termination Land, but we now know that this does not exist.

Captain Wilkes’s theory has been proved to be quite correct—that there is a continuous land forming a coast-line of 2000 miles and more, and he certainly made out the distant land on several occasions, as Balleny and Dumont D’Urville had done before him, but his subsequent controversies are to be deplored.

CHAPTER L

FIRST ANTARCTIC VOYAGE OF SIR JAMES ROSS

THE great Antarctic expedition commanded by Sir James Ross had magnetic research and not geography for its immediate object. It originated with Colonel Sabine, who read a paper on terrestrial magnetism at the meeting of the British Association at Newcastle in August, 1838, which led to a deputation being nominated to approach the Government. The deficiency in our knowledge of terrestrial magnetism in the southern hemisphere, it was considered, should be supplied by observations of magnetic direction and intensity in high southern latitudes between the meridians of New Holland[191] and Cape Horn, and Her Majesty's Government was urged to appoint a naval expedition expressly directed to that object.

Lord Melbourne acceded to the request, and Sir James Ross received his commission to command the expedition on the 8th April, 1839. The *Erebus*, a bomb vessel of 370 tons, strongly built and with a capacious hold, was selected for Sir James Ross, and the *Terror*, of 340 tons, a similar vessel which had been thoroughly repaired after her disastrous voyage with Sir George Back, was chosen for Ross's second in command, Commander Crozier. The complement of each ship amounted to 64 persons.

The officers were not only thoroughly efficient; there were among them men who were distinguished in their profession and whose record is worthy of remembrance. Sir James Ross was by far the most experienced Arctic officer then living. He had passed through no less than nine Arctic winters and seventeen navigable seasons, was the most eminent magnetic observer next to Sabine, an admirable collector, and an unequalled navigator. Crozier was his old friend and messmate in the Arctic regions, and was also a practised magnetic observer.

The first Lieutenants were worthy to serve under such men. Lieutenant Bird of the *Erebus*, son of the Rev. Godfrey Bird, Rector of Little Witham, was a distinguished Arctic officer, highly thought of by Parry as well as by Ross. Knowing his work thoroughly he was steady, reliable, and calm in moments of danger. As a midshipman he had seen service at the blockade of Brest and the battle of Algiers. Archibald M'Murdo of the *Terror*, grandson of Major M'Murdo, the friend of the poet Burns, was an officer of more than ordinary ability, whose brother Sir Herbert was equally distinguished as a soldier, and as the right hand of Sir Charles Napier in Sind. Archibald served in the *Blonde* with Sir Edmund Lyons in the operations against the Turks in the Morea, and later in the *Alligator* under Captain Lambert in the East Indies and New Zealand. He was promoted in 1836 for his intrepidity and skill in recovering a crew of wrecked whalers from the clutches of the Maoris. He served in the disastrous voyage of the *Terror* with Sir George Back, who had a very high opinion of his capacity, and he was first Lieutenant of that ship until ill health obliged him to return home. He afterwards commanded the *Contest* on the coast of Africa, became a Rear-Admiral, and died in December, 1875.

Of the other Lieutenants John Sibbald was a steady, capable officer, and Wood a good surveyor. Phillips of the *Terror*, a very active enthusiastic officer, was a good seaman, and a man of ability and sound sense. He afterwards showed those qualities in the Arctic regions under Sir John Ross, when I knew him well.

Of the Mates, Oakley was a good observer and a useful young officer, and Alexander Smith was well known to Sir James Ross, having served under him in Davis Strait, on board the *Cove*. Moore was a young officer endowed with no ordinary ability, energy, and tact. He commanded the *Pagoda* afterwards, when she was sent south to complete some of Ross's magnetic work. In command of the *Plover* he made a boat voyage to Cape Barrow; he became a Rear Admiral, Fellow of the Royal Society, and Governor of the Falkland Islands 1855–62. He died in 1870.

Dr McCormick and Dr Robertson undertook the geology and zoology. McCormick, enthusiastic, energetic, and tireless, had been Assistant-Surgeon in the *Hecla* with Sir Edward Parry. Afterwards he commanded a boat to examine the western side of Wellington Channel in 1852 during the Franklin search. In his old age Dr McCormick published an interesting narrative of his three polar voyages, and was quite indefatigable in helping and advising us when we were fitting out for the search expedition in 1850. Dr Robertson of the *Terror* was equally hard working, but not so excitable and sensitive. He was afterwards Surgeon of the *Enterprise* with Sir James Ross in the first Franklin search expedition.

Of the Assistant-Surgeons, Sir Joseph Hooker, though then a very young man, was already a skilled botanist. He was a most valuable member of the expedition, and his future eminence had some of its roots within the Antarctic circle. His colleague Dr Lyall of the *Terror*, a zealous botanist, was a scientific student of rare ability and had a distinguished career. He was afterwards naturalist of the *Acheron*, New Zealand surveying ship from 1847 to 1852, then surgeon of the *Pembroke* during the Russian war, and afterwards of the *Plumper*, surveying ship in the North Pacific. He was surgeon of the *Assistance* in the Arctic expedition of 1852–54, and made a valuable collection of plants in Wellington Channel. Dr Lyall, after a very useful career, died as a Deputy Inspector, on the 25th February, 1895.

Mr Tucker, Master of the *Erebus*, was a very capable and efficient officer, afterwards Staff Commander and a useful member of the Thames Conservancy Board. Mr Cotter was Master of the *Terror*. Henry Yule, the second Master of the *Erebus*, was a good surveyor and continued his service in that capacity on the Home Survey. John Davis, second Master of the *Terror*, was an officer of much ability, a good surveyor, and an excellent artist. He had previously served under Captain FitzRoy on board the *Beagle* in Magellan's Strait. He executed the charts and drawings for Sir James Ross, for which he received the special thanks of the Hydrographer. Afterwards he was employed as a surveyor in the *Fox* with Sir Allen Young in 1862, and Naval Assistant to the Hydrographer from 1863 to 1876. His most interesting letter to his sister in 1843 was printed in 1891. Retired as Staff Captain in 1876, he was the author, jointly with his son, of the Azimuth Tables. Captain Davis died on the 30th January, 1877.

Mr Hallett, Purser of the *Erebus*, had previously been with Sir James Ross in the *Cove* in 1836. He afterwards served on the coast of Africa, where he died. George Moubray, the clerk in charge of the *Terror*, was thought so highly of that he received the very responsible appointment of Naval Agent and Storekeeper at Constantinople during the Crimean war, and was afterwards Storekeeper at Malta for some time, retiring as a Paymaster-in-Chief with the Greenwich pension. The gunner of the *Erebus* must not be left out, as he was a very exceptional character and had very wide Arctic experience. Thomas Abernethy, born at Peterhead in 1802, was an experienced seaman when he joined the *Fury* in Parry's third Arctic expedition in 1824, and was very active and useful in all the work at Fury Beach. He was with Parry again in 1827, and second mate of the *Victory* with the Rosses during the Boothian expedition 1829–33. When the boatswain of the *Erebus* fell overboard in a heavy sea on the voyage out and was drowned, Abernethy and Oakley commanded the two boats that were lowered for his rescue. Oakley's boat was struck by a sea which knocked four of the

crew out of her. Abernethy, whose boat was again alongside ready to be hoisted up, immediately pushed off and succeeded in saving the crew of Oakley's boat from their perilous position. Abernethy was a splendid seaman. He served again with Sir James Ross in the *Enterprise*, and finally with old Sir John Ross in the *Felix*. He died at Peterhead on April 13th, 1860[192].

With this exceptionally distinguished staff and two well-equipped and strongly built ships, Sir James Ross sailed from the Thames on his great enterprise on the 30th September, 1839. After visiting and exploring Kerguelen Island, the expedition arrived at Tasmania on August 16th, 1840. Sir John Franklin was then Governor, and gave every assistance in his power. The chief thing was the erection of an observatory for synchronous observations. Sir John selected the site and, with convict labour, the building, with its pillars carried down to the bed rock, was erected in nine days. Sir John named it Rossbank. Lieutenant Kay, R.N., was placed in charge, with two Mates named Dayman and Scott as assistants. Kay, who was a Fellow of the Royal Society, had served in the *Chanticleer* with Captain Foster, and in the *Rainbow* with Sir John Franklin. The magnetic observations of the expedition were under the immediate superintendence of Commander Crozier, and were continued uninterruptedly every hour throughout the day and night[193].

Sir James Ross heard of the voyages of Dumont D'Urville and Wilkes, and received advice from the latter about the best places he had seen for entering the ice. But Sir James had no intention of shaping a course in their direction. Captain Balleny had been much further south than either of them, having attained a latitude of 69° S., finding an open sea. Sir James, therefore, resolved to proceed on Balleny's meridian, about 170° E.

On November 13th, 1840, the expedition sailed, Sir John Franklin remaining on board the *Erebus* until she reached the mouth of the Derwent, when he returned in his tender. Sir James Ross touched at Auckland Island and Campbell Island, and on January 1st the Antarctic Circle was crossed, and the warm clothing supplied by the Admiralty was served out. Passing a great many icebergs with a strong breeze from the N.W., the main pack was reached on the 5th, and Sir James resolved to put the bows of the two old sailing ships straight on to it and force his way through. The pack is always closest and most difficult to penetrate at the edge, and more open inside. After about an hour's hard bumping, and receiving several heavy blows, the outer edge was forced, and the inside ice was found to be much lighter and more scattered than it appeared to be when viewed from a distance. During the following days the ships were bored through the pack, steering south for the supposed position of the magnetic pole.

They had been six days in the pack when, on January 10th, in the middle watch, Lieutenant Wood reported that land was distinctly visible right ahead. It rose in lofty peaks, but was still very distant. They were in 71° 15′ S. Next day they were fairly close to the land, the northern point of which was named Cape Adare. Soundings were obtained in 160 fathoms. The mountains, crowned with snowy peaks, attained a height of from 7000 to 10,000 ft. They were named the Admiralty Range, and the peaks were called after the then Lords of the Admiralty. The principal peak, nearly 10,000 feet high, was, however, named after Sir Edward Sabine, who was with Ross in two Arctic voyages.

Here the variation was 44° and the dip 86°, which according to Sir James Ross's calculation placed the magnetic pole in 76° S. and 1450 26′ E., or about 500 miles inland[194].

With some difficulty Ross, Crozier, and several officers landed on a small island near the coast, covered with penguins, in 71° 56′ S. and 171° 7′ E., giving it the name of Possession Island. In very bad and stormy weather a further range of lofty mountains came in sight whose peaks were named

after friends of the Royal Society and the British Association, while an island received the name of Coulman, and its northern point Cape Anne, the name of Sir James's *fiancée*.

On the 27th January the ships were in sight of another island which was named after Sir John Franklin. The two captains with several officers went on shore in two boats. There was a heavy surf beating on the rocks but Ross and a few others effected a landing. Hooker, however, fell into the sea, and was nearly drowned before he could be hauled into the boat, more dead than alive from the intense cold. His condition made it necessary to return to the ship as soon as possible, Ross having collected several specimens of rock. The island is in 76° 8′ S., and is 12 miles long by 6 broad.

On the same day the ships sighted a mountain 12,400 ft. high, emitting flame and smoke in great profusion. Sir James Ross named it Mount Erebus, and an extinct volcano to the eastward 10,900 ft. high, Mount Terror. A small round island, which had been in sight all the morning, was called Beaufort Island.

Ross and his officers were astonished at the sight of a mighty ice cliff 100 feet high, with a uniform level summit, stretching away to the eastward from the peninsula or island of the volcanoes. It was a bitter disappointment, as they hoped to have gone much further south. As the ships approached the volcanoes two capes were recognised and named after Crozier and Bird, Sir James Ross taking the opportunity of expressing his affectionate regard for his two old Arctic messmates, who were giving him such invaluable help. The bay formed by the island of volcanoes was called after M'Murdo, the first Lieutenant of the *Terror*, "a compliment that his zeal and skill well merited." The ice cliffs were higher than the masthead, so that little could be seen, but some peaks were made out, rising above the line of cliffs, and looking more distant than they really were owing to the haze. These Ross named the Parry mountains, after his revered old commander with whom he had served in all but one of his Arctic voyages. The peaks were really the tops of islands at the back of the volcanoes, but the mistake was natural, indeed inevitable under the circumstances.

When within three or four miles of the great ice barrier, Sir James Ross altered course to the eastward to ascertain its extent. Mount Erebus was then emitting smoke and flames in great volume, affording a grand spectacle. Good progress was made in sailing along the ice barrier but no rent or fissure could be seen throughout its whole extent. On the 29th, after sailing along the barrier for a hundred miles, the ships being in 77° 47′ S., it was still seen stretching away to the east. The soundings showed that the outer edge of the ice was not resting on the ground. Bad weather came on with much snow, and the barrier was only seen at intervals as they continued their course to the east. Ross wrote of the barrier as a "mighty and wonderful object, far beyond anything we could have thought of or conceived." The furthest south of the two ships was in 78° 5′ S.



Mt Erebus from the South

On the 13th February Ross gave up any attempt to go further along the barrier and resolved to steer for the magnetic pole and seek for a harbour in which to winter. The course was set for Franklin Island. On the 16th Mount Erebus was again sighted, and there was a splendid view of the whole line of coast. A great number of whales of two kinds were visible. Upon the cape ahead of the ships was conferred the name of Professor Gauss of Göttingen "who has done more than any other philosopher of the present day to advance the science of terrestrial magnetism." The range of mountains which Ross considered to be the seat of the magnetic pole was called after Prince Albert.

The course was now northward along the coast. Two capes named after Captain Washington, the Secretary of the Royal Geographical Society, and Captain Johnson, R.N., were seen to enclose a bay which was called after Lieutenant Wood of the *Erebus*[195]. On February 20th the breeze freshened to a gale and next day they were off Cape Adare. Rounding this, the northern coast was reached, the furthest point seen being Cape North. The line of coast presented perpendicular ice cliffs, and no landing was possible. The course was therefore set to the N.W., and on the 2nd March land was seen ahead appearing like two islands, but really peaks of one of the Balleny Islands. On the 6th April, 1841, the *Erebus* and *Terror* arrived in the Derwent river, Tasmania.

CHAPTER LI

SECOND ANTARCTIC VOYAGE OF SIR JAMES ROSS

The *Erebus* and *Terror* were refitting at Hobart Town from April to July, 1841, when they proceeded to Port Jackson. The chief object of Captain Ross was to obtain a series of magnetic observations for comparison with those made at Hobart Town. From Port Jackson the expedition went to the Bay of Islands in New Zealand. During these visits Dr Hooker had opportunities of making collections and observations which are embodied in his great work, the *Flora Antarctica*.

On November 23rd, 1841, the expedition sailed from New Zealand, and Sir James Ross shaped a course for Chatham Island, chiefly for magnetic purposes. After a short visit he steered south for the main pack and pushed boldly into the ice on the 18th December. Christmas Day was passed closely beset in the pack, near a chain of eleven icebergs, and in a thick fog.

On New Year's eve they were in the same place. This would be called an impenetrable pack. But there is no such thing as an impenetrable pack for men like Sir James Ross, and he had resolved to force the ships through it. On the 9th January they were still at the same place as on Christmas Day, with no apparent prospect of moving. But Sir James still persevered. On the 20th it blew a gale of wind, and they were in the midst of large masses of ice with a very heavy swell. No ordinary ship would have stood the hammering from the masses of ice for half-an-hour. The rudder of the *Terror* was broken and rendered useless. When the weather moderated it took a whole day to ship the spare rudder owing to the gudgeons being bent. Both ships had been in imminent danger, and for the first time Sir James Ross looked anxious and careworn. They had been 40 days going a hundred miles. On the 20th February they encountered a frightful gale, the spray dashing over the ships and becoming ice as it touched the deck. Sir James would not turn back, and on the 28th they reached a latitude of 78° 10′ S. The great ice barrier was in sight; not so high as the part they had seen the previous year, but more irregular.

The season was advanced and it became necessary to give up further exploration and turn the ships' heads in a northerly direction. On the 1st March a magnificent range of icebergs was in sight, extending in an unbroken chain as far as the eye could discern from the masthead. On the 4th a furious gale was encountered and on the 12th several bergs were again seen during thick weather. There were constant squalls of snow concealing the bergs from view. Suddenly a large berg was seen ahead, and quite close. The *Erebus* was hauled to the wind on the port tack with the expectation of being able to weather it. At that moment the *Terror* came in sight running down upon her consort. It was impossible for her to clear both the berg and the *Erebus*, so that collision was inevitable. The *Erebus* hove all aback to diminish the violence of the shock, but the concussion was terrific nevertheless. Bowsprit and fore-topmast were carried away and the ships, hanging together, dashed against each other with fearful violence. The *Terror's* anchor and cat-head were carried away, the yard-arms came in contact at every roll, smashing the booms and boom irons. All this time there was a heavy sea, and both ships were drifting on the berg. The men behaved splendidly when ordered up to loose the main topsail. Sir James resolved to brace the yards bye, and haul the main tack on board, sharp aback, an expedient that had never before been resorted to in such weather. It was three quarters of an hour before this could be done. The ship gathered stern way, plunging her stern into the sea and washing away the gig and quarter boats, while her lower yard arms actually scraped the rugged face of the berg. In a few minutes the ship reached the iceberg's

western end, the under-tow alone preventing her from being dashed to pieces against it. No sooner had the ship cleared it than another iceberg was seen astern, against which the ship was running. The space between the bergs did not exceed three times the breadth of the ship. The only chance was to pass between the bergs. This was happily accomplished. She dashed through the narrow channel between two perpendicular walls of ice, and the next moment she was safe in smooth water under their lee. As Sir James said, "the necessity of constant and energetic action to meet the momentarily varying circumstances of our situation left us no time to reflect on our imminent danger."

Sir James Ross then shaped a direct course round Cape Horn to the Falkland Islands before strong westerly gales, and on April 6th the two ships sailed up Berkeley Sound and anchored in Port Louis. Commander Crozier and Lieutenant Bird had been promoted, and Smith the Mate had also received his Lieutenancy. Lieutenant M'Murdo was invalided, and Lieutenant Sibbald took his place on board the *Terror*. On the 22nd June the *Carysfort*, Captain Lord George Paulet, arrived, with a large supply of provisions sent by Commodore Purvis, as well as a new bowsprit.

The refitting of the *Erebus* and *Terror* proceeded steadily, and by the end of July both ships were in good order and ready for sea. During the stay of the Antarctic Expedition at the Falkland Islands the Governor, Captain Moody, supported by the opinion of Sir James Ross, removed the settlement from Port Louis to Port William, Lieutenant Sibbald was left at Port William to carry on a system of magnetic observations upon such a plan as to secure a satisfactory record, while the ships proceeded to Cape Horn for synchronous observations.

On the 8th September, 1842, the *Erebus* and *Terror* sailed from Port William, and encountered very severe weather during their voyage towards Cape Horn. But the day was fine when they sighted the famous promontory on the 18th, passing it at a distance of a mile and a half and anchoring off St Martin's Cove in 55° 51′ 20″ S., 67° 32′ 10″ W. An observatory was set up on Hermit Island. While the magnetic work was proceeding, Dr Hooker made a specially interesting botanical collection. On November 13th the expedition returned to the Falkland Islands, meeting the *Philomel*, Captain Sulivan, who was engaged in surveying the group. The Falkland Islands were left again on the 17th December for a third visit to the Antarctic. All hands on board had been diligently at work; careful magnetic, meteorological, and tidal observations being taken wherever they were.

The first iceberg was met with on December 24th in 61° S., soon afterwards the main pack came into view, and on the 28th land was sighted which appeared to be the northern cape of Dumont d'Urville's Joinville Island. An examination of part of the South Shetland Islands was then begun.

CHAPTER LII

THIRD ANTARCTIC VOYAGE OF SIR JAMES ROSS

Sir James Ross began his survey of part of the South Shetland Islands when he reached the north-west coast of Joinville Island of Dumont d'Urville. On December 28th, 1842, he sighted the conical islet to which he gave the name of Etna, then passed an enormous glacier descending from an elevation of 1200 feet into the ocean, where it presented a vertical cliff 100 feet high. Near it, and evidently broken away from its face, was the greatest aggregation of icebergs that Sir James ever remembered to have seen collected together. Shaping a southerly course, numerous rocky islets appeared amongst heavy fragments of ice which completely concealed them until the ships were quite close. They were named Danger Isles, and the southernmost islet received the name of Charles Darwin. A great number of the largest sized black whales were seen here, and Sir James thought that a valuable whale fishery might be established in these localities.

A point of land supposed to be the southern point of Joinville Island, but since found to be on a separate island, was given the name of Commodore Purvis, commanding the *Alfred* on the Brazilian station; a remarkable peak was called Mount Percy after the Admiral at the Cape, and an island off Cape Purvis after Lord George Paulet. There appeared to be a passage between Joinville Island and Louis Philippe Land (the northern end of Graham Land) into Bransfield Strait. The most striking feature in these discoveries was considered to be Mount Haddington (7050 ft.), named after the First Lord of the Admiralty. It is on the large island to the south, since known as James Ross Island. The great gulf between Graham Land and Joinville Island was called Erebus and Terror Bay. A very small brown islet to the south, a quarter of a mile across, with a crater-like peak of 760 ft. was given the name of Admiral Sir George Cockburn. On January 6th, 1843, Captains Ross and Crozier landed on this volcanic islet, and Dr Hooker, who was with them, found that the flora consisted of nineteen species, all mosses, lichens, and algae. Two out of the five mosses were new. Cockburn Island is in 64° 12′ S. and 59° 49′ W. The inlet between James Ross Island and Seymour and Snow Hill Islands—afterwards found to be a channel—was named after the Admiralty; and what was thought to be a promontory and called after Admiral Sir George Seymour, has since been found to be an island (Seymour Island), rendered famous in after years for its yield of fossils.

From Seymour Island a course was shaped to the S.S.W. on January 7th, passing along Snow Hill Island. Upon the southern point of James Ross Island the name of Captain Foster of the *Chanticleer*, Ross's lamented old Arctic messmate, was conferred.

On the 8th there was a dense fog, and icebergs with much loose ice surrounded the ships, which were secured to the land ice until the 12th, when Sir James resolved to endeavour to trace this land ice to the S.E. But the ships were quite enclosed, and it was accordingly determined to force them through the pack, a long and arduous as well as a hazardous struggle, for they were sustaining severe pressure. On the 4th February however, in latitude 64° S., the vessels were clear of the ice with which they had been battling for nearly six weeks. The hope was that on reaching the meridian of 40°, where Weddell had penetrated so far to the southward, Ross and Crozier would also find the sea so clear as to admit of their reaching a high southern latitude.

On the 14th February Weddell's track was crossed in 65° 13′ S., but there was a dense pack. Dumont d'Urville found the same conditions and not so far south. In the following days there were

snow-falls, and a heavy sea, yet on March 1st the *Erebus* and *Terror* once more crossed the Circle and entered the Antarctic regions, accompanied by several whales, a sooty albatross, blue and white petrels, and Cape pigeons. On the 4th they passed the highest latitude attained by Bellingshausen and crossed the 70th parallel. Next day they were in 71° 10′ S. and ran into the pack for thirty miles, but the young ice was so strong and the season so late that it became necessary to work out again, after reaching 71° 30′ S. A gale sprang up with a heavy snow-fall, the sea was running very high, and the thick weather caused continual apprehension of collision with one of the numerous bergs. It was a fearful night, and next day there was not the least mitigation of the force of the gale. Sir James expressed his admiration at the seamanlike manner in which Captain Crozier and the officers of the *Terror* kept their station in the face of such difficulties, and at the vigilance, activity, and cool courage of Commander Bird.

The third Antarctic voyage of Sir James Ross was now drawing to a close, and he resolved to shape his course for the Cape of Good Hope. On the 4th April, 1843, the two ships anchored in Simon's Bay, close to the *Winchester*, flag-ship of Admiral Percy. There was not a single individual in either ship on the sick list. Refitting, refreshing the crew, and comparing instruments occupied the time until the end of the month, and on April 30th the voyage home was commenced. The ships arrived at Woolwich and were paid off in September, 1843.

In the conduct of these Antarctic voyages by Sir James Ross the first thing that strikes one is his extraordinary skill in ice navigation, his fearlessness and resolution. Very few captains would have persevered, in the face of such imminent dangers, in the long struggle with the pack for forty days; but Sir James was determined to examine the further end of the great ice barrier, and nothing could stop him. In the collision close to the icebergs, under circumstances of appalling danger, this great commander showed a seamanlike skill, a presence of mind, and a quickness of decision such as has never been surpassed. These rare gifts and his unfailing nerve saved the ship. His next great quality was his perseverance in conducting the magnetic observations, his unceasing care in taking every opportunity to secure advantageous positions for observing, and in obtaining accuracy. He took the same care as regards meteorological observations, deep sea soundings, and tidal observations[196]. He was most attentive in promoting the welfare and health of his officers and men, and in all his work he certainly was assisted by an exceptionally diligent and accomplished staff.

Referring to the uninterrupted observations that were taken during the course of the expedition he himself said "they will elucidate several points of importance and interest in science, while they present others for elucidation and afford a basis of comparison, should a sound mode of prosecuting inquiry be adopted."

Ross's geographical discoveries were of the utmost importance and interest. They threw a completely new light on the economy of the southern continent, and pointed the way to future discoveries in the far south[197].

At the request of Sir James Ross Admiral Percy, Commander in Chief on the Cape Station, chartered a merchant vessel called the *Pagoda* with the object of taking a series of magnetic observations in the direction of Enderby Land. The command was given to Mr Moore, who had served in the *Terror*. He was accompanied by Captain Henry Clerk of the Royal Artillery, a scientific officer, son of Sir George Clerk, Bart., M.P., of Penicuick, and by Dr Dickson, Assistant-Surgeon of the *Winchester*, flag-ship at the Cape. The duty was satisfactorily performed during 1844–45, and an account of the voyage was afterwards written by Dr Dickson in the *United Service Magazine* for June and July 1850.

CHAPTER LIII

ANTARCTIC OCEANOGRAPHY

AFTER the days of Sir James Ross various causes led to the development of what was almost a new science, that of Oceanography. It included not only measurement of depths, but also of the temperatures at different depths, the study of *plankton* or surface ocean life, and of life in the depths. I remember what a revolution it caused in one's ideas. When I went to sea we were taught that there was enormous pressure at great depths, sufficient to prevent the existence of life, for in descending the sea water got heavier and heavier under pressure. It was held that at 2000 fathoms a man would bear on his body a weight equal to 20 locomotive engines each with a goods train loaded with pig iron. The answer to this is that water is almost incompressible, so that the density of sea water at 2000 fathoms is scarcely appreciably increased. Facts send theories to the four winds.

Sir James Ross was himself much impressed with the importance of deep sea sounding with serial temperatures, and he was the first to adopt the method of sounding by time with weight and marked line, the principal conditions to ensure accuracy being rapidity of descent and regularity. The advance of the science depended on the invention of improved apparatus and instruments until they were brought to perfection.

The project of laying cables across the Atlantic gave the first impetus to these improvements. Brooke's[198] sounding-apparatus was on the principle of disengaging weights. In 1856 the American Captain Derryman took twenty-four deep sea soundings with Brooke's apparatus on a great circle from St John's to Valentia. In July, 1857, Lieutenant Dayman on board H.M.S. *Cyclops* was ordered to carry a line of soundings from Valentia to Trinity Bay, using an apparatus which was a modification of that invented by Brooke. Thirty-four soundings were taken. They were singularly uniform, 1700 to 2400 fathoms, and showed a light brown muddy sediment, and minute hard particles, animal organisms (*Foraminifera*) with skeletons composed of carbonate of lime. In the autumn of 1858 Lieutenant Dayman, in H.M.S. *Gorgon*, took another line of soundings from the S.E. angle of Newfoundland to Fayal, and from Fayal to the Channel. In the following year, in H.M.S. *Firebrand*, he took another series across the Bay of Biscay and along the coast of Portugal to Malta. Later, Captain Shortland, in H.M.S. *Hydra*, took deep sea soundings from Malta to Bombay.

Great energy continued to be shown, and in 1860 the *Bulldog* was commissioned by Sir Leopold M'Clintock, to take a line of soundings from the Faroes by Greenland to Labrador. The sounding machine was an adaptation of Ross's deep-sea clam with Brooke's principle of disengaging weights. The *Bulldog* brought up specimens from 600 to 2000 fathoms.

Hitherto oceanographic operations had been chiefly directed to the practical purpose of preparing for the laying of cables on the bed of the ocean, but the obtaining of specimens at great depths caused science to step in. Dr Carpenter and Dr Wyville Thomson were anxious to go into the whole question of the physical and biological conditions of the sea bottom, and in the autumn of 1868 the Admiralty lent the *Lightning* gunboat, in which the two savants worked for two stormy months between Scotland and the Faroes. They found that there was abundance of animal life at the bottom of the sea, and that the fauna was in many respects peculiar. The results were considered so interesting that the Admiralty placed the *Porcupine* gunboat at the disposal of Dr Carpenter, Dr

Wyville Thomson, and Mr Gwyn Jeffreys for two successive seasons. They then succeeded in dredging to a depth of 2435 fathoms and found that even at that depth the invertebrates were fairly represented. An invention to protect the thermometer bulbs from being irregularly compressed under great pressure made the deep sea temperature determinations fairly trustworthy. Dr Wyville Thomson found that "public interest was now fairly aroused in the new field of research."

A circumnavigating expedition was then suggested to traverse the great ocean basins, and prepare sections showing their physical and biological conditions. Mr Lowe, who was then Chancellor of the Exchequer, approved the plan, and the *Challenger*, a corvette of 2306 tons and 1234 h.-p., was selected for the service. All but two of her guns were taken out and she was fitted out entirely for deep sea sounding and dredging operations. The *Challenger* sailed in January, 1873, under the command of Captain Nares, with Dr Wyville Thomson as head of the scientific staff. There were four Lieutenants, Maclear, Aldrich, Bromley, and Bethell, and five scientific assistants to Dr Wyville Thomson, Buchanan (Physicist) Moseley, John Murray, Willemoes-Sühn, and Wild. The ship was fitted with all the latest inventions that twenty years of study and experience had produced.

After having thrown much light on the depths and the fauna of tropical oceans, the *Challenger* approached the Antarctic regions early in 1873. She met with dense fogs in 65° 42′ S. on February 19th, but Captain Nares continued a southward course and the vessel crossed the Antarctic Circle in 78° 22′ E. She then followed the edge of the pack for 150 miles eastward to within 15 miles of Wilkes's supposed Termination Land. The soundings gave depths of from 1250 to 1975 fathoms. Westward of 80° E. very few icebergs were met with, but eastward of 92° E. they were very numerous. It was thought that there was no land for a considerable distance between 70° and 80° E. The depths showed that the continental shelf had not been reached on those meridians. This particular region to the east of Kempe Land has not since been visited and it offers a very interesting, and possibly a successful route for future explorers.

The science of oceanography has progressed considerably since the days of the *Challenger*; great improvements have been made in the varied apparatus connected with it, and the work has become at once more easy and more accurate. Steam power is indispensable, rendering reliable deep sea soundings possible and ice navigation much easier.

Some years after the return of the *Challenger*, the Germans despatched the *Valdivia* on a deep sea sounding expedition. She left the Cape in November, 1898, and reached the drift ice in 56° 45′ S. Further progress was stopped in 64° 15′ S. and 54° 20′ E. A depth of 3000 fathoms was obtained, and specimens of gneiss, granite, and schist, as well as a mass of red sandstone, were brought up, probably dropped by icebergs. The ocean floor between Kerguelen Island and Enderby Land was strongly folded, a depth of 1300 fathoms alternating with great abysses of 2000 and 3000 fathoms. Many lines of soundings are still needed from the known areas near the southern extremities of America, Africa, Australia, and New Zealand to the southern continental shelves, as well as along the edges of the shelves themselves. Great progress, however, has been made in this respect within the last fifteen years, large collections have been obtained, and the Antarctic ocean depths have been sounded in several directions with important physical and biological results.

CHAPTER LIV

REVIVAL OF ANTARCTIC EXPLORATION

AFTER the return of Sir James Ross a quarter of a century elapsed and the Antarctic regions remained neglected. While Sherard Osborn and I were working for the despatch of an Arctic expedition, we were equally resolved to use every effort for the revival of Antarctic research and to see Sir James Ross's splendid discoveries continued by a worthy successor. From 1872 Osborn was collecting data for an Antarctic expedition, but my accomplished and energetic old messmate died in 1875. Still I had others to help, Sir Vesey Hamilton, Sir Joseph Hooker, who was always encouraging, and above all Captain Davis, who served with distinction under Sir James Ross as surveyor and artist. On February 26th, 1869, Captain Davis read a paper on antarctic discovery, proposing Sabrina Land, discovered by Balleny, as a station for the transit of Venus. He also presented the Geographical Society with a large map of the Antarctic regions, showing the tracks of explorers. Then on March 19th, 1870, Sir Vesey Hamilton read a critical paper on a book purporting to be the voyages of an American, Captain Morrell, showing that the statements were impossible, and the whole story apocryphal and of no use to us for reference or in any other way. These papers aroused some interest, and in September, 1885, the British Association appointed an Antarctic Committee which in 1887 reported in favour of further exploration.

Sir Graham Berry, the representative of the Colony of Victoria in London, took a great interest in our efforts, and induced the colonial authorities to promise a vote of £5000 if Her Majesty's Government would give another £5000. I saw Sir Graham on November 30th, 1887, and arranged to have private representations made to the Ministers concerned. But on January 3rd, 1888, Her Majesty's Government refused to join the Colony of Victoria in granting £5000, enclosing a characteristic report from the Board of Trade to the effect that there were no trade returns from the Antarctic regions. Then Oscar Dickson, the munificent Swedish promoter of polar voyages, offered to give the £5000 to the Victoria Government which our Government had refused, but then the Colony drew back. During this time we were warmly supported by Baron Müller of the Botanical Gardens at Melbourne, by Captain Pascoe, R.N., and by other geographers in that colony. From Baron Müller especially I received most enthusiastic letters, Sir Erasmus Ommanney actively supported and raised the Antarctic question at the Berne Congress, while Captain Davis continued to work steadily in the good cause until his death.

In 1892 I heard from Captain David Gray that it was intended to send three Scotch whalers to the south, in consequence of the numbers of whales mentioned in the narrative of Sir James Ross. Accordingly the *Active*, *Balaena*, and *Diana* were despatched, but the result was disappointing. They never even crossed the Antarctic Circle. The *Active*, in South Shetland waters, found that what was supposed to be Joinville Island really consisted of two islands, one much larger than the other; the smaller one, which the *Active* sailed round, was named Dundee Island. That was all: the voyage was not pecuniarily successful and was not repeated.

The Norwegian, Captain Larsen of the *Jason*, was much more enterprising. He landed on Sir George Seymour's Island in 1892, and found several pieces of fossil wood and some fossil bivalves, a most important discovery. His voyage was considered so promising in Norway that in the following year he was sent again in the *Jason* with two other vessels in company, the *Hertha* and *Castor*. On the 18th November, 1893, Larsen again landed on Sir George Seymour's Island to make

collections, and then proceeded down the east coast of Graham Land, the best side for an advance south. In 65° 44′ S. he named a lofty peak Mount Jason. He observed several deep fjords, and the ice terraces resting on the slope of the mountains with their bases on the sea bottom. They are similar to the ice-foot up Smith Sound, but on a gigantic scale. On the 6th December Larsen had reached 68° 10′ S. and could have gone further, had he not remembered that his chief business was sealing. On the 9th December he discovered an island quite snow-covered, which he named Veiro. In 65° 20′ S. Robertson Island was discovered, and two other islands—one of them the cone of a volcano—were named Christensen (after the well-known builder at Sandefjord who fitted out the *Jason*) and Lindenberg Sukkertop. Captain Larsen went over the ice on ski to Christensen Island, and from it he saw five volcanic islets which were named Oceana, Castor, *Hertha*, Jason, and Larsen. Captain Eversen of the Hertha made his way to the west side of Graham Land and sighted Adelaide Island, in November, 1893. He went as far south as 69° 10′ S.

When Captain Larsen returned to Sandefjord he came to see me at Laurvik on July 23rd, 1894, and presented me with some of the fossil wood found on Sir George Seymour's Island. Sir Archibald Geikie, to whom I afterwards gave them, was inclined to think that it was drift-wood, because it showed perforations. Larsen's two voyages, in their way so important, were certainly a great help to our efforts by interesting geographers, and it was with no small degree of pleasure that I presented Captain Larsen with one of the Geographical Society's awards—that bequeathed by Sir George Back.

When I was elected President of the Royal Geographical Society in 1893, I resolved that no efforts should be spared to secure the despatch of a properly equipped Antarctic expedition: the main object being to make further discoveries in connection with the great Antarctic continent which had received the name of Antarctica. No sooner was this known than enterprises sprang up in all directions—Norwegian, Belgian, Scottish, German, Swedish, and French. Without any concerted action, except as regards the Germans, none of these touched Antarctica, but roved as free lances, so that it will be quite convenient to deal with them separately before treating of the preparations for the Antarctic expedition of the Royal and Royal Geographical Societies.

CHAPTER LV

PRIVATE EXPEDITIONS—BORCHGREVINK—GERLACHE —NORDENSKIÖLD—BRUCE—DRYGALSKI—CHARCOT— FILCHNER

Borchgrevink

It was in 1894 that Mr Svend Foyn, the great Norwegian shipowner, sent a vessel southwards to determine whether the despatch of whaling ships to Antarctic seas would be remunerative. She was commanded by Captain Christensen, and he reached Cape Adare and Robertson Bay of Sir James Ross. The voyage was not repeated, but there was a volunteer on board named Carstens Borchgrevink who, in 1898, induced Sir George Newnes to supply the funds for an expedition under his command. Borchgrevink bought a Norwegian sealer named the *Pollux*, of 521 tons, built in Arendal, Captain Jensen being master. Re-named the *Southern Cross* she left Hobart 19th December, 1898, and arrived at Cape Adare 17th February, 1899, and the landing party was put on shore in Robertson Bay, with a house taken out in pieces. Here the party wintered, it being arranged that the ship should return for them next summer. Nothing of any importance was possible in the way of sledge travelling from Robertson Bay. But there was a very able staff—Mr Colbeck, R.N.R., the magnetic observer and surveyor, Mr Bernacchi the physicist, Hanson (who died during the winter and was buried at Cape Adare) and Hugh Evans the biologists. All the staff did their work admirably, and the results were published by the authorities of the British Museum in 1902. When the ship returned she followed the track of Sir James Ross's ships. Borchgrevink landed on the barrier and then returned to New Zealand.

De Gerlache

The Belgian Expedition was well supported by patriotic subscribers. Captain de Gerlache was chosen to command it, and in February, 1896, there were sufficient funds to enable him to buy a suitable ship in Norway—the *Patria* of 241 tons, built at Svelvig near Drammen in 1884. She was very thoroughly refitted and strengthened at Sandefjord, and on June 19th I spent the day there and was very favourably impressed by the efficiency and ability of the Belgian Commander and above all by his modesty. Lieutenant Lecointe was his second in command, Arçtowski went as geologist, Racovitza as naturalist, Danco as magnetic observer, and Dr Cook, who had been with Peary in Whale Sound, as surgeon. Roald Amundsen was 2nd Lieutenant. The *Patria* was renamed the *Belgica*.

The expedition of de Gerlache approached the South Shetlands at the western end of the group by Smith and Low Islands to the Gulf of Hughes, which is an expansion of the Orleans Channel discovered by Dumont d'Urville. The *Belgica* then proceeded down a channel with the north-west coast of Graham Land on one side, and four large islands on the other which de Gerlache named Liège, Brabant, Gand, and Anvers. The channel, which was named after de Gerlache, led into the Pacific Ocean. The scenery on both sides was magnificent.

Captain de Gerlache gave as many opportunities of landing as possible, and M. Arçtowski, the geologist, was specially eager to examine the rocks and the glaciation. At his first landing he found eruptive rocks of great density, of a deep green colour. He next landed on Trinity or Palmer Island. The rocks were erratic, from a moraine, and consisted of granite, and also of numerous ancient eruptive rocks. The latitude was 63° 57′ S. The landings of Arçtowski and his messmates were, in fact, very numerous as the *Belgica* steamed down Gerlache Channel, with interesting glacial and geological results; the officers meanwhile making surveys of the coast. Arçtowski thought that the channel and the islands were once covered with a vast glacier. He found some evidence that the glaciers were now receding.

On leaving the channel the *Belgica* ran south along the western coast of Graham Land, passing many flat-topped icebergs. The Circle was crossed and the Antarctic regions entered on the 14th February, 1898. De Gerlache tried to approach the Alexander Island of Bellingshausen, but was stopped by the pack. It was, however, sighted. The coast beyond seemed to turn to the east. The Alexander Island glaciers were found not to reach the sea, coalescing in a gigantic ice-foot or terrace.

De Gerlache then left the coast of Graham Land and the *Belgica* was steered westward into the Pacific on February 24th, being in 69° 30′ S. Working through the closely-packed ice the ship had reached a latitude of 71° 31′ S. on the 20th March, in longitude 85° 16′ W. The young ice was forming fast, and it became evident that they would have to winter in the pack. During that dreary winter the ship drifted from 85° to 90° W., the Peter Island of Bellingshausen being in 92°. As summer approached it was necessary to cut a canal to the open water, but at length the *Belgica* was clear of the ice on March 14th, 1899.

Over the area that the vessel drifted during the winter the depth averaged about 270 fathoms. This was a continental shelf, showing that the land was at no great distance to the south. At the edge of the shelf to the north there was an abrupt descent to 800 fathoms.

This discovery of the edge of the continental shelf in the Pacific Ocean is important, combined with the discoveries of Bellingshausen. But all the work done by this expedition was well done and has increased our knowledge of the geology and glaciation of Graham Land. Captain de Gerlache conducted the expedition with ability and success. He has since done very useful Arctic work in the same ship, with the Duc d'Orléans. M. Arçtowski's excellent paper on the exploration of Antarctic lands during the voyage of the *Belgica* was included in the Royal Geographical Society's *Antarctic Manual*[199].

Nordenskiöld

The Swedish expedition, which was equipped at Gothenburg in 1901, was intended to investigate the geology of the south-west part of the South Shetlands, where fossils were first made known by Captain Larsen, and to complete and rectify the topography. The command was given to Dr Otto Nordenskiöld, an eminent Swedish geologist with Arctic experience, and a nephew of Baron Nordenskiöld. With him was associated another distinguished geologist, Gunnar Andersson, who was to join after the first year. The ship, named the *Antarctic*, was commanded by Anton Larsen, who as already stated had done splendid work on the east coast of Graham Land. With him was Lieutenant Duse of the Norwegian army as cartographer, and Lieutenant Sobral of the Argentine Navy joined at Buenos Aires as magnetic and meteorological observer.

Leaving Gothenburg in October, 1901, the *Antarctic*, after putting into Falmouth, reached the Falkland Islands on the 1st January, 1902. Proceeding to the South Shetland Islands it was decided that Nordenskiöld should winter as near the fossil-bearing island of Sir George Seymour as possible. A sheltered position was selected on the neighbouring Snow Hill Island, where the house was set up and provisions, instruments, and other necessaries landed. The party consisted of Nordenskiöld, Ekelof the surgeon, the Argentine Lieutenant Sobral, a very useful person named Bodman, and two seamen. May and June were months of storm, but the rest of the winter was safely passed, and in October Nordenskiöld, who had obtained some dogs at the Falkland Islands, started on an expedition to the south. He was just a month away, but did not get as far south as the Antarctic Circle. Later in November he made two journeys to Seymour Island to collect fossils, with very important results.

The *Antarctic* returned to the Falkland Islands, whither Dr Gunnar Andersson had arrived. Taking him on board, Captain Larsen spent some time in exploring South Georgia, and then proceeded to Tierra del Fuego, entering the Beagle Channel. The needs of the *Antarctic* were supplied at the Argentine settlement of Ushuaia while Andersson explored the interior. The course was then south, passing Deception and Trinity Islands, and surveying the Orleans Channel. The ultimate destination was Nordenskiöld's winter quarters, to take all on board and return. But Dr Andersson wanted to undertake some exploring, and was landed at Hope Bay, at the extreme north-west end of Graham Land, in order to reach Nordenskiöld by land. His companions were Lieutenant Duse and a seaman. Insuperable obstacles intervened to prevent the completion of their journey, and they returned to Hope Bay, where they built a stone hut. The abundance of penguins and seals prevented any danger from starvation or scurvy, and Dr Andersson found that the locality was rich in fossils.

The *Antarctic* had left in order to embark the party with Nordenskiöld, but she was beset off Joinville Island, drifted away, and underwent great pressure in the pack. This continued, her ribs were broken and she began to sink, but there was fortunately time to get all the boats out and fill them with provisions and stores before the ship foundered off Paulet Island. The shipwrecked crew pulled to the shore and Captain Larsen established winter quarters and built a stone house. In the spring Dr Andersson and his party succeeded in reaching Nordenskiöld's winter quarters, and a little later Captain Larsen manned a boat and went to Hope Bay only to find Andersson and his comrades gone. He then went on to Nordenskiöld's winter quarters, where he found both parties all well.

When the Nordenskiöld expedition did not return after the first winter, grave anxiety was felt. The Argentine Government ordered their naval attaché in London, a young officer named Julio Irizar, to obtain all the necessary equipment, and then to proceed to Buenos Aires and take command of a relief ship. He came to me for advice, and the able Antarctic Secretary of the Royal Geographical Society, Mr Cyril Longhurst, gave him all possible assistance with regard to equipment. After visiting Norway for furs and other gear, he sailed for Buenos Aires and took command of the *Uruguay* relief ship. On the 8th November, 1903, he arrived off Snow Hill Island, and took all the Swedes on board with their valuable collections. Thence proceeding to Paulet Island he ultimately found the shipwrecked crew, and all were taken safely home. Captain Irizar conducted his relief expedition with remarkable skill and ability from start to finish.

The geographical results of the Nordenskiöld expedition were the surveys which completed our knowledge of the intricate topography of the south-western part of the South Shetlands, correcting former work of Ross and d'Urville, and discovering much that was new. The geological results were of great importance, for they point to the connection of Graham Land with South America at a recent geological period. Graham Land and most of the islands belong to the region of folding and of Andine eruptives. The rocks are plutonic and, according to Nordenskiöld, belong or are closely

related to a peculiar type of eruptives characteristic of the American cordilleras throughout their length. Ross Island and Vega Island are volcanic, composed of basalt and lava flows. Paulet Island also contains cones of eruption.

In the fossils of Hope Bay, Dr Andersson discovered a very rich Jurassic flora, consisting of conifers, mare's tails, and ferns in profusion. In abundance of species Hope Bay far surpasses all Jurassic floras hitherto known in South America. They are fresh-water deposits. The Seymour and Snow Hill formations are Cretaceous. There are many ammonites, cephalopods, bivalves, and trunks of fossil wood in the sandstone; there are also birds, and a mammal belonging to the Tertiary period. On Cockburn Island there was a curious conglomerate of pecten shells, formed on basaltic tuff in Pliocene times.

In Jurassic times the land must have been covered with rich vegetation in a mild and uniform climate. At Hope Bay the fresh-water lake flora has close affinity with the contemporaneous floras of India and Europe. After the Cretaceous surface was lifted above the sea level, mountain ranges were formed. The South Shetland Islands were once a clearly-marked mountain range parallel to that of Graham Land, and the Gerlache channel was a longitudinal valley.

During the Miocene period there were violent eruptions causing a great accumulation of volcanic tuff. The fauna of this period was closely allied to the Miocene fauna of Patagonia. On Seymour Island five new genera of fossil penguins and the large cetacean, *Zeuglodon*, were found in the Tertiary beds; also the impressions of large and very distinct leaves of an Araucaria, a beech tree, and ferns.

Patagonia was connected by land with Graham Land, and spread out to a great width. At that time the warm coast current from Brazil would have flowed down to the coasts of Antarctica, causing that region to be much warmer than it is now. These geological facts give rise to alluring and not altogether impossible conjectures.

The results of the Nordenskiöld expedition were of great value, serving to connect, as they do, the Andes with the Antarctic mountain range of Graham Land, and perhaps with a continuous range further south. The expedition was without comparison the most important of all the private enterprises which have undertaken discoveries in the far south in recent years, except of course the great expeditions of Captain Scott[200].

Bruce

The expedition under Mr Bruce was for a very short time south of the Antarctic circle, most of its two years and a half duration being devoted to scientific investigations in two islands of the South Orkneys.

Mr Bruce was a natural history student. In that capacity, in 1893, he made a voyage to the south in one of the whalers, the *Balaena*, Captain Robertson. From 1894–96 he was at the meteorological station on the summit of Ben Nevis, and in 1896–97 he served under Jackson during his last winter in Franz Josef Land. Having received a promise of support from Mr James and Major Andrew Coats, wealthy manufacturers at Paisley, he went to Norway and bought an old vessel of 400 tons called the *Hecla*, which required much repair. Captain Robertson was master of the ship, which was renamed the Scotia, and there was a scientific staff. The main object appears to have been deep sea sounding. The Scotia sailed on the 2nd November 1902, and in the first year she crossed the Antarctic Circle, went south as far as 70° 25′, and then returned to winter at the South Orkneys.

The two islands of the South Orkneys, called Laurie and Coronation, were discovered by a sealing captain named Powell in the *Dove* in 1821. They had been visited by Weddell, who named them, by Dumont d'Urville in 1838, and by Larsen in 1893. Bruce and his staff took meteorological, magnetic, and tidal observations, and made biological and geological researches and collections. Silurian fossils were found, and some evidence was obtained to show that the Patagonian coast once extended to these islands and beyond them.

In the second season the *Scotia* crossed the Antarctic Circle in 32° W. on February 27th, 1904, finding a depth of 2630 fathoms. The ship was now in King George's Sea of Weddell. Icebergs of immense size were met with, far too large to have come off the mountain slopes. They pointed to a vast glacial formation analogous to Ross's ice barrier. On the 3rd March, when in 72° 18′ S. and 17° 59′ W. with a depth of 1131 fathoms, a line of ice cliffs 100 to 180 feet high was sighted, but could not be approached nearer than two miles. These cliffs were probably resting on land which is a continuation of the coast of Antarctica from Enderby Land. The line of cliffs was traced for 150 miles, and a sounding on the continental shelf gave 159 fathoms. Mr Bruce named the ice cliffs Coats Land. On the 9th March, the *Scotia* was in 74° 1′ S. and 22° W. and on the 14th she was headed north. The soundings obtained were from 2000 to 2600 fathoms. On the 27th the Antarctic Circle was again crossed, the *Scotia* having been 28 days south of it. After a second winter at the South Orkneys the expedition returned.

DRYGALSKI

German scientific students had long taken a great interest in Antarctic research, and Dr Neumeyer, a native of Frankenthal near Worms, did more than anyone else out of England to arouse an interest in the subject. He had been in charge of the observatory at Melbourne from 1858 to 1862, and afterwards became chief of the Seewarte at Hamburg. When the German Antarctic expedition was decided upon and funds were raised, it was wisely resolved to build a vessel specially for the service, to be named the *Gauss* after the great magnetician of Göttingen. She was built at Kiel of the best dry oak and pitch pine. Her gross tonnage was 650, her length 165 ft., breadth 37 ft., depth 22 ft., speed when laden 5 knots. She could carry 600 tons of coal, and was well adapted for Antarctic work.

Professor Neumeyer was of opinion that, to secure adequate results, the command should be given to a naval officer. But eventually Dr Erik von Drygalski was selected, a physicist who had studied glacial action in Greenland and was the author of a work on the subject[201]. An accomplished scientific staff accompanied him, and Captain Hans Ruser was Captain of the ship and navigator.

The *Gauss* left Kerguelen Island on the 31st January, 1902, entering the ice in February, and working for the Termination Land of Wilkes, which was not found. Land was sighted, but the *Gauss* wintered in the pack outside the Antarctic Circle in 66° 13′ S. All the scientific staff were diligently at work, and valuable series of meteorological and magnetic observations were taken by Dr Friedrich Bidlingmaier of Potsdam. The other members of the scientific staff were Dr Ernst Van Hoffen, Dr Hans Gazert, and Dr Emil Philippi. In the summer a travelling party reached the land, distant about 50 miles. A conical mountain consisting of volcanic rock was discovered and named Gaussberg, and collections were made. A line of ice cliffs was seen, extending from 89° to 94° E., which was named König Wilhelm II Land. The place where the *Gauss* wintered was over a comparatively shallow bank, within the continental shelf. The ship was freed on February 8th, 1903, and reached Cape Town on June 9th.

It is to be regretted that Dr Drygalski did not go south on a meridian nearer to Kempe Land, when it is probable that he would have been more successful from a geographical point of view. Antarctic work was given up by the Germans, and the *Gauss* was sold to the Canadian Government[202].

Charcot

Dr Charcot, son of the celebrated physician, an energetic and gifted Frenchman, endowed with a peculiar charm of manner, undertook to continue the work on the coast of Graham Land. He sailed for the south in a little vessel called the *Français* in 1903 and passed a winter at Wandel Island, afterwards cruising for some distance along the coast of Graham Land. Returning to France he resolved to construct and equip a small steamer specially for Antarctic work. She was built at St Malo in 1908 and named the *Pourquoi Pas* (450 h.-p., length 131 ft., beam 30 ft.), and Charcot sailed in her from Havre August 15th, 1908. From Punta Arenas he sailed south, and examined the coasts of Adelaide Island of Biscoe, landing on one of a group of small islets on the 15th January, 1909. The winter was passed at Petermann Island. In the summer of 1909–1910 he followed the edge of the pack as far as 125° W., sighting Bellingshausen's Peter Island on January 16th, 1910. He had previously sighted the Alexander I Land of Bellingshausen on board the *Français* at a distance of 60 miles, on January 11th-13th, 1905. After again sighting it, he shaped a course into the South Pacific, when south of 70°, calling a distant appearance of land Charcot Land after his father. He returned to Rouen June 5th, 1910.

These two voyages comprise a useful piece of polar work. Dr Charcot has won the admiration of all who know him, and all true Britons feel a regard for the gallant Frenchman when they remember his *camaraderie* and affection for Captain Scott.

Filchner

In 1911 Filchner, an officer in the Prussian army, came forward to raise funds for an Antarctic expedition, announcing that there was much talk of theories, but that he was going to cut the Gordian knot by going to see. Having raised the necessary funds, Filchner's plan was to explore the Weddell Quadrant to its apex. He bought a Norwegian whaler built at Arendal and named the *Njord*, and took with him a scientific staff, Dr Koenig of Vienna being the naturalist, and Dr Heinrich Seelheim the geographer. The master of the ship was Captain Jorgensen. The expedition left Hamburg in May, 1911, with all the equipment for long inland journeys, including three motors.

Filchner went the right way to work. There was no impenetrable pack for him. He put the ship's stem straight at it, somewhere near Weddell's furthest, and forced her through. After battling with the pack over 120 miles the ship came out into open water, and land was sighted in 76° 35′ extending to 79°. There was an ice barrier to the westward. Unfortunately the ship was carried away to the north before she could be properly secured, and she drifted about in the ice-cumbered sea during the winter. The new land was named after the late venerable Regent of Bavaria. Captain Jorgensen died before the ship returned to Buenos Aires.

CHAPTER LVI

PREPARATIONS FOR THE SOCIETIES' ANTARCTIC EXPEDITION

In May 1893 I was elected President of the Royal Geographical Society, and resolved that an Antarctic expedition should be despatched, preferably by Government, as the encouragement of maritime enterprise, especially in a school so favourable to the acquisition of valuable experience as the polar regions, has always been my special aim. I found that Dr Murray of the *Challenger* agreed with me that the expedition should be under naval control, and he consented to open the campaign by reading a paper at a meeting of the Royal Geographical Society on November 27th, 1893.

It was a great meeting, reminiscent of the splendid opening of the Arctic campaign by Sherard Osborn, and Sir John Murray's address was eloquent and convincing. Apart from the main object, the duties of an expedition, as outlined by Dr Murray, would be:—

1. To determine the nature and extent of the Antarctic Continent.
2. To penetrate into the interior.
3. To ascertain the depth and nature of the ice-cap.
4. To observe the character of the underlying rocks and their fossils.
5. To obtain as complete a series as possible of magnetic and meteorological observations.
6. To observe the depths and temperatures of the ocean.
7. To take pendulum observations.
8. To sound, trawl, and dredge.

He added that observations such as the above were especially desirable "for the more definite determination of the distribution of the land and water of our planet, for the solution of many problems concerning the ice age, for the better determination of the internal constitution and superficial form of the earth, and for a more complete knowledge of the laws which govern the motions of the atmosphere and hydrosphere."

The approval of the great meeting was unanimous Sir Joseph Hooker, the Duke of Argyll, and other eminent men of science and naval officers expressing themselves strongly in favour of the project. A dash to the Pole was not advocated, but rather a steady, continuous, and systematic exploration of the antarctic region.

Our efforts to induce the Government to undertake an expedition failed, and need not be dwelt upon here. The Admiralty, however, offered to lend instruments, and later, thanks to the exertions of Admiral Sir Anthony Hoskins, there was liberality in giving leave, on full pay, to officers and men.

Articles in magazines had to be published, lectures to be delivered, circulars to be sent out, and the desperately uphill work of raising funds for a private expedition undertaken. In December, 1895, I proposed that the expedition should be undertaken by the Royal Geographical Society. There was some opposition and delay, but at length, on April 12th, 1897, the R.G.S. Council agreed to subscribe and raise funds. As the Royal Society is the scientific adviser of the Government, that eminent body was asked to unite with the Royal Geographical Society, and its President and Council consented on February 24th, 1898. The Council of the Geographical Society consented to a grant of £5000 for the expedition, on June 20th of that year.

By that time I had collected only £14,000 when on March 24th, 1899, Mr Longstaff asked me if £25,000 would enable the expedition to start. I assured him that it would, on a small scale, and he at once sent a cheque. This was an example of princely munificence which entitles its generous donor to take rank with the merchant adventurers of the days of Elizabeth. For similar patriotic munificence Sir Felix Booth received a baronetcy; Oscar Dickson received a barony. Longstaff received the admiration and gratitude of his countrymen, and a very honourable niche in polar history. On June 22nd, 1899, the First Lord of the Treasury promised a grant, and the Treasury afterwards announced that this would amount to £40,000 on condition that an equal sum was raised privately. We then had only £37,000, but the R.G.S. Council at once granted an additional £3000 to make up the required sum.

I considered it necessary, as did Sir William White, that a wooden ship should be specially built for the service. In consultation with Captain Creak, R.N., C.B., Superintendent of compasses at the Admiralty, I found that he also thought it necessary from the point of view of magnetic observations. Sir William White advised me to secure the services of Mr W. C. Smith, C.B., of the Controller's Department at the Admiralty, to prepare the designs and specifications. Mr Smith very kindly undertook the duty, with the permission of Admiral Sir Arthur Wilson, the Controller. A Ship Committee was appointed on April 10th, 1899, meeting first on the 26th[203].

It was decided that the ship should be of wood, and that the lines of the old *Discovery* of the 1876 expedition should be followed as closely as possible. It was then considered whether the new ship should have a midship section, like the *Fram*, of a peg-top character to facilitate her rising to ice pressure, but as there is not the same likelihood of severe nips in the south, it was thought better to have an ordinary section, with a view to the probability of heavy weather conditions. A complement of 43 souls was to be arranged for, with accommodation equal in all respects to a man-of-war of the same size, and there was to be stowage for two years' provisions and 335 tons of coal. The ship was to be of 400 I.H.P. and fitted with a two-bladed lifting screw. Mr Smith adopted a special plan for shipping and unshipping the rudder.

That the ship should be absolutely free from magnetic qualities was impossible, owing to the engine and boilers. But in order that there should be as little as possible, steel and iron were excluded from a space having a radius of 30 feet from where the magnetic observatory was placed.

Instead of the usual square stern, a round form of stern was adopted, which gave better protection to the rudder and screw and was much more satisfactory in heavy seas. It gave the helmsman nearly dry quarters.

The length of the ship on the water line was finally fixed at 179 ft., the breadth 34 ft., the depth amidships 18 ft. She was to be barque-rigged and of 735 gross and 483 registered tonnage. The framing throughout was of oak, the keel of elm. The boats were a sailing cutter (which was not taken south), four 26-foot whalers, and two Norwegian prams.

The Dundee Shipbuilders Company undertook her construction for £34,050 and £10,322 for the engines, and on March 16th, 1900, the keel was laid. On March 21st, 1901, Lady Markham launched the ship at Dundee, and gave her the name of the *Discovery*. She left Dundee on the 3rd June, was in the East India Docks for 55 days loading, and on August 1st she arrived at Stokes Bay[204].

I had selected the fittest commander in my own mind in 1887, when I was on board the *Active* in the West Indies, the guest of my cousin Commodore Markham, then in command of the training squadron, the other ships being the *Rover*, *Volage*, and *Calypso*. When we were at St Kitts, March 1st, 1887, the lieutenants got up a service cutter race. The boats were to be at anchor with awnings

spread. They were to get under way and make sail, beat up to windward for a mile, round a buoy, down mast and sail, pull down to the starting point, anchor and spread awning again. The race tried several qualities. For a long time it was a close thing between two midshipmen, Robert Falcon Scott and Hyde Parker. However, Scott won the race and on the 5th he dined with us. He was then 18, and I was much struck by his intelligence, information, and the charm of his manner. My experience taught me that it would be years before an expedition would be ready, and I believed that Scott was the destined man to command it. At Vigo we were thrown together again, when my young friend was torpedo lieutenant of the *Empress of India*, and I was more than ever impressed by his evident vocation for such a command. When the time came for the selection I consulted Captain (now Admiral Sir George) Egerton, an Arctic officer with a wide knowledge of men and much experience in the service. He sent me several names, but Scott's was first, and he had excellent testimonials. As a torpedo lieutenant he had gone through a special course of training in surveying, and he wrote the whole section on mining survey in the *Torpedo Manual*, and suggested all the instruments to be used. He had a thorough knowledge of the principles of surveying and of surveying instruments, as well as of electricity and magnetism. Seven of the ships in which he had served were masted, and frequently under sail.

Scott was now just the right age for a leader of a polar expedition, and admirably adapted for such a responsible post from every point of view. He was recommended very strongly by Captain Egerton, by his Admiral, and also by the First Lord and the First Sea Lord of the Admiralty. Yet there was long and tedious opposition from Joint Committees, Special Committees, Sub-Committees and all the complicated apparatus which our junction with the Royal Society involved, harder to force a way through than the most impenetrable of ice-packs. But we got through and I had the pleasure of signing Scott's appointment on the 9th June, 1900. On the 30th he was promoted to the rank of Commander, the numerous committees were gradually got rid of, and Scott took command.

Albert Armitage, a *Worcester* boy and a very efficient P. and O. officer, who had served throughout Jackson's expedition and was with Jackson on his long sledge journey round Alexandra Land, was selected by me as Navigator and in charge of magnetic observations at sea, and was approved by Captain Scott.

Some years before, on June 14th, 1892, I was in a river steamer going down to Greenhithe to see the boat-race between the *Conway* and *Worcester* cadets. I saw on board a young *Conway* cadet who bore a remarkable resemblance to Wyatt Rawson, the gallant Arctic officer in the expedition of 1875–76. The boy, Charles Royds, was his nephew, and I found that he was most anxious to get into the navy. He succeeded in July, 1892. His career was meritorious and he won golden opinions from his captains. He was the first to volunteer, and no better man could be found as First Lieutenant. He also took charge of the meteorology. He was a good musician, both vocal and instrumental, a thorough seaman, and a good all round man. Scott wrote of him that he was a first-rate worker, an excellent officer, popular with the men, and the right man in the right place as First Lieutenant.

Michael Barne was Scott's special choice. The younger son of Colonel and Lady Constance Barne of Sotterley in Suffolk, and great-grandson of Admiral Sir George Seymour, he was born in 1877. He was always ready to help any one, full of good humour, the most unselfish of mortals, and entirely to be trusted in any position of responsibility. He had charge of all the deep sea apparatus and performed the duty right well.

The Engineer Lieutenant, Reginald Skelton, was an officer of great ability. In addition to his very arduous work in the engine room, he had charge of the dark room, stored all the negatives of interest, assisted with the pendulum observations, and, with Dr Wilson, did all the bird-skinning.

No more Lieutenants could be obtained from the Admiralty, so Captain Scott had to turn elsewhere and accepted Ernest Shackleton as the junior executive. He had been in the merchant service since 1890, and was very energetic and zealous. I got him made a Sub-Lieutenant in the Naval Reserve.

Dr Koettlitz, the surgeon, had served in Jackson's expedition., Dr Edward Wilson, of Gonville and Caius College, Cambridge, also surgeon, was the vertebrate zoologist. He had quite the keenest intellect of any one on board, and possessed great artistic talent, with a marvellous capacity for work. The special scientific staff consisted of Mr Hodgson, the invertebrate zoologist, Curator of the Plymouth Museum; Mr Ferrar, a very able young geologist, a graduate of Sidney Sussex College, Cambridge; and Mr Bernacchi the physicist, who had previously been in the *Southern Cross* Antarctic expedition.

The Admiralty was liberal as regards volunteers, allowing 22 petty officers, able seamen, and stokers to join, and two marines, all excellent men. Indeed the whole ship's company exclusive of the officers was naval except Clark, the cook's mate and laboratory attendant, and Weller, who was in charge of the dogs.

A colossal amount of work and responsibility fell upon the shoulders of Captain Scott. Fortunately we had, in the person of Mr Cyril Longhurst, an admirable hard working and conscientious secretary, though he was then very young. Close attention was given to the supply of provisions, as one of the most important considerations. The food for the sledge travellers was mainly pemmican. It used to be made at Clarence Yard of the very best quality, but the art was lost. Scott had to fall back upon the very inferior article made at Chicago, and a better kind manufactured by Beauvais at Copenhagen. He himself visited the Beauvais factory, and ultimately took 500 lb. of American and 1500 lb. of Beauvais' pemmican. Extreme care was taken in the examination of the preserved meats, soups, vegetables, and fruits. Dr Collingridge, medical officer for the city of London, appointed Mr Spadaccini for this duty, and 10,250 lb. in 1542 packages of other provisions were accepted, and 231 lb. rejected. But Captain Scott was deeply impressed with the urgency of supplying fresh meat to his people whenever it was possible.

Our dockyards had also lost the tradition of the clothing, sledge equipments, and sledges, which had been brought almost to perfection as supplied to the Franklin search expeditions. Scott had to turn to Norway for these things, and he was a good deal guided by Armitage, whose experience was the most recent, though he saw to the matter himself in Norway. The peltry, reindeer sleeping-bags, 4 bales of Lapland grass, and 70 pairs of ski (7 ft. h in.) were supplied from this source, as well as nine 9 ft. sledges of Nansen's pattern with broad ski runners, five of 7½ ft., and five iron shod and fastened to be used for work in winter quarters[205].

Scott thought that it might be useful to have a captive balloon, whence to reconnoitre and obtain more extensive views, and the idea was strongly supported by Sir Joseph Hooker. Accordingly the necessary gear was provided, and an officer and two men went to Aldershot for instruction. The balloon was of the army pattern, and the gas was taken in sixty heavy tubes which were stowed on deck. There were also dynamos, for electric lighting. When the steam-driven dynamos were not at work, an iron-sailed windmill could be fitted, driving the dynamo at its base and thus supplying the accumulators with electric current.

Most of the instruments were lent by the Admiralty—astronomical, magnetic, meteorological, pendulum, and seismograph, as well as sounding gear with all the newest inventions, and dredging nets.

Baron Richthofen suggested to me that there should be synchronous observations at as many other observatories as possible. Captain Creak fully concurred and, in concert with him, I wrote to the observatories at Kew, Falmouth, Potsdam, Bombay, Mauritius, Melbourne, and Christ Church (N.Z.), also making arrangements with the Argentine Government for Staten Island, and for observations at Kerguelen Island, and with the *Gauss*. The object was to obtain a series of synoptic charts which would allow of the variations in the magnetic conditions of the whole earth being traced in detail during a definite period, and so provide the necessary basis from which alone the fundamental principles of terrestrial magnetism can be more closely approached. The observing stations to take part in this international co-operation were distributed over the globe with a uniformity never before attained.

The observations were of two classes: (1) of the three elements at intervals of an hour on certain terminal days, so as to obtain a comprehensive view of the diurnal variations of terrestrial magnetism, (2) of the three elements during one specified hour on each term day, to trace the course of individual disturbances. The *Discovery*, the *Gauss*, and all the observatories were supplied with identical forms for term days and term hours; declination, horizontal force, vertical force. The magnetic observations were the most carefully planned and completely thought out of all the branches of scientific work carried on by the expedition.

There was a complete supply of meteorological instruments under the able management of Lieutenant Royds, a most careful and accurate observer and recorder, and the observations were two-hourly, taken by the officers of the watch. Special instruments were taken out for use on shore including spirit thermometers graduated as low as -90° Fahr., and a Dines pressure anemometer. A photographic spectrometer was to be used for observing the auroras.

The most important question to be decided was the direction the expedition should take. To consider it with care and understanding we divided the regions within the Antarctic Circle into four quadrants—the Victoria Quadrant from 90° E. to 180°, the Ross Quadrant from 180° E. to 90° W., the Weddell Quadrant from 90° W. to 0°, and the Enderby Quadrant from 0° to 90° E. We knew from Captain Cook's conclusion, and he was always right, that there was an extensive continent round the south pole, and that the coast line came furthest north to the south of Australia and the Cape, and receded furthest south in the King George IV Sea of Weddell and the Pacific. The correctness of Captain Cook's view as regards the northern extension was proved by the discoveries of Balleny, Biscoe, and Kempe and confirmed, as regards Balleny's discoveries, by Dumont d'Urville and Wilkes. Apparently, in most parts of this coast, access would be impossible owing to the lofty ice cliffs. Moreover, merely sighting ice cliffs at a distance is of no use. The great discoveries of Sir James Ross offered far better opportunities of landing. I felt that the chief point should be the finding of the *land* of Antarctica, not the ice cap which conceals everything. The land would be found on coasts facing east, the east coast of Victoria Land, and east coast of Graham Land; the ice cliffs occur mainly on northern and western-facing coasts.

The main object of the expedition, then, would be to explore this Antarctic continent by land, to ascertain its physical features, and above all to discover the character of its rocks, and to find fossils throwing light on its geological history. We therefore decided that the *Discovery* should follow in the wake of Sir James Ross, and winter on the Victorian coast. I was anxious that everything else should be left to the discretion of Captain Scott.

The instructions were drafted in January 1901. The first paragraph stated the objects to be discovery and exploration. Importance was also attached to a magnetic survey and to meteorological, oceanographic, geological, biological, and physical investigations and researches. After paragraphs dealing with the relations with a chief of the scientific staff—who, perhaps

fortunately, did not go out, for there could have been no fitter chief of the scientific staff than Scott himself—particular attention was called to the discovery of new coast lines, of the depth and nature of the ice cap, of the nature of the mountain ranges, and of the underlying fossiliferous rocks. Co-operation with the German expedition was enjoined whenever possible. Attention was drawn to the region to the east of the Great Barrier, which was entirely unknown, and an effort was to be made to discover land in the Ross Quadrant. Equal importance was attached to an examination of the Barrier, of the volcanic region, and to journeys to the west and south. Discretion to winter with the ship was left to Captain Scott. All mention of the south pole as an objective was carefully avoided.

I planned an Antarctic Manual on the lines of the Arctic Manuals prepared for the expedition of 1875–76, securing the services of Mr G. Murray as editor. It proved very useful, the first part containing instructions and information by leading men of science, and the second part being the narratives of Biscoe, Balleny, Dumont d'Urville, and Wilkes, with papers on polar travelling by Sir Leopold M'Clintock and on the exploration of Antarctic lands by Arçtowski.

In July 1901 the great work of fitting out the expedition was fast approaching completion. The Geographical Club gave the officers a farewell dinner at Greenwich on the 3rd. There were many toasts, and Captain Scott did a very graceful thing in proposing the health of our Secretary, Mr Longhurst, "with whom," he said, "he had worked so pleasantly for nearly a year, and whose services had been so valuable to the expedition." On the 16th the Bishop of London visited the *Discovery*, held service and delivered a very impressive address to officers and men[206]. He presented the books for divine service, and a prayer which he had written for daily use.

On August 5th, 1901, when the *Discovery* was at Cowes, the King and Queen went on board, and his Majesty made a charming speech to the men. Then the good ship started on her mission. No finer set of men ever left these shores, nor were men ever led by a finer captain.

CHAPTER LVII

THE SOCIETIES' ANTARCTIC EXPEDITION

First Year.

LYTTELTON, New Zealand, was selected for the head-quarters of the expedition in the southern hemisphere. It was a long voyage thither and there was natural anxiety respecting the behaviour of the new ship. As time went on, however, Captain Scott became more and more satisfied with her seaworthy qualities. She proved wonderfully stiff and, as her sail area was small, it was rarely necessary to shorten sail, even in the most violent gales. She was wonderfully free of water on the upper deck, and the peculiar rounded shape of her stern gave additional buoyancy to the after part and caused her to rise more quickly to the seas. One day, driving before a very heavy gale, the ship made 223 knots in the 24 hours.

In 51° S. and 131° E. a very interesting magnetic area was reached, where there appeared to be a curious inconsistency in the distribution of magnetic force to the north of the magnetic pole. Captain Scott, therefore, resolved to proceed south for some distance to explore this area more effectively. On November 15th the 60th parallel was crossed, and next day the first ice was seen. Soon loose pack ice was all round the ship. They were within 200 miles of Adélie Land in 62° 50′ S. when the ship's head was reluctantly turned again to the north. The soundings at the furthest south were 1750, then 2300 and 2500 fathoms. Scott noticed and was much interested in the abundance and variety of bird life, most of the birds being familiar to those who have rounded the Horn. On the 22nd Macquarie Island was reached, and the first penguin rookery was visited. On the 30th November they arrived at Lyttelton and the ship was docked.

After a thorough refit, the receipt of more and supplementary provisions, and the enjoyment of much genuine hospitality, the *Discovery* was again ready for sea on the 21st December. Besides the dogs, there were 45 sheep on deck. A short service of farewell was held by the Bishop of Christchurch on the mess deck, and the voyage was continued.

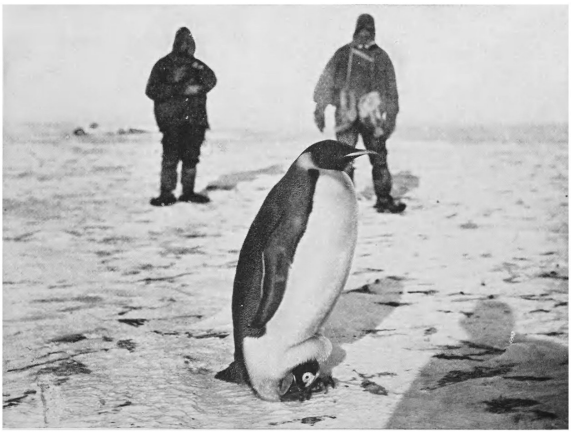
The first iceberg was sighted in 65° 30′ S. on the 2nd January, 1902, and by evening as many as seventeen could be counted. On the 3rd the Antarctic Circle was crossed. Soundings were taken in 2040 fathoms. Soon afterwards the pack was entered, and they forced their way through grinding floes, taking advantage of every favourable lead when the ice loosened. Seals and penguins were plentiful on the pack, and very tame, for the only dangers they knew were in the sea. On the 8th a strong water sky was reported, and soon they were in a clear open sea, after only five days in the pack. There was a well-defined edge to the pack, which indicated the presence of southerly winds at this season. There must have been heavier obstruction than was met with by Sir James Ross, for he got through, in bluff-bowed sailing ships, in four days. Far to the south the high mountain peaks of Victoria Land were visible. Scott anchored in Robertson Bay, which is formed by the long peninsula of Cape Adare, but next day the anchor was weighed and the southward course continued.

It is very difficult to write an abstract of this voyage, for the perils of ice navigation, the lovely scenery in fine weather, and the gallant struggles against the ice helped by gales of wind and tides, are so delightfully described by Captain Scott that condensation seems impossible. A visit to the land, south of Cape Washington, satisfied Scott that there were possible winter quarters in a bay

which he named Granite Harbour from the huge granite boulders on the beach. By 8 a.m. on January 21st the *Discovery* was in the middle of M'Murdo Sound, with fine views of the lofty mountains and of Mounts Erebus and Terror. A landing was effected on the north side of Cape Crozier, and Scott, with Dr Wilson and Royds, climbed to a height of 1350 ft., whence they obtained a glorious view of Ross's great ice barrier. For the first time this extraordinary formation was seen from above.



Adélie Penguins



Emperor Penguin with chick

Captain Scott then proceeded to make a closer examination and survey, with soundings, of the barrier ice-cliffs. Sir James Ross, with sailing ships and with bad weather, was unable to do this thoroughly. The work was done with great care, the height of the cliffs, which attained 280 ft. in the highest part, was measured at intervals, photographs were taken, and frequent soundings, the depth varying from 350 to 400 fathoms. It was found that their course throughout had been south of the position of the barrier in Ross's time, and that they had sailed continuously over sea which in his day had been covered with a solid ice sheet. On January 29th they were eastward of the extreme position reached by Sir James in 1842. Passing a deep bay in the barrier Scott pushed still further to the eastward; and on the 30th new land was sighted. Soundings varied from 88 to 265 fathoms. Most of the surrounding icebergs were aground, young ice was formed, and Scott resolved to shape

a westward course on February 1st. The coast-line was now clearly seen for many miles, with sharp peaks rising to 2000 and 3000 feet, the bare rock appearing in a few places. The new discovery was a country of considerable altitude and extent, and of great importance as fixing the limit of the great ice barrier.

Captain Scott then steered for the inlet he had seen when standing to the east, and found that the ice cliffs were only 20 feet high, and in one place not higher than the ship's bulwarks. Here he anchored and made fast. There were great numbers of seals on the sea-ice. Armitage and Bernacchi, with a light sledge equipment, marched up the ice valley to the south.

On February 4th preparations were commenced for a balloon ascent, in one of the army captive balloons for lifting a single observer. Scott himself ascended to 800 feet, from which height the nature of the barrier surface could be well seen as a series of long undulations running east and west, each wave occupying a space of two or three miles. Shackleton made the next ascent with a camera, and took some photographs, and in the evening Armitage returned, after having crossed and examined several of the undulations. At this place a quantity of seal meat was obtained.

The *Discovery* was then taken under sail along the barrier cliffs and was in M'Murdo Sound again on February 8th, where an excellent position for winter quarters was selected, with a view to a good starting-point for travelling parties. On one side was Mount Erebus and the lower hills ending in an abrupt point—Cape Armitage—on the other the lofty mountains of the Victoria range. The ship was to be the home, and the large hut was erected on shore, with two small huts for magnetic instruments, consisting of a wooden framework covered with sheets of asbestos. The kennels for the dogs were arranged on the hill side, below the huts. The selected place was at the southern extreme of a long tongue of land jutting out from the slopes of Mount Erebus. The hills on it formed a semicircle, the hut being on its western extreme which was called Hut Point. Behind, the hills rose to 500 ft., and to the north was a fine mass called Castle Rock.

There were ski races and football, and also limited sledge journeys, which discovered that the land of the volcanoes was, as Ross suspected, an island; that there were three small volcanic islets further south (named Black, Brown, and White), that the ice barrier came up to the foot of the mountains, and that the great Victoria range extended far to the south.

A journey was planned to Cape Crozier to be led by the Captain himself, but an accident to his knee while on ski prevented him from going, and Royds took command, with Skelton, Koettlitz, Barne, and eight men, divided into two teams, and each assisted by four dogs. Experience in sledge travelling was of course wholly wanting and had to be acquired. They started on March 4th.

Eight (Wild, Weller, Heald, Plumley, Quartley, Evans, Hare, and Vince) were sent back on the 9th under Lieut. Barne. On the 11th they left their tent and walked onward, thinking they were close to the ship. A blizzard came on and they found themselves on a steep slope, could see nothing, but tried to keep close together. Suddenly Hare disappeared, then Evans went. Barne and Quartley left the rest to search for Evans. Then they suddenly found themselves on the edge of a precipice. Vince shot past Wild, and went over the edge. With the greatest difficulty Wild, Weller, Heald, and Plumley climbed back, reached some rocks, and ultimately groped their way to the ship.

Armitage was at once despatched with a relief party and a sledge laden with warm clothing and medical comforts, and fortunately not in vain. They came upon Lieut. Barne with two men, and learnt that when Barne left the rest in search of Evans, he found himself flying down an icy slope at a furious pace until he was stopped by soft snow. Within a few feet of him was Evans, then Quartley came hurtling down. The soft snow saved all three, for they were on the brink of the precipice over which poor Vince had been hurled.

All hope of finding young Hare, a lad of 18 who had been shipped at Lyttelton, had been given up. But on March 13th, a solitary figure was seen staggering towards the ship. It was Hare, exhausted and famished, but free from frost bites. He had been buried in the snow for thirty-six hours without food. His preservation was little short of miraculous. Of Vince's fate, however, there could be no doubt, though his body was never found. He was a fine young seaman, very popular, always obliging and cheerful. A cross, firmly fixed, was erected to his memory. Royds and his companions returned some days afterwards.

The explorers now entered upon a very severe Antarctic winter in 77° 52′ S. All the scientific observers were soon steadily at work, and occupations were found for officers and men alike. Every Tuesday, after dinner, there was a debate in the ward-room on a given subject. The *South Polar Times* came out periodically, edited by Shackleton, and most beautifully illustrated by Dr Wilson. Some of the men, as well as officers, contributed. The men acted the drama of the "Ticket-of-Leave Man" in the large hut, with Barne as stage manager.

Captain Scott, throughout the winter, was diligently studying the problems connected with sledge travelling. In many respects Arctic sledging conditions differ from those of the Antarctic regions. The cold in the spring and summer is very much more severe in the south, where the thermometer often falls below -60° Fahr. On the other hand the southern traveller escapes the misery of water on the floes, which renders travelling in an Arctic summer so very arduous. Another striking difference is that while the Arctic traveller usually travels over sea ice, often hindered by ranges of hummocks, the Antarctic explorer does most of his work over land ice. The land ice is the most formidable, not only from the deep furrows ploughed by the wind, but also from the dangerous chasms and crevasses. Scott was impressed with the necessity of attention to the minutest details in studying the art of Antarctic sledge travelling.

The sledges were built at Christiania. Their great fault was in being too narrow, causing them to capsize more readily, it being necessary to pile the load much higher. They had five pairs of uprights and cross bars. The width of the sledges was only 17 inches, the runners 3¾ inches wide; two sledges were 12 ft. long, six 11 ft., and three 7 ft.[207] The best width of runner-surface depends on the nature of the snow, and can only be decided after sufficient experience. The Danes have an excellent plan of attaching a ski-runner of walrus-hide in dealing with soft snow.

Scott conceived the idea, having to deal with fewer men, of dividing the sledging crews into units of three, each unit having its own tent and equipment complete. The great advantage of this plan is that, when advisable, a party can be split up into threes, or three can be detached from it. Each article was, therefore, designed for the requirements of three men. The tents were bell-shaped and made of the lightest green Willesden canvas, spread on five bamboo poles 7 ft. long and united at the top. They were thus 5 ft. 6 in. high, and 6 ft. in diameter on the floor, with a skirting edge on which to pile snow; their weight with the floor cloth was 30 lb. Scott considered the sleeping bags of the greatest importance. They were made on board of reindeer skin, some for one man, but most of them to contain three men, which is a great advantage as regards weight. The fur was inside, and there was a flap to be drawn over the occupants and made fast. Their weight was 40 lb. Seven of M'Clintock's sleeping bags only weighed 42 lb. but there was also a wolf or buffalo robe weighing 40 lb.

Scott's arrangements for diet while travelling were adopted after careful study and much thought. Experts place our ordinary food under three headings—the nitrogenous food supplied by meats, the fats, and the carbohydrates or farinaceous foods. Supposing all to be water-free, the allowance he adopted was 29 ounces per man, 25 being the allowance in the army on war footing. For polar travelling a much larger allowance is necessary. Water cannot be entirely excluded,

though it is a dead and useless addition to the weights. Ordinary cooked meat contains 54 per cent. of moisture. This moisture in food was reduced to a minimum, yet it increased the 29 ounces of actual food to about 35 ounces[208]. Our ration in the Arctic Regions was 42 ounces per man per day. We could not do without 1 lb. of pemmican, and we also included lime-juice ½ ounce, tobacco ½ ounce, and 3¾ ounces (¾ of a gill) of rum. Fanaticism has deprived Antarctic travellers of the latter most comforting and useful part of the ration. On the whole the pemmican allowance might well have been increased, by omitting plasmon and cheese.

The manufacture of the best pemmican is a lost art. Scott obtained most of his from Beauvais of Copenhagen. It contained 20 per cent. of water, but that I sent out in the *Morning* made by the Bovril Company was better. But the substantial dish with the *Discovery* travelling parties was a mixture of pemmican, bacon, and other ingredients, forming a thick soup which they called "hoosh."

Scott adopted the cooking apparatus invented and used by Nansen, made of aluminium for lightness. It takes as long to reduce ice to a liquid state at very low temperatures as it does to boil the water, so that double the quantity of fuel is needed. Boiling water was made from snow in twelve minutes. The "Primus" lamp of Nansen's pattern was also adopted. Paraffin oil was used for fuel. Each tin contained a gallon, weighed 10 lb., and was the allowance for three men for ten days.

The constant weights for two sledges were 568½ lb. and 630 lb. could be devoted to provisions, a total of 1200 lb., *i.e.* about 200 lb. per man at starting. Our constant weights in the Arctic regions were 440 lb., provisions 840 lb., making a total of 1280 lb.

Ski were given a fair trial, but all were novices, and it was found that a party on foot invariably beat a party on ski.

For clothing, furs were eschewed, thick cloth was used, and over all a suit of thin and loose gaberdine, consisting of a blouse and breeches, fitting closely, however, about the neck, wrists, and ankles. "Balaclava" helmets were the head-gear, with special protection for the ears and back of the neck. In summer, when the glare was great, broad-brimmed felt hats were preferred. For the hands, fur or felt mitts were worn over long woollen half-mitts. For the feet finneskos were used. These are Lapp reindeer-fur boots, the soles being of the hard skin of reindeer legs. Two pairs of socks were worn and the boots were stuffed with fine hay before they were put on. There were three kinds of goggles in use, one wire gauze with smoked glass, another a piece of leather with a slit in place of the glass, the third made out of a piece of wood with cross slits cut for the eyes. The latter, used also by the Eskimos, were the best, but attacks of snow blindness could not be altogether prevented.

Scott adopted a quite different kind of hauling gear from any hitherto used. Instead of working from the shoulder, a broad band of webbing was worn round the waist with braces for supports. The two ends of the band were fastened by an iron ring to which a rope was attached, secured to the trace. The men were thus upright when pulling, and Scott believed that the weight was thus distributed evenly over the upper part of the body, which made the pulling easier, and gave greater freedom for breathing.

With regard to the use of dogs there were two ways of treating them. There was the idea of bringing them all back safe and well, which was M'Clintock's way, and there was the way of getting the greatest amount of work possible out of them, regardless of everything else, and using them as food, which was Nansen's and Peary's way. If dogs are treated with humanity, they are in the writer's opinion not so good as men in a long journey, and Scott had an unconquerable aversion to the employment of them in the second way. The dogs, twenty in number, had been obtained from Siberia, but five were lost in various ways before the travelling season arrived.



Chasm separating Ice and Land in Lat. 82° S.

Having thus settled every part of the equipment down to the minutest detail Scott then proceeded to plan the work for the coming season. He himself was to lead the journey to the south: Armitage was to attempt the main ridge of mountains, provided with ice axes, crampons, and ropes. Several shorter journeys were to precede them. Royds and Skelton made their way to Cape Crozier to see to the record post, as a signal to a relief ship, and returned on October 24th, having discovered the breeding-place of the Emperor penguins. On the 30th the supporting party, under Lieut. Barne, left for Depôt A, where Scott had already established provisions.

On November 2nd the southern party started under the command of Captain Scott, with Dr Wilson, Sub-Lieut. Shackleton, R.N.R., and the dogs. Barne was caught up just as he was rounding White Island. Odometers had been manufactured on board, the wheel being attached to the sterns of the sledges, so that a rough dead-reckoning could be kept, provided that the route was straight and the course observed and known. Stockfish had been brought for the diet of the dogs, and though it had been taken by the advice of an experienced authority on dog-driving it soon became apparent that it was having a permanently bad effect on them. The food must have deteriorated on the passage through the tropics. Advances could only be made by relays, going over 15 miles to make 5 miles good.

On November 25th the latitude was 80° S. On December 2nd they were passing a magnificent range of mountains running S.E. and N.W., with peaks 10,000 feet above the sea, and long rounded snow capes merging into the barrier. A deep chasm cut them off from any nearer approach to the land. For 31 days they had been at the wearisome relay work, as it was impossible to drag the whole load, but at length a suitable place for a depôt was found, called Depôt B. Throughout the journey Dr Wilson was indefatigable, spending two or three hours at the end of each fatiguing day, sitting at the door of the tent, sketching the splendid mountainous coast to the west. Scott wrote:—

The beauty of the scene before us is much enhanced when the sun circles low to the south, we then get the most delicate blue shadows, and purest tones of pink and violet on the hill slopes. There is rarely any intensity of shade—the charm lies in the subtlety and delicacy of the colouring and in the clear softness of the distant outline.

Their furthest point was reached in 82° 17′ S. December 30, 1902. The views of the land were here extremely interesting. The cliffs rose to a height of 1800 feet, ending in the snow expanse which rose into ridges and peaks. In colour the cliffs were a rich deep red, further on nearly black. The most distant peak to the south, far beyond the 83rd parallel, was christened Mount Longstaff. To the S.W. "there was a splendid twin-peaked mountain which, even in such a lofty country, seemed as a giant among pigmies." Captain Scott named it Mount Markham. One more unsuccessful attempt was made to reach the land, but it was impossible owing to an intervening chasm.

On the return journey the few surviving dogs were useless, and the men had to drag the sledge, deriving occasional help from the sail. On the 14th January, Shackleton broke down altogether. The only hope was to keep him on his legs, doing nothing, for the other two could not possibly have dragged him all the way on the sledge. On the 15th the two last of the dog team died, but on the 28th the depôt was reached and they again had plenty of food. Shackleton struggled along on ski, in a deplorable state, Scott and Wilson dragging the sledge, and on the 30th they put Shackleton on it and dragged him also. Next day he managed to walk again; his two gallant companions being nearly worn out. The ship was finally reached on February 3rd, 1903. In 94 days they had gone over 800 miles, or counting relays 960 miles. The return with their disabled comrade was nothing less than heroic.

The western party started on December 2nd, Armitage and Skelton with ten men forming the extended party; Koettlitz, Ferrar, and Dellbridge (Assistant Engineer) with six others the limited party. Armitage's plan was to attempt the ascent of the mountains near a vast pile of moraine material which he had seen on a reconnoitring journey. The party ascended a steep snow-slope which divides two masses of bare rocky foot-hills, and rises to a plateau separating them from the higher mountains beyond. Armitage reached an elevation of 5000 ft., and obtained a view of a glacier, afterwards called the Ferrar Glacier, winding inland between high rocky cliffs. Here the supporting party returned, while Armitage and Skelton with the rest of the extended party continued to ascend the steep snow slopes, most arduous and toilsome work. At 6000 ft. they were stopped by an outcrop of rock, and Armitage then resolved to attempt the descent into the Ferrar Glacier, a fall of 1800 feet. In this his party succeeded. On December 18th they commenced the ascent of the glacier, and by January 1st, 1903, were 7500 feet above the sea. One of the men broke down and was left in a tent with half the party, while Armitage pushed on with the rest until his elevation was over 8900 feet. In returning Armitage fell down a crevasse, and was saved with great difficulty. They returned to the ship on the 19th, after having discovered a practicable route to the interior. It was a piece of excellent pioneer work.

Many shorter but useful sledge journeys were made by Koettlitz, Ferrar, Hodgson, and Bernacchi which threw much light on the volcanic region, where the numerous craters show the result of a very remarkable volcanic outburst. Thus Koettlitz proved the insularity of Black Island, examined the northern side of Minna Bluff, and ascended to the summit of Brown Island, 2750 ft. in height.

As the summer advanced the anxious work of freeing the boats, which had sunk deep in the snow, was undertaken; equally laborious work was entailed in getting the ship ready for sea, and

well-founded hopes were entertained that a relief ship would arrive.

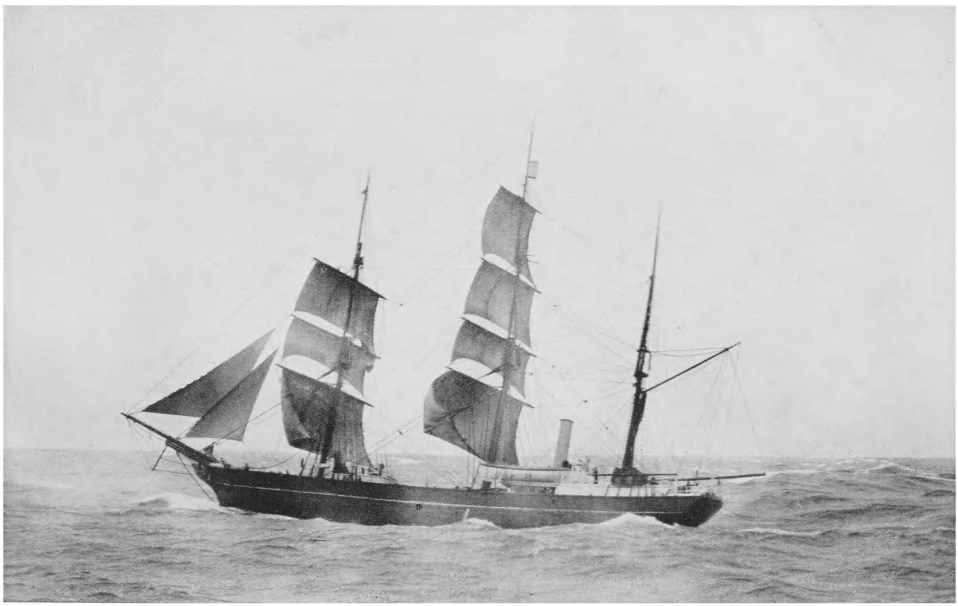
CHAPTER LVIII

THE SOCIETIES' ANTARCTIC EXPEDITION

The *Morning*

THE dreadful disaster to the Franklin Expedition was entirely due to the absence both of a relief ship and a depôt ship; and the necessity of providing one has ever since been recognised. We had promised Captain Scott that such a ship should be provided to take out provisions and letters, bring back any invalids, and afford relief and the means of return if anything had happened to the *Discovery*. Captain Scott had furnished full information respecting places where records would be found, and other directions for finding his ship.

There was no time to be lost. I first carefully considered what ships suitable for arctic work were available in Scotland, but the only one was the *Terra Nova* and her price was beyond our means. This ship was built in 1884 and had been employed in Newfoundland; she would have suited admirably had sufficient funds been forthcoming. I therefore turned to Norway in August, 1900, where I had an excellent adviser and friend in Captain Bonnevie of Laurvik, who had been surveyor for the Veritas, the Norwegian Lloyds, since 1874, a good seaman who had had immense experience. There were a dozen ships. Of these four were too small, though strongly built, others had dry rot. The only one that would suit was the *Morgen*, but her price was £6000, and I then had no money in hand.



The *Morning*

It became necessary to raise funds and bring down the price of the *Morgen*. The Council of the Royal Geographical Society subscribed nothing, but the Royal Society generously sent me £500. With his usual munificence Mr Longstaff subscribed £5000, and later Sir Edgar Speyer gave another £5000. With these exceptions very rich people refused to help. But hundreds of our countrymen with small means sympathized and sent all they could afford. Money came from officers in South Africa and on the Gold Coast, in the Sudan and Uganda, from a Gurkha regiment at Chitral, from 24 Admirals and Captains, from several men-of-war, and a large and most generous subscription from the acting Sub-Lieutenants at Greenwich. One schoolboy, who was saving up his money to buy a bicycle, sent 5*s.*, a real act of sympathy and self-sacrifice. Mr Cyril Longhurst was untiring and indefatigable in seconding my efforts. I also appealed to the Government, as there were 32 naval officers and men on board the *Discovery*, who ought not to be abandoned to their fate. The reply was that the Government denied any responsibility and expressed surprise at being asked. On the other hand the New Zealand Government granted £1000. From Norwich, due to the exertions of Mr and Mrs Colman, nearly £200 was received. The Duke of Westminster kindly gave the use of Grosvenor House for a concert, which yielded £483. On February 14th the Prince of Wales sent for me to enquire about my progress and subscribed £50, while His Majesty the King gave £100. By July 2nd, 1902, the receipts amounted to £22,000.

I then went to Norway again and met Captain Bonnevie at Tönsberg to inspect the *Morgen*. Mr William Colbeck, R.N.R., then Chief Officer of the *Montebello* (Wilson line) accompanied me, as I had decided upon offering him the command, and ultimately I succeeded in getting the price of the vessel reduced to £3,880. The *Morgen* was built specially for strength by Mr Svend Foyn of Tönsberg. The engines were old-fashioned but strong, the boilers strong and serviceable. I bought the vessel on October 23rd, 1901, and became the managing owner, and on the 30th she was delivered over to Bonnevie as our agent. Her length was 140 ft., breadth 31 ft., depth 16½ ft., tonnage 452. I had her painted black, with a white ribbon like the dear old *Assistance*, with *Morning* on her stern in white. On arrival in England she was handed over to Messrs Green of Blackwall for considerable repairs and alterations, which were effected under the superintendence of Lieut. Colbeck.

William Colbeck, born at Hull in 1871, was educated at Hull grammar school, and went through a six months' course of navigation before going to sea as an apprentice, at the age of 15. He passed for first Mate in July 1892, and got a Master's extra-certificate in 1897. Since 1900 he had served as chief officer of the *Montebello* under Captain Pepper. After going through a course of magnetism at Kew, he joined the Newnes Antarctic Expedition as navigator, cartographer, and one of the magnetic and meteorological observers. He proved himself to be an acute and intelligent observer and his descriptions of parts of the coast of Victoria Land are excellent. He had acquired experience in Antarctic ice navigation. There could not be a better man to command our relief ship, and he was appointed on February 10th, 1902. After some delay, he received his commission as a Lieutenant R.N.R. and I had the pleasure of conferring upon him Sir George Back's geographical award for his former services in the Antarctic regions.

Captain Colbeck chose for his chief officer Mr Rupert England, who held the same position on board the *Angelo* of Wilson's line. He was a steady attentive officer who knew his work, and saw that the men did theirs. Mr Morrison, the engineer, was an excellent and zealous officer, always making the best of everything. Dr Davidson, the surgeon, a distinguished student and medallist of Edinburgh University, was an excellent doctor and very popular. Two friends, formerly cadets of the *Worcester*, came to volunteer, Evans a naval Sub-Lieutenant, and Doorly a P. and O. officer, and they were very anxious to be taken as junior executive officers. Evans had excellent certificates, was keen, able, and full of zeal. Gerald Doorly was a musician, an athlete, and a student, in the

racing boat's crew of the *Worcester*, and Queen's Gold Medallist on board that ship. He proved to be very popular and clever, always bright and cheerful, and a hard worker. Then came Mulock, a naval Sub-Lieutenant who was very pressing and said he must go; so I got leave from the Admiralty for him also. He was an acquisition, for he had served in the *Triton* surveying ship under Captain Cust, who had the highest opinion of him. He was a surveyor and an excellent draughtsman. There were two midshipmen, Maitland Somerville and a son of Captain Pepper.

For the crew, as a nucleus, Captain Colbeck got several volunteers from his old ship the *Montebello*, and the rest appeared satisfactory. Cheetham, the boatswain from the *Montebello*, was a very smart respectable man who could be trusted to take charge of a watch. He continued in the service and now has a long record of Antarctic work.

The officers were entertained at dinner by the Geographical Club, when a glee was sung specially composed for the occasion. Afterwards the Bishop of Stepney kindly came on board and conducted a farewell service. The ship was loaded with letters and papers, and supplies of all kinds for the *Discovery*. I had been rather anxious about the pemmican, and I sent out a fresh supply which I believed to be very good, manufactured by the Bovril Company.

During the long voyage to Lyttelton all went well; and the ship was received in New Zealand with cordial hospitality. On the 6th December, 1902, they sailed for the Antarctic. The *Morning* met with adverse winds and frequent gales at first, until she reached 60° S. in longitude 170° 30′ E., when Captain Colbeck was able to stand away to the south with a W.S.W. wind and fine clear weather. He decided to work south between longitudes 178° and 180° E., well to the eastward of the Balleny Islands. The Antarctic Circle was crossed on Christmas Day in 179° 30′ E., when icebergs became numerous. At 2 p.m. two small islands were sighted, and later the *Morning* steamed round them. The largest was about 1¼ miles long and three-quarters of a mile broad, rising to about 250 ft. The other islet or rock was only about 200 ft. in diameter and 250 ft. high. Captain Colbeck, accompanied by Mulock and two others, effected a landing with some difficulty on a beach on the southern side of the larger island, and collected some rock specimens. Thousands of birds were on both islands. Mulock made a careful survey and the position was fixed. It received the name of Scott Island and is a discovery of special interest, from its isolated position.

Making her way through much heavy pack ice, the *Morning* came in sight of the lofty mountains of Victoria Land on the 3rd January, 1903, when a very heavy gale was encountered. On the 8th Captain Colbeck landed at Cape Adare and then proceeded to the south, guided in his search by the information in Captain Scott's letter. Reaching Franklin Island, England landed and searched the beach, but could find no record. Captain Colbeck and Mulock then landed at Cape Crozier and found the record announcing the position of the winter quarters of the *Discovery* in M'Murdo Sound. The *Morning* then proceeded to Cape Bird and announced her arrival to the *Discovery* by signal. The mails, stores, and provisions were transferred to the *Discovery* with all possible speed. The distance between the ships was six miles of ice, and 14 tons of stores were transported, officers and men carrying out the work with admirable zeal and determination. The Mornings dragged the loads to a half-way flag, and the Discoveries took them on—a heavy job completed with alacrity and despatch.

Some invalids and others, including Shackleton, were sent home in the *Morning*; and Mulock, an acquisition as a draughtsman, surveyor, and good messmate, was transferred to the *Discovery*.

On the 2nd March the *Morning* began her return voyage, arriving at Lyttelton on the 25th, ready to return again for the relief of the *Discovery* in the ensuing year. England had proved himself to be an indefatigable worker and an excellent seaman. Evans had been of great assistance in the navigation of the ship, and in the work of transporting the stores over the ice. Doorly had kept the

meteorological records. All had done well. Above all Captain Colbeck had proved that there could be no better man to perform the very important duties which the command of the *Morning* entailed.

CHAPTER LIX

THE SOCIETIES' ANTARCTIC EXPEDITION

Second Year.

THE arrival of the *Morning* with letters and fresh supplies of stores and provisions was a very welcome incident for the explorers, though the precaution had been taken to collect the largest possible supply of seal and other fresh meat. The need for constant exercise had been kept in view; there was a good deal of hockey on the ice, dancing, and other amusements. The second winter thus passed without sickness and in the pleasantest fashion.

When the travelling season approached Captain Scott decided that there should be a journey over the mountains to the west, led by himself, one to the south under Barne and Mulock, and one to the south-east over the barrier ice under Royds and Bernacchi, besides several shorter journeys for specific purposes.

Captain Scott started on September 9th, 1903, with Mr Skelton, Evans, Lashly, Mr Dailey, and Handsley. The first object was to find a new road to the Ferrar Glacier, and to lay out a depôt. The discovery of a route by New Harbour was made, and the glacier was entered. It lay between massive cliffs like a ribbon of blue, down the middle of which ran a dark streak caused by a double line of boulders—a median moraine. The depôt was placed on this moraine, 2000 ft. above the sea. Scott observed that where Antarctic glaciers run east and west the south side is much broken up and decayed, while the north side is comparatively smooth and even. The reason is that the most direct and warmest rays of the sun fall on the south side of a valley, and here the greatest amount of summer melting takes place.

Scott's party returned, and found that Barne had laid out a depôt S.E. of White Island, the temperature being as low as -70°. Royds had reached Cape Crozier and found that the Emperor penguins had hatched out their young.

Barne and Mulock began their extended journey on October 6th to Barne Inlet. Scott's party started on their very difficult enterprise of discovering the ice cap on the 12th. His party was a combination of three separate parties. The first consisted of Captain Scott, Mr Skelton, Mr Feather the boatswain, Evans, Lashly, and Handsley. Secondly there was the geological party, consisting of Mr Ferrar with Kennar and Weller. The third, the auxiliary supporting party, consisted of Dailey the carpenter, and two other men, Williamson and Plumley. An absence of nine weeks was calculated for the extended party, and six weeks were allowed to Mr Ferrar for his geological studies. They started with four 11-ft. sledges, and no animal traction, dragging 200 lb. each at starting.

One of the noblest passages in Scott's great work compares the use of dogs with that of men for traction. Admitting that dogs, ruthlessly used, increase the distances that may be reached he adds:—

> "To pretend that they can be worked to this end without pain, suffering, and death is futile. The introduction of such sordid necessity must and does rob sledge-travelling of much of its glory. To my mind no journey ever made with dogs can approach the height of the fine conception which is realised when a party of men go forth to face hardships, dangers, and difficulties with their own unaided efforts and by days and weeks of hard physical labour

succeed in solving some problem of the great unknown. Surely in this case the conquest is more nobly and splendidly won."

On October 18th the condition of the sledges obliged them to return. Only one remained sound. On the others the German silver on the runners was split to ribbons and the wood deeply scored. Leaving the sound sledge and a large depôt they hurried back to the ship, the last march covering 36 miles. The sledges were repaired, and Ferrar now took a smaller 7 ft. sledge. The final start was made on October 26th; and they crossed the sea ice at a rate of 25 miles a day. There was continual trouble with the runners, and Mr Skelton with the stokers of the party were kept at work with pliers, files, and hammers, stripping off the torn metal and lapping fresh pieces over the weak places.

On November 3rd they had reached a height of 7000 ft. The majestic cliffs were below them and they gazed over the summits of mountains to the eastward. Next day it was blowing a full gale, and there was only just time to get the tents up when it burst upon them. It was a week before they were able to move again, and throughout the whole time the gale raged incessantly.

The delight of being able to start again may be imagined, and on the 13th they had reached the summit at a height of 8900 ft. with five weeks' provisions in hand. They found themselves on a great snow plain with a level horizon all round, but above it to the east rose the tops of mountains. Captain Scott had discovered the great Antarctic ice-cap.

The gale had blown away the nautical tables so that the observations could not be worked out until their return. Scott's inventive talent came into play. He could calculate the declination for certain fixed days, and having ruled a sheet of his note-paper in squares, he plotted these points on the squares, and joined them with a curve. It was afterwards found that the curve was nowhere more than 4′ in error. It gave him the latitude with as much accuracy as was needed at the time.

The cold on the ice-cap was intense, -44° Fahr. But they had reached the lofty plateau, leaving the mountain peaks behind, and before them lay the unknown. Scott resolved to press onwards. On November 22nd he went on with Evans and Lashly, the rest returning.

From a magnetic point of view this was a very interesting region. The travellers were directly south of the magnetic pole, and the north end of the compass pointed south, or a variation of 180°!

Of Scott's two companions, Evans, who had been a gymnastic instructor in the navy, was a man of herculean strength. Lashly had been a non-smoker and a teetotaller all his life, and had the largest chest measurement in the ship. The progress made was rapid, though they had to struggle over a sea of broken and distorted snow-waves, causing frequent capsizes of the far-too-narrow sledge. The night temperature continued as low as -40°, and, judging from the *sastrugi*, the wind blows from west to east across the ice-cap, often with great violence, and as the summer temperature is -40° the cold of the winter may be imagined. The little party of three resolutely pushed on to the westward until November 30th. They had gone for 200 miles over the ice-cap, and could see nothing beyond but a further expanse of the terrible plateau. Yet, "After all," writes Scott,

"it is not what we see that inspires awe, but the knowledge of what lies beyond our view. We see only a few miles of ruffled snow bounded by a vague wavy horizon, but we know that beyond that horizon are hundreds and even thousands of miles which offer no change to the weary eye ... nothing but this terrible limitless expanse of snow. It has been so for countless ages and it will be so for countless more.... Could anything be more terrible than this silent wind-swept immensity?"

On December 1st the little party turned their steps homewards. Day by day they struggled on over rough snow ridges in thick weather. On the 15th all were precipitated down a steep slope for 200 ft., finding themselves sore and bruised at the bottom, and near the upper entrance of the glacier. It was a month since Scott had seen any known landmark. They started again, Scott in the middle and a little in front, Lashly on his right, and Evans on his left. They had been going for a quarter of an hour when Scott and Evans suddenly disappeared down a crevasse. Almost by a miracle Lashly saved himself from following, and sprang back with his whole weight on the trace. The sledge rushed past him and jumped the crevasse down which Scott and Evans had gone. The two who had fallen were dangling at the ends of their traces with blue walls of ice on each side and a fathomless abyss below. Scott struggled on to a thin shaft of ice wedged between the walls of the chasm, guiding Evans's feet to the same support. The great danger was that the intense cold would soon render them powerless. There was no time to lose, and Scott by a desperate effort managed to swarm up the trace and flung himself on the snow. With the united efforts of Scott and Lashly Evans was also landed on the surface. Both were terribly frost-bitten. On the same evening they reached their nunatak depôt and next day, by a long march, arrived at the main depôt. There were no further troubles, and the three reached the ship on the 23rd December.

In his absence of fifty-nine days Scott and his companions had travelled over 725 miles, but for nine days they had been confined to the tent by gales of wind. The distance, therefore, was accomplished in fifty marching days, a daily average of 14½ miles. Taking the whole eighty-one days of absence they had covered 1098 miles at a little under 15½ miles a day. They had reached the limit of possible performance, under the hardest conditions.

This is, in some respects, the greatest polar journey on record without dogs. The only comparison can be with the journeys of M'Clintock and Mecham. But they had not the intense cold, the danger from crevasses, and the great height to climb. Nor can any one journey be compared with it as regards the value and importance of its results. Scott discovered the vast Antarctic ice-cap and explored it for 200 miles, and his observations enabled Captain Chetwynd to fix the position of the south magnetic pole.

Barne and Mulock marched to the south, but, after leaving Minna Bluff, they were much hampered by southerly gales which confined them to the tent for ten days. They had barely reached the mouth of the inlet which they were to explore when they were obliged to return. The ground was scarcely passable, and they had to cross wide crevasses, and clamber over steep ridges. Mulock was indefatigable in the use of the theodolite, so that this stretch of coast-line has been very accurately plotted. But the most important result of Barne's journey was the discovery that the ice on the barrier moved. Depôt A lay on an alignment with a small peak on Minna Bluff and Mount Discovery in 1902. Barne found the depôt was no longer on with this small peak and Mount Discovery and, therefore, that it must have moved. Thirteen and a half months after the establishment of Depôt A Barne measured the displacement, and found that it had moved 608 yards. Barne and his party were absent 68 days.

The journey of Royds and Bernacchi over the ice of the barrier to the S.E. occupied thirty days. Scott wrote, "It deserves to rank very high in our sledging efforts, for every detail was carried out in the most thoroughly efficient manner." A very interesting series of magnetic observations were taken by Bernacchi, who carried with him the Barrow dip circle, a specially delicate instrument. The party returned on the 10th December, having accomplished an exceedingly fine journey. There were several shorter journeys. Dr Wilson was at Cape Crozier again to study the habits of the Emperor penguins during twelve days, and Armitage explored the Koettlitz glacier, previously only seen from Brown Island, and obtained some excellent photographs.

Captain Scott ordered all the parties, when they returned from sledging and had rested, to join the sawing camp about ten miles to the north, where work was being proceeded with for cutting the ship out of the ice. But it was soon found that the task was an impossible one, and it was accordingly relinquished.

The *Morning* was got ready for her second voyage, with arrangements complete for taking all the *Discovery's* officers and men on board if necessary, which was very unlikely. But the Government began to interfere. The *Terra Nova*, Captain MacKay, was bought and sent out as well as the *Morning*, which was quite unnecessary and a great waste of public money, for all that was required could have been perfectly done by the *Morning*. The two ships arrived at the edge of the ice on the 5th January, 1904. The *Discovery* was freed from the ice on the 16th February. A large wooden cross, with an inscription, had been made in memory of Vince, and this was erected on the summit of Hut Point before their departure.

On the 17th a furious gale of wind sprang up. A heavy anchor was down. Steam was got up, but the wind was more powerful and the ship was driven upon a shoal near Hut Point at 11 a.m. The gale kept increasing in force, the seas broke over the *Discovery's* starboard quarter and she listed heavily to port, the keel constantly pounding and grinding on the stones. Late in the afternoon the wind abated and the ship began working astern. The engines were put full speed astern, and she slid gently into deep water. There was no leakage, an eloquent testimony to the solid structure of the ship, and what showed every sign of becoming a great disaster was happily averted.

The *Discovery* then received her coal from the relief ships, Colbeck reducing himself to the very narrowest limits, keeping just enough to take him back to New Zealand. Scott intended to explore westward from Cape North. In the voyage northward the rudder was damaged, and the *Discovery*, after rounding Cape Adare, anchored in Robertson Bay, where the rudder was shifted. As soon as the spare rudder was in place the vessel put to sea again, February 25th, and was soon in the thick of the icebergs. There was a great mass of closely-packed ice towards Cape North. Captain Scott, therefore, altered course and sighted the Balleny Islands on the 2nd March, afterwards proceeding west to beyond 159°E., where the ship was actually behind Wilkes's alleged land. On March 4th she was in 67° 23′ S. and 155° 30′ E., and it was quite clear that Eld's Peak and Ringgold's Knoll did not exist. Cape Hudson is also imaginary, and there is no case for any land near that latitude eastward of Adélie Land. The coast turns S.E. to Cape North. On April 1st the *Discovery* arrived at Lyttelton, where a most cordial reception awaited her.

The *Discovery* sailed again June 8th, completing her magnetic survey across the South Pacific. Passing through Magellan Strait, Port Stanley was visited for coal, and on the 10th September the good ship was anchored at Spithead. Never has any polar expedition returned with so great a harvest of results. The discoveries alone were remarkable—the entirely new land of King Edward VII, the nature of the ice on the barrier, the great Victorian range of mountains, the volcanic region of Ross and the smaller islands, the glaciers and the remarkable phenomenon of their recession, the great Antarctic ice-cap over which Captain Scott and two companions travelled for 200 miles, the discovery of the position of the south magnetic pole, and the lines of deep sea soundings with serial temperatures and dredgings. Yet these are only the skeleton which is provided with flesh and blood by the scientific results and observations which are contained in the twelve large volumes published on the voyage.

Captain Scott's own narrative, in two volumes, beautifully illustrated by Dr Wilson, was worthy of the expedition. It was his first literary effort, but the great explorer had a natural gift, and there are few polar stories to be compared with the *Voyage of the Discovery* either in literary merit or in scientific interest.

CHAPTER LX

SHACKLETON'S ATTEMPT TO REACH THE POLE

SHACKLETON'S expedition to reach the South Pole differed from any previous one in that ponies were employed. Great care was exercised in the equipment, the sledges were built in Christiania, and ten 12 ft., eighteen 11 ft., and two 7 ft. were taken. Woollen garments were almost exclusively used, with an outer suit of wind-proof gaberdine; fur being restricted to the sleeping bags, and to foot and hand coverings. "Finnesko" boots filled with sennegrass were, however, largely used. A hut, 33 ft. by 19 ft., was taken out in pieces ready for erection, lighted with acetylene gas and heated by anthracite. There were 15 Manchurian ponies, nine Siberian dogs, and a motor car, but much was not expected of either of the two latter modes of traction.

The intention was to land a shore-party, which was to winter, and though the scientific work of the expedition was not to be sacrificed, one of the main objects was to reach the South Pole. The ship's staff consisted of 14 officers and crew under the command of Lieut. R. N. England, R.N.R., who had been first officer in the *Morning*; the shore party were also 14, with Shackleton as commander. Professor T. W. E. David was Director of the scientific staff, Dr Douglas Mawson physicist, Mr J. Murray biologist, Mr Raymond Priestley and Sir Philip Brocklehurst geologists, and Lieut. J. B. Adams meteorologist. The vessel purchased for the expedition was the *Nimrod*, a not very suitable craft, being small and not able to make more than six knots under steam. She proved, however, to be better than was anticipated.

On July 30th, 1907, the *Nimrod* left the East India Docks for New Zealand, King Edward and Queen Alexandra and others of the Royal party paying a visit to the ship at Cowes. She reached Lyttelton and sailed on New Year's Day, 1908, for the south, being towed to the edge of the pack, a distance of over 1500 miles, and meeting with very heavy weather. After trying along the Barrier for a place for winter quarters a landing was ultimately made close to Cape Royds at Ross I. under great difficulties, and on February 22nd the *Nimrod* left on her return voyage to New Zealand.

On March 5th an expedition with a supporting party was arranged to ascend Mt Erebus, and in this they were successful; the summit, which was estimated at 13,370 ft., being reached on March 10th. A striking feature was found to be the vast quantity of large and perfect felspar crystals on the snow around the crater.

Preliminary sledge journeys were made from August to get all hands into practice, and visits were made to Hut Point of the *Discovery* expedition, whither ultimately everything needed for the journey to the South Pole was brought, in order that the start might be made from the most southern point possible. Depôts were also laid out. Ill luck befell them with the ponies, only four being left at the start. It was resolved that the sledge loads should be limited to 650 lb., the sledge itself weighing 60 lb. The daily rations for the polar journey per man were as follows:—Pemmican 7½ oz., biscuit 16 oz., cheese or chocolate and cocoa 2·7 oz., plasmon and quaker oats each 1 oz., sugar 4·3 oz., emergency ration 1·5 oz., total 34 oz. This was doubtless an insufficient quantity, the pemmican allowance especially being much too small.

On October 29th the southern party, consisting of Adams, Marshall, and Wild, under Shackleton, started, accompanied by a supporting party who returned on November 7th. The ponies did well, but crevasses rendered the going very dangerous and narrow escapes more than once

occurred. Later the surface became soft, and on November 21st the first pony had to be shot, and a week later two others, the conditions being very bad. On December 1st the latitude of 83° 16′ was reached and they were left with one pony, which pulled one of the sledges while the other was dragged by themselves. Misfortune, however, was soon to overtake them, for on December 7th the last pony fell down a crevasse, and complete disaster was only just avoided.

The sledges had now to be dragged by the explorers unaided, but by December 16th they had crossed over 100 miles of dangerously crevassed glacier and were at an altitude of some 6000 ft. The ground steadily rose, and on December 28th an altitude of 10,199 ft. was attained. The party suffered from a kind of mountain sickness, and the lessening food, combined with failing strength, made it evident that success was beyond their powers. They persevered for a few days longer, until January 9th, 1909, when the flag was hoisted in what was calculated to be Lat. 88° 23′ S., and the return march was begun. This was a desperate struggle against starvation, failing strength, and disease, for a form of dysentery attacked all of the party, and it was only by providential fortune that Shackleton and Wild were able to reach the *Nimrod* (which by this time had arrived) on March 1st, and the others three days later. The explorers had done all that was humanly possible on a somewhat inadequate supply of food, due mainly to an insufficiently-considered scheme of depôt-laying. A noteworthy fact was that both on the outward and the return journey the wind had been very greatly in their favour.

During the absence of Shackleton and his companions on their southward march, the Western Party, consisting of Armitage, Priestley, and Brocklehurst, did some work in the western mountains and obtained a valuable series of geological specimens. On their way back, while encamped on the sea ice, it broke up, and they were carried out to sea. Their position seemed desperate, for some miles of open water separated them from the shore, and the day passed without relief, but by the greatest good fortune the floe was at length swept back into contact with the shore ice for a few seconds and they were just able to get across.

A third expedition was meanwhile being undertaken by the Northern Party, which was also composed of three men—Professor David, Mawson, and Mackay. The main object was accurately to determine the position of the South Magnetic Pole, and to reach it, while if possible a rough geological survey of the coast of Victoria Land was to be made if time and opportunity permitted.



Typical Loose Pack—Mt Melbourne in distance

The start was made on October 5th, and twelve days later, after landing at Cape Bernacchi, the Union Jack was hoisted and Victoria Land taken possession of for the British Empire. Progress was very slow, only about four miles a day being covered by relay work. The Drygalski Glacier, however, was reached in the beginning of December, whence the party turned inland, and on January 16th the mean position for the magnetic pole, as calculated by Mawson, was reached in Lat. 72° 25′ S., Long. 155° 16′ E. The return was made to the depôt left by them on the Drygalski Glacier, and this was attained on February 3rd after desperately hard work and many narrow escapes from falling into crevasses. Next day they were picked up by the *Nimrod*, having brought their work to a successful termination. The remaining parties were then picked up and the *Nimrod* arrived safely in Lyttelton on March 25th.

CHAPTER LXI

AMUNDSEN'S JOURNEY TO THE SOUTH POLE

SHACKLETON'S attempt to reach the South Pole was soon followed by another and more successful one. The Norwegian, Amundsen, whose conquest of the North-west Passage had fascinated him with Arctic work, had formed a project of drifting across the North Pole after the manner of Nansen. Funds for such an expensive expedition, however, were difficult to obtain, and it was while awaiting events that the idea occurred to him of making a bid for fame and the South Pole together, the latter goal requiring less time and hence less expense. But the affair was kept secret, and when on August 9th, 1910, the *Fram* left Norway under Roald Amundsen with 110 dogs and 18 men, she left for an unknown destination. Reaching Madeira on the 5th September this was announced to be the South Pole.

There were several points of difference between the Norwegian expedition and those led by Scott and Shackleton. The first, and perhaps the most important, was that dogs were to form the motive power, instead of men as in Scott's, or men plus ponies as in Shackleton's journey. All the Norwegians had been practised ski-runners from childhood, but the English were very indifferent performers in this respect. The English always used woollen clothing, the Norwegians only wore it in moderate temperatures, invariably using fur for the extreme cold. It was not a teetotal expedition, though alcohol was apparently only served out about twice a week. The aim was to make seal meat as much as possible the basis of their rations, and whether owing to this or not the fact remains that there was not a single case of scurvy throughout.

On January 2nd, 1911, the Antarctic Circle was crossed, and a few hours later the pack was sighted. Fortune favoured them and they got through it with great rapidity—"a four days' pleasure-trip," Amundsen called it. They were no less favoured in finding Ross Sea free from icebergs, and on January 11th they reached the Great Barrier and altered course due east for the Bay of Whales, their destination, which they reached on the following day. Their hut was in 78° 40′ S. and 164° W., three miles from the edge of the Barrier, and 150 ft. above the sea. Great herds of seals were found here—Weddell's seals and "crab-eaters"—but at that time not many penguins. The crew were now divided into two parties. It had been decided to despatch the *Fram* on an oceanographical cruise while the Polar journey was attempted, and with her went ten men under Capt. Nilsen. The party to be left on shore consisted of eight. Without loss of time the hut, "Framheim," which had been brought out in pieces, was erected, and the party set to work to shoot and store seals, of which they soon had a pile of 100 or more. On February 4th Capt. Scott's ship, the *Terra Nova*, entered the bay on its way from M'Murdo Sound.

On February 10th the first expedition for the placing of depôts started; it consisted of four men and three sledges, each drawn by six dogs, and left a depôt in Lat. 80° S., a distance of 93 miles, which took them 4½ days. They drove back in two days, running no less than 62 miles in one day. On February 22nd the second depôt expedition started, consisting of eight men, seven sledges, and 42 dogs. They passed the depôt in 80° S., and reached 81° S. on March 3rd, where they left a depôt of 1234 lb. of dogs' pemmican, and three men returned. They flagged their depôts for a distance of 5½ miles at right angles on each side, the flags being about 1000 yards apart, so that they should be sure of not missing them. The weather was very cold for the season, -49° Fahr. Five days later, March 8th, Lat. 82° S. was attained, and 1370 lb. of pemmican placed in depôt. But the dogs had

suffered greatly and they could not get farther. They got back to the base March 21st, having lost 8 dogs altogether. On March 31st the third depôt party left for Lat. 82° S., returning April 11th, and by the time winter arrived they had a total of 3 tons of supplies in their depôts.

Anxious to lose no time, they started for their attempt on the Pole on September 8th, but it was soon evident that it was far too early, the temperature being -60° Fahr. or thereabouts, and the party returned after reaching the first depôt in 80° S. and leaving further stores there.

At length, on October 19th, 1911, the final start was made—five men, Amundsen, Bjaaland, Wisting, Hassel, and Hanssen, with four sledges, each with 13 dogs. Under favourable conditions the pace attained was very fast, and 4½ miles per hour was covered with the greatest ease. They now began the system of putting up beacons of snow, 6 ft. high, each of which was numbered and gave the distance and direction of the next one to the north. They were put up about every 13th or 15th kilometre, and 150 of them were erected. After 81° S. they were put up every 9 kilometres. The final depôt at 82° S. was reached and left on November 6th, and the latitude of 83° on November 8th, and here provisions for 5 men and 12 dogs for four days were left.

On November 10th they approached the great mountain chain, the mighty peaks of which rose to heights of 15,000 ft., and on the 12th made their depôt in Lat. 84° S. leaving provisions for 5 men and 12 dogs for five days, as well as matches and about 4 gallons of paraffin. Three days later they were in 85° S. It was from here that they decided to make their dash for the Pole—a distance there and back of 683 English miles—and it was resolved to take 60 days' provisions on the sledges, leaving the remainder, 30 days, in depôt. The weather was very fine, and in this respect they were peculiarly fortunate. On the 17th they began their passage through the mountain range and found it easier than they had expected. The dogs were in admirable condition, and nearing 86° S. they found the heat positively disagreeable, and "sweated as if they were running races in the tropics." Twenty-four dogs were killed for food on reaching the divide, and a rest of five days taken, partly owing to a blizzard. Great difficulties now beset them on the glacier on the farther side, and one day only 2½ miles were covered. In Lat. 87°, however, things improved, and December 4th and following days they progressed at the rate of some 25 miles a day. On the 6th they passed Lat. 88° S., and were at an altitude of a little over 11,000 ft. A meridian altitude was obtained in 88° 16′ S. on December 7th, and a little later Shackleton's record of 88° 23′ was beaten. Two miles farther they camped and left 220 lb. of stores. They were suffering greatly from frost sores on the face and shortness of breath. On the 14th December, 1911, the Pole was reached without further adventure. After a series of observations the return journey was begun on the 17th. On January 6th they reached the Barrier and met with much snow and a temperature of 17° Fahr. The remaining dogs were in very good condition, and 34 miles were made one day. On January 25th, 1912, they were all safely back at "Framheim" with eleven dogs. The journey of 1860 miles had taken 99 days. It was a miracle of forethought and organisation, the success of which was greatly aided by remarkably favourable weather conditions, and no doubt also by the fact that the explorers were all practised ski-runners. All returned in perfect health.

CHAPTER LXII

MAWSON'S EXPEDITION

It had always been desired that that portion of the coast of Antarctica which faces Australia, along which Balleny, and afterwards Wilkes and Dumont d'Urville, had sailed more than sixty years ago, should be landed upon and explored. The coast is not one that faces eastward, and much accessible land could not be expected. It was assumed that there would probably be ice cliffs for the most part, and the ice-cap inland. Still, exploration of this locality was very desirable.

Mr. Mawson[209] undertook the difficult enterprise. He had made a very fine journey to the South Magnetic Pole during Shackleton's Expedition, and was deeply interested in Antarctic problems. Born in Australia he wished his expedition to be mainly an Australian undertaking. The *Aurora*, a fine steamer, was purchased and Captain Davis received the command. There could be no better man, both as a sailor and an enthusiast in the work of deep-sea sounding. Frank Wild, who had been both on the *Discovery* and the *Nimrod*, was appointed to command a second landing party. Dr Mertz was the naturalist. Ninnis, a 2nd Lieut. of the Royal Fusiliers, son of my old friend Dr Belgrave Ninnis of the *Discovery* in the Arctic expedition of 1875–6, first wrote to me from Pietermaritzburg, full of Antarctic enthusiasm, in September 1909, and his excellent qualifications obtained for him a place on the scientific staff of the *Aurora*.

The *Aurora* left Hobart December 2nd, 1911, arriving at Macquarie Island on the 11th to land five men, who were to install and manage the wireless telegraph. On Christmas Day the voyage to the south was resumed. On January 3rd, 1912, the ice cliffs were sighted, 50 to 80 ft. high, and the *Aurora* sailed along them all day. On the 6th she crossed the Antarctic Circle and sighted Adélie Land, with small rocky islets off the coast. On the 8th a landing was effected, and winter quarters were established in 66° 48′ S. and 143° 5′ E. Mawson landed with Dr Mertz, Lieut. Ninnis, and 15 men, all hands working hard at landing the hut, stores, and provisions. Their quarters were at the western end of Adélie Land, in a bay with ice cliffs on both sides. It received the name of Commonwealth Bay.

On January 19th, 1912, the *Aurora* sailed eastward to land another party of eight men under Frank Wild. They met with many icebergs and heavy pack, but the Côte Clarie of Dumont d'Urville had disappeared. From the 24th to the 27th the *Aurora* encountered gales and heavy seas. It was not until February 19th in Lat. 66° 18′ 28″ S. and Long. 94° 58′ E. that Captain Davis found a place on the ice cliffs to land Wild's party and their provisions, and it was only with the greatest difficulty that Wild got his stores on shore and managed to haul them up to the top of the ice cliff. The two stations were 1200 miles apart. Having passed the winter on this ice, Wild and his companions made two important journeys. One was nearly to Sabrina Land, the other connected Wild's base with Kaiser Wilhelm II Land. The *Aurora* returned to Hobart on March 11th, 1912.

In the spring Dr Mawson, with Dr Mertz and Ninnis, undertook a journey with dogs over the ice cap to the S.E. While travelling over the ice, many days after leaving the winter station, the sledge, dogs, and Ninnis suddenly disappeared down a crevasse and were seen no more. Mawson and Mertz were left with scarcely any food and only six dogs, and began to make their way back, undergoing terrible privations from which Dr Mertz died. Mawson, now the sole survivor, succeeded in reaching the winter quarters after 31 days of untold hardship and danger.

The loss of Lieut. Ninnis was deeply felt by his friends. He was full of life and energy, and deeply interested in his work. He had the makings of a very good officer, in whatever branch of the service he might have been employed.

The *Aurora* had arrived off the winter quarters in January, 1913, but was unable to wait for the return of Mawson himself, so that he and sixteen men were left to face a second winter. On February 23rd, however, Captain Davis reached Wild's station, taking him and his party on board, and bringing them back to Hobart. The *Aurora* returned again the next summer, picking up Mawson on December 13th, 1913. After carrying out some important oceanographical work she reached Adelaide on February 26th, 1914.

The result of this expedition was the final connecting up of the northern coast of Antarctica from Lieut. Pennell's discovery to Kaiser Wilhelm II Land, which was found, as I anticipated, to be the edge or northern boundary of the ice cap, with scarcely any visible land. It is from coasts with eastern aspects that interesting discoveries will be made. A further valuable result were the lines of deep sea soundings taken by Captain Davis.

CHAPTER LXIII

CAPTAIN SCOTT'S LAST EXPEDITION

I.

THE ideal of Captain Scott was completeness, and he put it into practice in his second expedition. This is the reason that the areas discovered from his chosen M'Murdo base are far more exhaustively explored, as regards every branch of science, than any other area within either the Arctic or Antarctic Circles.

After four years of naval service Scott entered upon the organisation of his final expedition. In September 1908 he was happily married to Miss Kathleen Bruce, who gave signal encouragement and help to her husband in all his work connected with the expedition. With such help the labour of preparation was much lightened, and the work of collecting the funds, a tedious and wearisome business, was fairly successful. Sir Edgar Speyer consented to act as treasurer, Mr. George Wyatt was business manager, and Mr. Drake, R.N., secretary. In September, 1909, the *Terra Nova*, the largest of the Dundee whalers, was purchased from Messrs Bowring of Liverpool, and handed over in the West India Docks on November 8th. She was barque-rigged, built in 1884, was of 744 tons gross and 450 net register; with a length of 187 ft., beam 31 ft., depth 19 ft. Scott had been elected to the Royal Yacht Squadron, so the *Terra Nova* flew the white ensign. Most of the interior re-fitting was entrusted to Lieut. Evans, who was to be captain on the way out, but to land when the station for wintering was reached. The provisions were most carefully selected and packed. Special 4-inch theodolites were constructed for sledge travelling, and there were 8 chronometers and 12 deck watches. Ponies and good teams of dogs were obtained from Siberia by Mr. Meares, Commander Wilfred Bruce meeting him at Vladivostock. They were brought to New Zealand with two Russian drivers.

The expedition had two 12-ft. and thirty ordinary sledges, ordered at Christiania. Captain Scott was very anxious that his experiments with motor sledges should be successful, for he disliked the use of dogs or ponies, and hoped that motor traction would be the remedy. He made trials, both in the Alps and in Norway, which gave every hope of success, and three motor sledges were taken out. One was lost in landing; the other two went well on the surface of the barrier, and the system of propulsion was quite satisfactory, but their use had to be abandoned owing to the over-heating of the air-cooled engines, a defect which could undoubtedly be remedied. Captain Scott was quite on the right tack, and with more experience, his idea of polar motors will hereafter be made feasible, a consummation which was very dear to his heart.

The financial position made a relief ship impossible, and it was arranged that the *Terra Nova* should land the exploring party with their provisions and a suitable house ready for erection, going back to New Zealand for the winter and returning in the next navigable season.

The Admiralty were fairly liberal in their permission for naval officers and men to join the *Terra Nova*. There were four Lieutenants—Evans, Pennell, Campbell, and Rennick. A young Lieutenant of the Indian Marine, named Bowers, was also allowed to go, but in his case the Indian Government was the reverse of liberal. Captain Oates of the Inniskilling Dragoons was a volunteer, and an invaluable acquisition. Two naval surgeons were allowed to join, Dr Atkinson and Dr

Levick. Dr Wilson of the *Discovery* was chief of the scientific staff and a host in himself. Besides the two Russians there were twelve men to land, all naval. Of these, five were old Discoveries. Lashly and Edgar Evans were Scott's companions during his great journey over the ice-cap. Crean and Williamson were also thoroughly reliable men, the former having been Captain Scott's coxswain in the *Victorious*.

With the most complete collection of scientific instruments and appliances Captain Scott resolved to have the largest and most efficient scientific staff that ever left these shores. Instead of the two biologists of the *Discovery* he took four, Dr Wilson, Mr. Nelson, Mr. Cherry Garrard, and Mr. Lillie; instead of one geologist he took three, Mr. Griffith Taylor, Mr. Debenham, and Mr Priestley, one of them a specialist in physiography; instead of one physicist he took two, Dr Simpson and Mr Wright; besides a photographer of great ability, Mr. Ponting. A young Sub-Lieutenant of the Norwegian navy, named Tryggve Gron, came as a ski expert, Mr. Day as motor engineer, and Mr. Meares in charge of the dogs.

The *Terra Nova* left the docks on June 1st, and arrived at Stokes Bay on June 3rd, 1910. They were all cordially received by the Commander-in-Chief at Portsmouth and at Cardiff there was another enthusiastic reception. During the voyage out the *Terra Nova* touched at Simon's Bay, Melbourne, and Lyttelton; large and very generous subscriptions to the expedition being received from Cape Colony, Australia, and New Zealand.

After a stay of a month at Lyttelton, where the ponies and dogs were taken on board, and a valuable addition was made to the executive officers in the person of Scott's brother-in-law, Wilfred Bruce, the *Terra Nova* finally sailed for the Antarctic regions on November 29th, 1910. Three days had not passed before the explorers encountered a furious storm from the S.W., lasting from December 1st to 3rd. The ship, hove to under a main lower topsail, laboured heavily and big seas began to come on board. The ponies suffered greatly, and Captain Oates and Dr Atkinson worked incessantly throughout the gale, dragging the poor beasts on to their legs again. The solid water which came on board lifted the coal bags and flung them against the rest of the deck cargo, acting like battering rams and gradually loosening the lashings of the petrol cases and forage bales. Soon the whole of the deck cargo was in danger, and there was nothing for it but to heave the coal bags overboard and re-lash the petrol cases. But the seas were continually breaking over the crew, and now and again they were completely submerged.

Worse was to come. It was reported that the pumps were choked and that the water, steadily gaining, was now over the stokehold plates. Every effort was being made to keep the fires fed, but a considerable part of the water on the upper deck found its way below. Then it was discovered that the main engine pump was also choked. The water gained to the lower level of the boilers, and the order had to be given to draw fires. The ship was very deeply laden, and it did not need the addition of much water to get her water-logged. As the water was gaining and there were no pumps available, the only resource left was an attempt at baling, yet the idea of baling a ship out by hand seemed ludicrous. Nevertheless all the officers and scientific staff fell to, working two hours' spells all day and night, passing up buckets of water from hand to hand.

Captain Scott felt that, at all hazards, they must get at the hand pump suctions, and ordered a hole to be made in the steel bulkhead behind the boiler. All this time the gale was raging as furiously as ever. About midnight the hole through the bulkhead was completed, and Evans and Bowers crawled through to the pump suctions and found them choked with coal. This was got out, and the pump on being tried again gave a good stream once more. By morning the level of the water was brought under the stokehold plates again. Very slowly the wind and sea had been moderating and in the afternoon of December 3rd they were able to continue the voyage. Two ponies had

dropped never to rise again, with the minor losses of 10 tons of coal, 65 gallons of petrol, and a case of the biologists' spirits. The ship had been in great danger. This terrible experience in its absorbing interest stands side by side with Ross's story of the collision among the icebergs.

On December 9th the *Terra Nova* entered the pack in 65° 5′ S. and 178° E. There was a long detention, unlike the fortunate voyage of the *Discovery*, and it was not until December 30th that the ship was extricated in 71° 30′ S., having had to force her way through 370 miles of ice. On January 3rd, 1911, Cape Crozier was sighted, the ship entered M'Murdo Sound, and on the 4th she was off the winter quarters at Cape Evans, 14 miles north of the *Discovery's* winter quarters. The landing was at once commenced. In a week the house, stores, coals, animals, and equipments were all on shore. In a fortnight the house was built and habitable, and in three weeks everything was ready for the depôt journey.



A Tilted Berg, showing the old surface inclined to the left



Typical Bergs. *Terra Nova* in distance

One part of Captain Scott's plan was that Lieut. Campbell should explore King Edward VII Land with Dr Levick, Mr. Priestley the geologist, three men, and two ponies. The *Terra Nova*, now commanded by Lieut. Pennell, accordingly took the party with their house and stores, leaving M'Murdo Sound on January 26th, but unfortunately no landing could be found at King Edward VII Land. Lieut. Pennell then took them to Balloon Bay, where there is a landing on the barrier, but the place was found to be already occupied by Amundsen's party. Campbell, in consequence, gave up the plan of landing there, and returned to Cape Evans and left the ponies. He then went on in the *Terra Nova*, intending to land at Smith Inlet, or as near Cape North as possible. But once more fortune was against him, the ice prevented the ship from approaching the land, and the whole coast back to Cape Adare was found to consist of inaccessible ice cliffs. Ultimately the party were landed in Robertson Bay, where they wintered. Sledging was attempted, but the ice near the coast proved too rotten to be trustworthy, and no exploring could be done in the direction of Cape North. On January 8th, 1912, the *Terra Nova* arrived and took the party on board, landing them again near Mt Melbourne with six weeks' sledging rations only. But grave misfortune was in store for them. The ship was prevented by dense pack from picking them up again and they were forced to winter, living in an ice cave with little besides penguins and seals for their food. These great privations were met with the greatest fortitude and cheerfulness, and in October they started with their sledge, reaching Cape Evans safely November 7th, 1912.

After landing Campbell's party, Lieut. Pennell again shaped a course to the westward, and discovered a long line of new coast beyond Cape North, from 68° 30′ S. and 158° 15′ E. to 69° 50′ S. and 163° 29′ E. On March 8th the *Terra Nova* was beset, and from March 20th a S.W. gale took her to Stewart Island. After being thoroughly overhauled and repaired the ship was chartered by the New Zealand Government to survey the channel between the north point of the North Island and the Three Kings Islands, 38 miles to the N.W. The survey occupied three months, and Lieut. Rennick drew the resulting chart, since published by the Admiralty. In the next winter Lieut. Pennell conducted another survey for the New Zealand Government, this time of Admiralty Bay, the chart being drawn by Lieut. Rennick. "It was a great thing," Pennell thought, "to have such long and continuous work for all hands during the winter." Lieut. Wilfred Bruce was a most valuable addition to the executive staff on board, and Mr. Lillie was indefatigable as a collector. Very valuable lines of deep sea soundings were taken southwards from New Zealand, and a large biological collection was made. Indeed the *Terra Nova* made no unimportant addition to the results of the expedition.

Captain Scott was meanwhile preparing for one of the greatest feats in man-drawn sledge travelling that has ever been achieved, comparable with the splendid journeys of M'Clintock and Mecham. There was much to be done and no time to lose. A great depôt had to be laid out during the autumn, a hundred and thirty miles to the south. Scott started on January 25th from Cape Evans with 12 men, 8 ponies, and 26 dogs, with 14 weeks' food and fuel (5385 lb.), 3680 lb. of compressed fodder, 1400 lb. of dog biscuit and 15 sacks of oats.

The journey was along the coast of Ross Island, passing the well-remembered places and the great hut at the *Discovery's* winter quarters. The first depôt was formed in 77° 55′, to the S.E. of Cape Armitage, called the home depôt. This was "Corner Camp." On the 12th February the party passed Minna Bluff, and rested at Bluff Camp; on the 15th the place for the final depôt was reached in 79° 28′ S., where 2181 lb. of provisions were deposited. This was the "One-ton Depôt."

In returning, a short cut was attempted by Scott with the dog teams nearer the coast, where the ice turned out to be heavily crevassed. On the 20th February they covered 35 miles. Next day they were about 12 miles inshore from Corner Camp. The men were running by the sledges. Suddenly Dr Wilson shouted "Hold on to the sledge," and as he spoke the whole team of dogs sank through the snow down a crevasse, and hung by their harness far down the abyss. Scott hauled the sledge

clear and anchored it. The dogs were howling dismally. Two had dropped out of their harness and landed on a snow bridge far below. Cherry Garrard brought the Alpine rope they had with them; the sledge was unloaded, and run across the gap. The dogs were then hauled up two by two until eleven of the thirteen were recovered, the other two loose ones being on the snow bridge 65 ft. down the chasm. Scott made a bowline in the Alpine rope and was lowered down. He reached the bridge, fastened the first dog to the rope, which was hauled up, and then the second. Lastly he himself, with some effort, was hauled to the surface. It was all the other three could do, the cold being intense and their fingers badly frost-bitten. Scott of course was in great danger, but he had insisted upon going down. It was characteristic of him that "he wanted to take such a good opportunity of examining the sides of a crevasse."

A greater disaster overtook the ponies in the return journey, coming from the Barrier on to the sea ice. It suddenly broke up, forming lanes of water, and notwithstanding every exertion to save them, two were lost on the ice and others succumbed to the furious icy gales. The year had been quite exceptional in this respect. There had already been four furious southerly gales. It was not until April 13th that Captain Scott returned to Cape Evans.

The abode for the winter had been carefully planned. The walls and roof had a double thickness of boarding, with sea-weed on both sides of the frames. On the south side Bowers built a long annex to contain spare clothing and provisions for immediate use. On the north was the stable, and a short distance away was a solid block of ice in which two caverns were dug, one for a larder, the other for differential magnetic instruments. Near this cavern there was a hut for absolute magnetic observations, and on a small hill above, on which was a flag-staff, were the meteorological instruments.

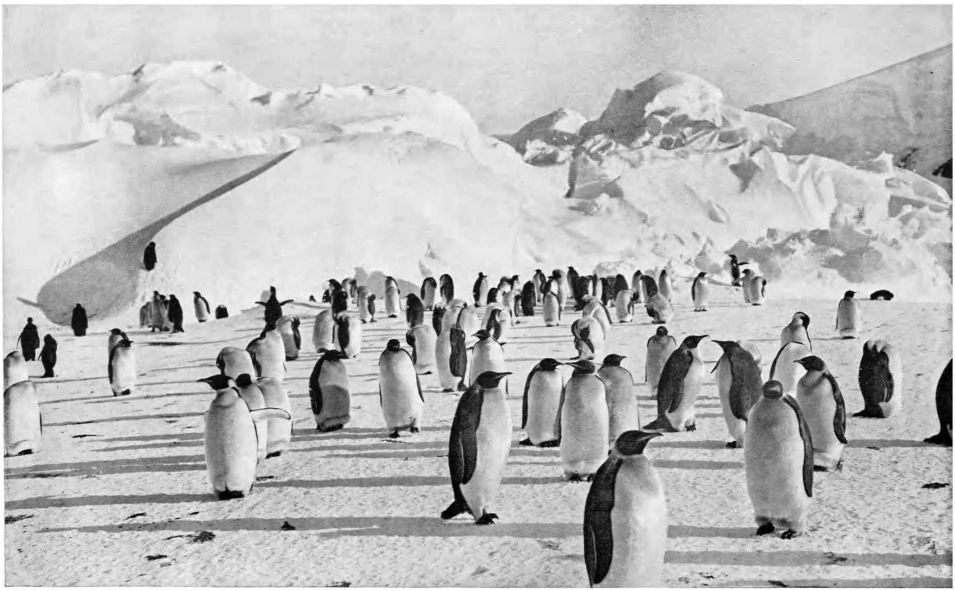
The house, below the hill, was on a long stretch of bleak sand, with many tons of provision cases ranged in neat blocks in front of it. The interior was divided into two rooms. Two-thirds of the area was for the 16 officers and members of the scientific staff, the other third for the 9 men[210]. In the officers' quarters there was a dark room, a space for the physicist and his instruments, a space for charts, instruments, and chronometers, and on the sides the 16 bed-places. Arrangements for light, warmth, and cooking were very satisfactory. The ten surviving ponies were made comfortable in their stables by the Russian lads.

The last day of the sun was April 23rd. Throughout the winter there was much to be done and many calculations to be made respecting the great journey. Everyone was always busy and the daily exercising of the horses was no simple task. Every Sunday divine service was held. There were frequent lectures, generally on subjects connected with Antarctic travelling or scientific work, often illustrated, and always followed by a discussion. So the winter passed, with the most perfect good fellowship. The *South Polar Times* was again started under the editorship of Cherry Garrard, well aided by Dr Wilson's admirable illustrations.

Dr Wilson was anxious to visit the emperor penguin rookery in order to secure eggs of the bird at such a stage as would furnish a series of early embryos by which alone the particular points of interest in the development of the bird could be worked out—this penguin being supposed to be the nearest approach to the primitive form. The journey entailed the risk of travelling in the winter and in darkness, for the birds nest in the coldest season of the year, early in July.

The party consisted of Dr Wilson, Lieut. Bowers, and Cherry Garrard, with two sledges and provisions for five weeks. They started on June 27th, 1911, and next day passed round Cape Armitage, and turned in the direction of Cape Crozier. At night the temperature was -56° Fahr. On July 11th, off Mount Terror, the wind from S.S.W. blowing a gale, brought the temperature up in a most extraordinary way to +7° Fahr., with heavy snow-fall. On the 15th they got to a height

overlooking the barrier cliffs, with a magnificent view, the whole range of pressure ridges at their feet, looking "as if giants had been ploughing with ploughs that made furrows fifty or sixty feet deep." The Ross Sea was completely frozen over, except an open lead along the coast. On this height at about 800 ft. they built a stone hut. On the 19th they made an unsuccessful attempt to descend to the rookery and next day the hut was finished. Then at last they effected a descent. Six eggs were collected and three birds were killed and skinned. Returning, the ascent was extremely difficult and hazardous. A heavy gale was blowing on the 22nd from S.S.W. and the tent was blown clean away. They took refuge in the hut, but next day the force of wind had risen to a storm, and the roof of the hut was blown away. At last the wind went down and they all started in search of the tent, which Bowers found a quarter of a mile from the place where it had been pitched, but fortunately undamaged. Without the tent it is doubtful whether any of them would have survived. The return journey in darkness and intense cold was terrible, the bags were saturated and hard frozen. Hut Point was reached on the last day of July, and the home at Cape Evans on August 1st.



Emperor Penguin Rookery, Cape Crozier

Scott wrote:—

> "The Cape Crozier party returned after enduring for five weeks the hardest conditions on record. It forms one of the most gallant stories in polar history. That man should wander forth in the depth of a polar winter to face the most dismal cold and the fiercest gales in darkness is something new; that they should have persisted in their efforts in spite of every adversity for five full weeks, is heroic. It makes a tale for our generation which I hope will not be lost in the telling."

From that time all was preparation and calculation for the great journey. The ponies were to take them to the foot of the glacier, where they would be killed for fresh food; the dog teams were also to go thus far, as far as they could be taken without cruelty. The hope that the motor sledges

would be useful auxiliaries was vain. Scott had looked forward to their revolutionizing polar traction, but was doomed to disappointment.

From the foot of the glacier to the Pole, a distance of 450 miles, the extended party would be able to reach their goal by the help of two limited parties, making three parties of four men each to start. Six depôts were to be placed at intervals. The most careful calculations were made about the quantity in each depôt and the quantity to be taken by each returning party, and it was found in practice that every detail of equipment was right.

Before starting, Captain Scott, with Dr Simpson, Bowers, and Edgar Evans went for a fortnight on what he called a remarkably pleasant and instructive spring journey. The party went a long way up the Ferrar Glacier, and Scott was able to measure the movement of the glacier, finding it to be at the rate of 24 to 32 feet in 7½ months.

On the 1st November, 1911, Captain Scott started on his last great journey. The ponies were in fine form, due to the care of Captain Oates through the winter. They drew 450 lb. each. On the 15th "One-ton Depôt" was reached, 130 miles from Cape Evans. On arriving at the entrance to the Beardmore Glacier the ponies were shot for fresh food. They had done their work well. Meares and the dog teams returned home.

From December 5th to the 9th a furious gale was blowing with heavy snow-fall. This most unfortunate storm not only caused serious delay, but also filled the lower part of the glacier ravine with soft snow, retarding progress and causing awful toil.

The three final units of four were:—

Scott	Commander Evans	Atkinson
Wilson	Bowers	Wright
Oates	Crean	Cherry Garrard
E. Evans	Lashly	Keohane

The ascent was hard work, and falls down crevasses to the length of the harness were quite common, but on the 22nd December the summit was reached at 7100 ft. in 85° 13′ S., 161° 55′ E. and here the "Upper Glacier Depôt" was formed. At this point Atkinson, Wright, Cherry Garrard, and Keohane bade farewell—alas! a long farewell—to their beloved chief, and returned.

Pushing steadily on, the two remaining parties reached 86° 55′ 47″ S. and formed another depôt, consisting of a week's provisions for both units. It was named "Three-Degree Depôt." On January 2nd, 1912, the camp was in 87° 32′ S. Long. 160° 40′ E., and 9600 ft. above the sea. Here Bowers joined the extended party, raising the number to five. The last limited party, consisting of Commander Evans, Crean, and Lashly, bade farewell and set out on the return journey. Evans was attacked by scurvy, became rapidly worse, and near Corner Camp was unable to go further. Lashly remained to nurse him, while Crean went off alone for help. Fortunately Dr Atkinson was at Hut Point and came at once to the rescue. Evans was brought safely down, and got on board the *Terra Nova*[211].

Scott, with his four gallant companions, was left within 140 miles of the South Pole, with provisions for a month, and depôts at proper intervals in their rear.

CHAPTER LXIV

CAPTAIN SCOTT'S LAST EXPEDITION

The End

SCOTT and his companions could now easily reach their goal. On the 4th January they were 10,280 ft. above the sea, the soft snow giving them very heavy work. They were still ascending slightly, reaching 10,320 ft. on the 5th, on the 6th 10,470 ft., and on the 7th 10,570 ft.

> "It is quite impossible," wrote Scott, "to speak too highly of my companions. Wilson ever on the look-out to alleviate the small pains and troubles incidental to the work, ever thinking of some fresh expedient to help the camp life, tough as steel on the traces, never wavering from start to finish. Evans a giant worker with a really remarkable head-piece. It is only now I realize how much has been due to him. Little Bowers remains a marvel—he is thoroughly enjoying himself. He has not made a single mistake in making up the dépôts, and at all times knows exactly how we stand. Nothing comes amiss to him, and no work is too hard. Oates goes hard the whole time, and does his share of camp work."

The highest point had now been passed and they were descending again. On the 15th at 89° 26′ 57″ S. the height was only 9920 ft. On the 16th, still descending, they were in 89° 42′ S. Scott had been for some time apprehensive of the possibility of the Norwegian expedition under Amundsen having forestalled them. The doubt was now to resolve itself into certainty. In the afternoon march Bowers' keen eyes detected an unusual object in the distance, which proved to be a black flag tied to a sledge-bearer. Around were the remains of a camp and tracks of men and dogs, and it was only too evident that the Norwegians had succeeded in their endeavour. Two days later Scott's party arrived at the tent left by Amundsen, and found his record dated December 16th, just a month previously. It was a terrible disappointment and no doubt was not without its depressing effect on their spirits on the homeward journey. The weather, moreover, was of an unusually trying character, a strong wind blowing with the thermometer at -22° Fahr. and a curious damp cold feeling in the air. "This is an awful place," writes Scott, "and terrible enough for us to have laboured to it without the reward of priority."

A cairn was built on the South Pole, and the Union Jack was hoisted. The altitude was 9500 ft. a descent of 1000 ft. from 88° S.

On the 19th January the return march was commenced, and they had a very hard time before them. Oates was feeling the cold more than the others, and Evans was never the same man after leaving the Pole. These were danger signals; both got frost-bitten so easily. There seems to be nothing in the Arctic regions to be compared with the wonderful storm-tossed *sastrugi* which here so perplexed and delayed them. On January 31 the Three-Degree Depôt was reached. The 9th February was a grand day. They steered for a moraine under Mount Buckley, which proved so interesting that Scott determined to spend the day there geologising. Above them rose a perpendicular cliff of sandstone, weathering rapidly and carrying veritable coal seams. Wilson found several plant impressions, one a piece of coal with beautifully-traced leaves in layers. There were some excellently preserved impressions of thick stems, showing cellular structure. Altogether

they had a most interesting afternoon, “and the relief of being out of the wind and in a warmer temperature is inexpressible.” Some 35 lb. weight of fossils were taken on the sledge. This discovery throws most important light on the geological history of Antarctica.

The return journey was continued. On February 16th poor Evans had quite collapsed in mind and body. He caused much delay and the rest felt that they were in a desperate position with a sick man on their hands at such a distance from home. Here was the risk which could not be foreseen, and which seemed so unlikely to arise. All that the very best arrangement can possibly do is to leave a margin for detentions. That margin had been overpassed, and there was danger. The arrangements were admirable, the depôts fairly easily found, but their contents were not calculated for such a long detention.

Evans died in the tent on February 17th, a sad and unexpected end for such a fine and useful hand, and one supposed to be the strongest of the party. On February 18th they had reached the Lower Glacier Depôt and were entering upon the march over the barrier ice. They began to use the horse meat.

The survivors encountered most extraordinary, indeed for the time of year quite abnormal, degrees of cold, and they were retarded by unusually bad surface. They reached the Middle Barrier Depôt on the 2nd March but found a shortage of oil, due to a leak, leaving hardly sufficient to take them to the next depôt. The temperature was -40°. Captain Oates disclosed the state of his feet, which were most seriously frost-bitten. Every circumstance was against them, and the danger was rapidly increasing. The surface continued terrible and retarded them fatally. “Amongst ourselves,” wrote Scott, “we are unendingly cheerful, but what each man feels in his heart I can only guess.” By the 6th Oates was unable to pull, and suffering great pain. He got worse and worse; but was always cheery, and never made a complaint. On the 17th the end came. It was blowing a gale. He said “I am just going outside and may be some time.” He knew they would never leave him and that he was increasing their danger. He nobly resolved to sacrifice himself. “It was the act of a brave man and an English gentleman. We all hope to meet the end in a similar spirit, and assuredly the end is not far.” Hope was departing. On Sunday March 21st they were only eleven miles from One-ton Depôt, getting more and more unequal to the work. Yet they had brought the great extra weight of 35 lb. of fossils all the way, a monument to the heroism of the gallant discoverers. Scott was now in as bad case as Oates had been. The tent was pitched, Wilson and Bowers intending to go to the depôt and back for fuel. But a furious gale, rendering the journey impossible, blew for several days from S.W. This was the final blow. Scott wrote letters to relations and friends until death caused his pencil to drop from his hand. Every sentence was intended to give them consolation and comfort. He also left a touching appeal to his countrymen. He died as he had lived, one of the most beautiful characters in our generation. When found by the search party Wilson and Bowers lay with their sleeping-bags closed over their heads, in the attitude of sleep. Scott had died later. The flaps of his sleeping-bag were thrown back. The little wallet containing his note-books was under his shoulder, and one arm was flung across Wilson’s body.

The search party, led by Dr Atkinson, started on the 30th of October, 1912. The excellent mules had arrived on board the *Terra Nova* in the spring. Seven mules and eight men set out from Hut Point, with Wright in command, two dog teams following with Dr Atkinson, Cherry Garrard, and Demetri[212].

On the morning of the 12th November, 1912, they found the tent. It was pitched well and had withstood the furious gales. Each man recognised the bodies. All their gear was recovered, and the sledge was dug out with their belongings and the precious fossils. Then the bodies were covered with the outer tent and the burial service was read. A mighty cairn was built above them, and it was

surmounted by a cross made out of two *skis*. On either side two sledges were up-ended and fixed firmly in the snow. Between the eastern sledge and the cairn a bamboo was placed containing a metal cylinder and the following inscription:—

> This cross and cairn were erected over the bodies of Captain Scott, R.N., Dr Wilson, M.B., and Lieut. Bowers, R.I.M. a slight token to perpetuate their successful and gallant attempt to reach the Pole. This they did on January 17th, 1912. Inclement weather with lack of fuel was the cause of their death. Also to commemorate their two gallant comrades, Captain Oates of the Inniskilling Dragoons, who walked to his death to save his comrades about eighteen miles south of this position; and Seaman Edgar Evans, who died at the foot of the glacier.
>
> "The Lord gave and the Lord taketh away, blessed be the name of the Lord."

It was signed by all the members of the party. They then marched south to search for the body of Captain Oates; but "the kindly snow had covered the body, giving it a fitting burial." Here, as near the site as they could judge, they built another cairn to his memory, placing on it a small cross and the following record:—

> Hereabouts died a very gallant gentleman, Captain Oates of the Inniskilling Dragoons. In March 1912, returning from the Pole, he walked willingly to his death to try and save his comrades, beset by hardships. This note is left by the Relief Expedition of 1912.

It was signed by Dr Atkinson and Mr. Cherry Garrard. Returning they bade a final farewell to their lost friends. Dr Atkinson wrote:—

> There, alone in their greatness, they will lie without change or bodily decay, with the most fitting tomb in the world above them.

The results of Captain Scott's expedition are of great importance. He arranged that the geologists should make a thorough geological survey of the region from Granite Harbour to Koettlitz Glacier, extending thirty miles inland where possible. This was done, and they also made a very interesting ascent to the crater of Mount Erebus, an account of which was written by Mr. Priestley. The results in the other branches of science were of no less importance, and furnish a splendid and convincing answer to those who question the use of polar expeditions. But of far greater service are the examples set to their countrymen by the lost heroes, and the experience gained by the young naval officers of the expedition.

The dying appeal of Captain Scott met with a prompt response. Seldom has the nation, both at home and beyond seas, been so deeply touched. On February 14th, 1913, there was a memorial service at St Paul's at which the King and the Queen Mother were present. Scott's widow was given the rank to which her heroic husband would have been raised. An appeal for funds to meet all demands received a most generous and ample response. The widows and orphans were suitably provided for, all the liabilities of the expedition were met, a bounty was given to the members of the expedition, provision was made for the publication of results, and a large sum was left for memorials.

In the whole range of polar history there is no greater name than that of Robert Falcon Scott. A life of devotion to duty, latterly of devotion to scientific discovery, was closed by a heroic and

glorious death. A man with rare gifts both of head and heart, those gifts were nobly used through life, and were never more prominent than in his last fatal march and in the hour of death.

CHAPTER LXV

REMAINING ANTARCTIC WORK

THE great object of Antarctic exploration is to discover the outline of the Antarctic continent, and to study its physiography so far as the great ice-cap will admit of such researches. Among those who took an intelligent interest in this important question was the late Duke of Argyll's father, who had the firmest grasp of the subject and the deepest insight. His view was that our efforts should be directed to discovering the physiography of this continental land previous to its being almost entirely concealed by the ice-cap. In that way alone—combined with series of deep sea soundings radiating from the shores of Antarctica to lands to the north—could its geological history, and possible former connection with other lands, be ascertained. Impressed with these views, we saw that those coasts must be sought where the mountains are more or less clear of the assumed ice-cap. The northern coasts forming the eastern half of the Victoria and all the Enderby Quadrant appeared to be ice cliffs only, and therefore unsuited. It was evident that coasts and mountains with an eastern aspect would alone enable us to obtain the desired knowledge. There are two such eastern coasts. These are the western side of the Ross Sea facing east, and the western side of the Weddell Sea, the coast of Graham Land facing east.

Victoria Land was selected for the first attempt, and a grand result was achieved by Captain Scott in his two expeditions. The great Victorian chain of mountains was traced from the Antarctic Circle to the apex of the quadrant, a distance of 1200 miles. The volcanic region of Ross Island was thoroughly explored. The basaltic irruptions were observed, together with the primitive rocks; the great unaltered formation now known as the "Beacon Sandstone" was discovered, the movements and character of its glaciers were noted, a complete geological survey was made from Granite Harbour to Koettlitz Glacier, and the peaks were measured. To crown all, Captain Scott and Dr Wilson made a large collection of the fossil flora which established the geological period of the rock formation. These fossils weighed 35 lb., but though worn out, and with strength failing fast, the gallant explorers would not leave them, but dragged these records, until they died. There is no more glorious and more touching event in the whole range of polar history.

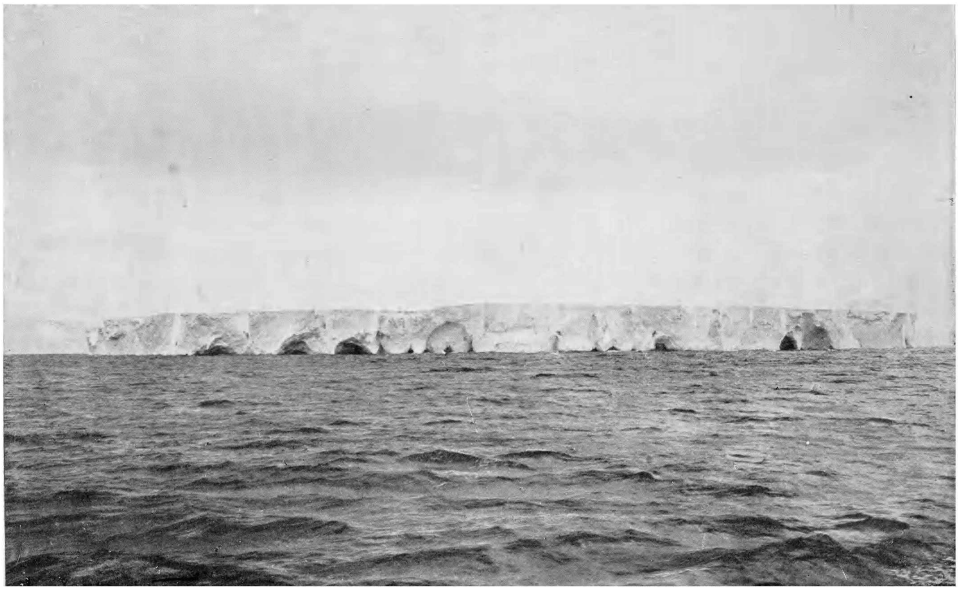
Captain Scott observed that the Victorian mountains turned in the direction of Graham Land, and this conclusion now has to be proved. A branch seems to run down to the coast and to terminate in the heights of King Edward VII Land, thus enclosing the vast bay filled with Mr Ferrar's "Ross piedmont." It would not be surprising to find a minor range branching off to Enderby Land, which Biscoe described as mountainous.

The land and islands with an eastern aspect on the other side of Antarctica were partly explored by Captain Larsen, who made an important voyage down the east coast of Graham Land, and the fossil remains have been collected and described by Nordenskiöld and Gunnar Andersson. Next to Captain Scott's great discoveries, the work of the Swedes has thrown most light on the former history of Antarctica.

There is something very fascinating in considering the analogy between the Ross and Weddell Seas and their shores on opposite sides of Antarctica. The Victorian Mountains on one side match the Graham Land mountains on the other. The interest is increased by the probability that they form one chain, and by the discovery that there are volcanic rocks peculiar to the Andes which have been

found in Graham Land. Then there are the enormous icebergs in both seas pointing to the need for the further study of the wonderful ice-cap which conceals so much of Antarctica from our knowledge.

The Antarctic ice-cap was discovered and explored by Captain Scott, who penetrated into its solitudes for two hundred miles from the mountain range. Dr Mawson has also examined it from another direction. There is little or no interest in travelling over its monotonous surface, but numerous borings would reveal its depth and solid contents, as suggested by the late Sir John Murray. The greatest interest connected with the Antarctic ice-cap is to be found in the study of its glaciers, and of its edges, possibly mighty cliffs like the Ross piedmont, whence the vast icebergs are discharged.



Barrier Berg Aground off King Edward VII Land

The most important geographical discoveries which remain to be revealed in the Antarctic regions are the coasts and interiors of the Weddell and Ross Quadrants. A great part of the eastern side of Graham Land is still undiscovered, and it is not known whether it is a peninsula or an island. A plan for the exploration of this important area was ably sketched out by Lieut. Barne, but nothing has yet been done. The continuation of the Victorian chain of mountains possibly to Graham Land, 800 miles in length, likewise calls for investigation as a part entirely unknown. An ancient connection between Antarctica and South America may be revealed, when the warm current flowing south down the east side of the latter continent was not diverted but flowed directly into the far south. But these are but a tithe of the problems which Antarctica still offers. There is the enterprise of crossing the mountains to ascertain the character of the much smaller section of the continent in the Ross Quadrant; there is the survey of the southern part of Graham Land; the exploration of the coast to the eastward; the problem of the origins of the great icebergs. The Weddell Quadrant calls for an immense amount of geographical and other scientific work, which would give full occupation for more than one expedition.

In the Ross Quadrant there is a coast line of 1100 miles in extent to be discovered. Captain Scott's work on King Edward VII Land on one side, Alexander and Charcot Lands on the other, are the boundary posts to this undiscovered Edwardian coast. All we know is that Captain Cook saw land in 71° S., that Bellingshausen sighted Peter Island a little further to the east, and that the Belgian expedition wintered over the continental shelf in about 71° S. The land is probably not a hundred miles further south. The ice-pack floats north from the coast during the navigable season, and in that case a ship might navigate along the Edwardian coast. It is possible that there may be one or more deep indentations, like the Ross Sea, when there would be a coast or coasts facing east whose exploration would throw further important light on the history of Antarctica.

Finally, in the Enderby Quadrant there is the "Challenger Gap" to be explored, so as to complete an examination of the region from Gaussberg to Kempe Land.

Fixed stations for meteorological, magnetic, and tidal observations ought to be established to carry out this excellent and useful work within the Antarctic Circle during a course of years, similar to that which Captain Scott achieved in M'Murdo Sound during four years. In no other part of the Arctic or Antarctic regions have observations been taken in one place for so long a time. But they are needed on other spots all round Antarctica.

There are many true lovers of geographical exploration for its own sake in the present generation, who look upon achievement as its own reward. We may, therefore, hope that the great work initiated by the Societies with such splendid results will be renewed by successors to Scott and Wilson, and that they will again and again raise the standard of duty and useful, if perilous, achievement. For such men there is a note of encouragement and sympathy deep down in the hearts of all true Britons.

CHRONOLOGY OF POLAR VOYAGES AND EXPLORATIONS

I. *Arctic*

Year	Explorer	Ship	Nationality	Locality[213]
1553	Willoughby and Chancellor	Bona Esperanza and others	British	Sea N. of Europe
1556	Stephen Burrough	Searchthrift	„	Kara Strait
1576–78 (3 voyages)	Frobisher	Gabriel and others	„	*Baffin Land*
1580	Pett and Jackman	George and William	„	Novaya Zemlya
1584	Brunel		Dutch	„
1585–87 (3 voyages)	Davis	Sunshine, Moonshine, etc.	British	*Davis Straits*
1594–95 (2 voyages)	Nai, Tetgales, Barents	(1) Swan, Mercury; (2) Griffin, Hope, Greyhound	Dutch	Novaya Zemlya
1596–97	Heemskerck, Rijp, Barents		„	*Spitsbergen* and Novaya Zemlya
1606	Knight	Hopewell	British	Greenland
1607–08	Hudson	„	„	Greenland, Spitsbergen, *Jan Mayen*
1609	„	Half-moon	Dutch	Novaya Zemlya, *Hudson River*
1610	„	Discovery	British	*Hudson Bay*
1610–14 (various voyages)	Poole, Edge, Joseph,	Various	„	Spitsbergen

	Marmaduke, Baffin			
1612	Button	Resolution and Discovery	„	Hudson Bay
1615–16 (2 voyages)	Bylot and Baffin	Discovery	„	*Baffin Bay*, etc
1617	Edge		„	Spitsbergen
1619–20	Munk		Danish	Hudson Bay
1631–32	Foxe and James	Charles and Maria	British	„
1644–48	Stadukhin, Alexeief, Deshnef, Ankudinof		Russian	N. Siberian coast
1664	Vlamingh		Dutch	Novaya Zemlya
1676–77	Wood	Speedwell and Prosperous	British	„
1707	Gillis		Dutch	N.E. Spitsbergen
1710	Permakof		Russian	N. Siberian coast
1734–42	Paulof, Mlyagin, Owzin, Minin, Sterlegof, Laptef, Chelyuskin		„	„
1742	Middleton	Furnace and Discovery	British	Hudson Bay
1746–47	Moore and Smith	Dobbs and California	„	„
1770	Liakhof		Russian	New Siberia Islands
1773	Phipps	Racehorse and Carcass	British	Greenland Sea
1776–7	Pickersgill, Young	Lion	„	Baffin Bay
1805–10	Hedenström, Sannikof, etc.		Russian	New Siberia Islands
1815–18	Kotzebue	Rurik	„	Bering Sea

1818	Ross (John)	Isabella and Alexander	British	N.W. Passage
1818	Buchan and Franklin	Dorothea and Trent	„	Greenland Sea
1819–20	Parry	Hecla and Griper	„	Melville Island
1819–22	Franklin and others	(land)	„	Arctic Canada
1820–23	Wrangel and Anjou		Russian	Siberian Polar Sea
1821–23	Parry	Fury and Hecla	British	American Archipelago
1821–24	Lütke Novaya Zemlya		Russian	Novaya Zemlya
1822	Scoresby	Baffin	British	E. Greenland
1824–25	Parry	Hecla and Fury	„	American Archipelago
1825–28	Beechey	Blossom	„	Point Barrow, etc.
1827	Parry	Hecla	„	Sea N. of Spitsbergen
1829–33	Ross (John and James C.)	Victory	„	N.W. Passage and Magnetic Pole
1833–34	Back	(land)	„	Great Fish River
1837–38	Dease and Simpson		„	Baffin Bay, etc.
1845–51	Franklin	Erebus and Terror	„	N.W. Passage
1848–51	Kellett	Herald and Plover	„	Franklin Search
1848–49	Ross (James C.) with M’Clure and M’Clintock	Enterprise and Investigator	„	„
1850–51	De Haven (Grinnell Exp.),	Advance and Rescue	American	„
1850–51	Austin, Osborn, Ommanney etc.	Assistance, Intrepid,	British	„

		Pioneer, Resolute		
1850–54	M'Clure and Collinson	Investigator and Enterprise	,,	,,
1852–53	Inglefield	Phoenix	,,	Beechey Island
1852–54	Belcher, Osborn, M'Clintock, Richards, Pullen	Resolute, Pioneer, Intrepid, Assistance, North Star	,,	Franklin Search
1853–54	Rae		,,	,,
1853–55	Kane (2nd Grinnell Exp.)	Advance	American	Smith Sound
1857–59	M'Clintock	Fox	British	Franklin Search
1858–62	Torell, Nordenskiöld, etc.	Various	Swedish	Spitsbergen and Greenland
1860–61	Hayes	United States	American	Grinnell Land and N. Greenland
1864–69	Hall	Monticello	,,	American Archipelago
1868	Nordenskiöld (A. E.)	Sofia	Swedish	Bear Island and Spitsbergen
1868	Koldewey	Germania	German	E. Greenland
1869	Palliser	Laurel	Anglo-Norwegian	Kara Sea
1869–70	Koldewey and Hegemann	Germania and Hansa	German E.	Greenland
1871–73	Hall	Polaris	American	Smith Sound and Robeson Channel
1872–74	Weyprecht and Payer	Tegetthoff	Austrian	*Franz Josef Land*
1874–95	Wiggins	Various	British	Sea route to Siberia
1875–77	Nares and others	Alert and Discovery	,,	Grant Land and N. Greenland

1875–76	Allen Young	Pandora	„	Lancaster and Smith Sounds
1878–80	Nordenskiöld (A. E.)	Vega	Swedish	*N.E. Passage*
1879–82	De Long	Jeannette	American	New Siberia Islands, etc.
1880–82	Leigh Smith	Eira	British	Franz Josef Land
1881–84	Greely	Proteus	American	Lady Franklin Bay, etc.
1885–86	Bunge and Toll		Russian	New Siberia Islands
1888	Nansen	(land)	Norwegian	S. Greenland
1891–92	Peary	Kite	American	N. Greenland
1893	Toll		Russian	New Siberia Islands, etc.
1893–95	Peary	Falcon	American	N. Greenland
1893–96	Nansen	Fram	Norwegian	*Across Polar Basin*
1894–97	Jackson	Windward	British	Franz Josef Land
1896–97	Conway	Express	„	Spitsbergen
1897	Peary	Hope	American	Cape York Meteorite
1898–99	Amdrup		Danish	E. Greenland
1898–1902	Peary	Windward	American	Sea N. of Greenland
1898–1902	Sverdrup	Fram	Norwegian	American Archipelago
1899	Makarof	Yermak	Russian	Kara Sea, etc.
1899	Nathorst	Antarctic	Swedish	Jan Mayen and E. Greenland
1899–1900	Duke of Abruzzi	Stella Polare	Italian	Franz Josef Land and Sea to North
1900	Amdrup	Antarctic	Danish	E. Greenland
1900–1901	Baldwin (1st Ziegler Exp.)	America	American	Franz Josef Land
1900–1902	Toll	Sarya	Russian	New Siberia Islands

1903–1905	Amundsen	Gjöa	Norwegian	N. Magnetic Pole and N.W. Passage
1903–1905	Fiala (2nd Ziegler Exp.)	America	American	Franz Josef Land
1905–1906	Peary	Roosevelt	„	Ocean N. of Greenland
1906–1907	Bernier	Arctic	Canadian	American Archipelago
1906–1908	Mikkelsen	Duchess of Bedford	Anglo-American-Danish	Beaufort Sea
1906–1908	Mylius Erichsen	Danmark	Danish	N.E. Greenland
1908–1909	Peary	Roosevelt	American	N. Pole
1908–12	Stefansson and Anderson	(land)	Icelandic Canadian	Arctic Canada
1909–12	Mikkelsen	Alabama	Danish	N.E. Greenland
1912	Rasmussen	(land)	„	N. Greenland
1912	De Quervain	„	Swiss	S. Greenland
1913	Koch	„	Danish	Central Greenland
1913	Vilkitski	Taimuir and Vaigach	Russian	Siberian Arctic Ocean
1913–17	Macmillan	Erik	American	Greenland, Ellesmere Island and Sea to north
1913–17	Stefansson, Anderson, and Bartlett	Karluk, Mary Sachs, Polar Bear, etc.	Canadian	American Archipelago and Beaufort Sea
1914–15	Vilkitski	Taimuir and Vaigach	Russian	N.E. Passage (E. to W.)
1917	Rasmussen	(land)	Danish	N. Greenland
1918	Storkersen	(ice)	Canadian	Beaufort Sea

II. ***Antarctic (including near approaches to Antarctic Circle)***

Year	Explorer	Ship	Nationality	Locality[214]
1772–75	Cook	Resolution and Adventure	British	Southern Ocean
1819–21	Bellingshausen	Vostok and Mirnyi	Russian	„
1819–20	Smith	Williams	British	South Shetlands
1820	Bransfield	Andromache	„	„
1820–22 (2 voyages)	Pendleton, Palmer, etc.	Frederick, Hero, etc.	American	South Shetlands, Palmer Land, Powell Islands
1821–22	Powell	Dove	British	South Orkneys
1822–23	Weddell	Jane and Beaufoy	„	Weddell Sea, etc.
1822–23	Morrell	Wasp	American	Southern Ocean
1837–40	D'Urville	Astrolabe and Zelée	French	Southern Ocean and lands to South
1838–39	Balleny	Eliza Scott	British	*Balleny Islands*, etc.
1839–40	Wilkes	Vincennes and others	American	*Wilkes Land*, etc.
1839–43	Ross (James C.)	Erebus and Terror	British	Ross Sea and *Victoria Land*
1873–74	Dallmann	Grönland	German	Graham Land, etc.
1874	Nares	Challenger	British	Southern Ocean
1892–93	Fairweather, Bruce, etc.	Balaena, Active and others	„	Graham Land, etc.
1893–94	Larsen and others	Jason, etc.	Norwegian - German	„
1894–95	Kristensen and Bull	Antarctic	Norwegian	Victoria Land
1897–99	Gerlache and others	Belgica	Belgian	Graham and *Alexander* Lands
1898–1900	Borchgrevink	Southern Cross	British	Victoria Land
1901–03	Drygalski	Gauss	German	*William II Land*

1901–03	Nordenskjöld	Antarctic	Swedish	Graham Land, etc.
1901–04	Scott	Discovery	British	Victoria Land
1902–04	Bruce	Scotia	„	Weddell Sea and *Coats Land*
1902–04	Charcot	Français	French	Graham Land, etc.
1907–09	Shackleton	Nimrod	British	Towards South Pole
1908–10	Charcot	Pourquoi-pas?	French	Graham Land, etc.
1910–12	Amundsen	Fram	Norwegian	*South Pole*
1910–13	Scott	Terra Nova	British	South Pole
1911–12	Filchner	Deutschland	German	Weddell Sea and *Luitpold Land*
1911–13	Mawson and Davis	Aurora	Australian	Lands south of Indian Ocean
1914–16	Shackleton	Endurance and Aurora	British	Weddell Sea

BRIEF BIBLIOGRAPHY OF POLAR VOYAGES AND TRAVELS

[*Limited to narratives of general interest, no attempt being made to include special reports and memoirs on scientific results.*]

ABRUZZI, DUKE OF THE. Farther North than Nansen; being the voyage of the *Polar Star*. *Illustrations.* La. 8°. 1901.

AMUNDSEN, ROALD. The North-West Passage; being the record of a voyage of exploration of the Ship *Gjöa*, 1903–1907. 2 vols. *Maps and illustrations.* 8°. 1908.

BACK, SIR G. Narrative of the Arctic Land Expedition to the mouth of the Great Fish River ... in 1833–35. *Map and illustrations.* 8°. 1836.

BAFFIN, WILLIAM. The Voyages of W. B., 1612–22. Ed. by Sir Clements R. Markham. (Hakluyt Society Publication, No. 63.) *Maps and illustrations.* 8°. 1881.

BARENTS, WILLEM. The Three Voyages of W. B. to the Arctic Regions in 1594–96. By Gerrit de Veer. Ed. by Lieut. Koolemans Beynen. (Hakluyt Society Publication, No. 54.) 2nd ed. *Maps and illustrations.* 8°. 1876.

—— Reizen van W. B., Jacob van Heemskerck, Jan Corneliz Rijp, en Anderen ... verhaald door Gerrit de Veer, uitgeg. door S.P. L'Honoré Naber. (Werken uitgeg. door De Linschoten Vereeniging, XIV, XV.) 2 vols. *Maps and illustrations.* La. 8°. The Hague, 1917.

BARROW, SIR JOHN. Chronological History of Voyages into the Arctic Regions.... *Map.* 8°. 1818.

—— Voyages of Discovery and Research within the Arctic Regions, from the year 1818 to the Present Time.... *Maps and portraits.* 8°. 1846.

BEECHEY, CAPT. F. W. Voyage of Discovery towards the North Pole, performed in H.M.SS. *Dorothea* and *Trent*, 1818. *Map and illustrations.* 8°. 1843.

BELCHER, SIR EDWARD. The Last of the Arctic Voyages; being a narrative of the Expedition in H.M.S. *Assistance* ... 1852–54. 2 vols. *Maps and illustrations.* La. 8°. 1855.

BERNIER, CAPT. J. E. Report on the Dominion Government Expedition to Arctic Lands ... on board the C.G.S. *Arctic*, 1906–1907. *Map and illustrations.* La. 8°, Ottawa, 1909.

CHRISTY, MILLER. *See* FOXE, LUKE.

COLLINSON, SIR RICHARD. Journal of H.M.S. *Enterprise*, on the Expedition in search of Sir John Franklin's Ships by Behring Strait, 1850–55.... *Maps and illustrations.* 8°. 1889.

Conway, Sir W. M. and others. The First Crossing of Spitsbergen. *Maps and illustrations.* La. 8°. 1897.

—— No Man's Land: a History of Spitsbergen.... *Maps and illustrations.* La. 8°. Cambridge, 1906.

Davis, John. The Voyages and Works of J. D. the Navigator. Ed. by Sir A. H. Markham. (Hakluyt Society Publication, No. 59.) *Maps and illustrations.* 8°. 1880.

De Long, George W. The Voyage of the *Jeannette*.... Ed. by Emma De Long. 2 vols. *Maps and illustrations.* 1883.

Ellis, Henry. Voyage to Hudson's Bay ... in 1746–47. *Maps and illustrations.* 8°. 1748.

Fiala, A. Fighting the Polar Ice. *Map and illustrations.* La. 8°. 1907.

Fox, Capt. Luke. North-west Fox; or, Fox from the North-west Passage.... *Maps and diagram*, sm. 4°. 1635.

—— The Voyages of Capt. Luke Fox and Capt. Thomas James in search of a N.W. Passage. With narratives of the earlier North-west voyages of Frobisher, Davis, Weymouth, Hall, Knight, Hudson, Button, Gibbons, Bylot, Baffin, Hawkridge, and others. Ed. by Miller Christy. (Hakluyt Society Publications, Nos. 88, 89.) 2 vols. *Maps and illustrations.* 8°. 1894.

Franklin, Sir John. Narrative of a Journey to the Shores of the Polar Sea, in 1819–22. *Maps and illustrations.* 4°. 1823.

—— Narrative of a Second Expedition ... 1825, 1826 and 1827. *Maps and illustrations.* 4°. 1828.

Frobisher, Sir Martin. The Three Voyages of Sir M. F.... By George Best. Ed. by Sir R. Collinson. (Hakluyt Society Publication, No. 38.) *Maps and illustrations.* 8°. 1867.

Greely, Gen. Adolphus W. Three Years of Arctic Service; an account of the Lady Franklin Bay Expedition of 1881–84. 2 vols. *Maps and illustrations.* La. 8°. 1886.

—— Handbook of Polar Discoveries. 4th ed. *Maps.* 8°. 1910.

Hakluyt, Richard. The Principal Navigations ... of the English Nation.... 3 vols. Sm. Folio. 1599–1600.

[Also reprint in 12 vols. 8°. Glasgow, 1903–1905.]

Hall, Charles, F. Narrative of the Second Arctic Expedition ... to Repulse Bay, etc., etc., 1864–69. Ed. by J. E. Nourse. *Maps and illustrations.* 4°. Washington, 1879.

—— Narrative of the North Polar Expedition, U.S. Ship *Polaris*.... Ed. by Rear-Adm. C. F. Davis. *Maps and illustrations.* 4°. Washington, 1876.

Hayes, Isaac I. The Open Polar Sea:... Voyage of Discovery towards the North Pole in the Schooner *United States*. *Maps and illustrations.* 8°. 1867.

Heemskerck. *See* Barents.

Hudson, Henry. H. H. the Navigator. Original Documents.... Collected ... by G. M. Aster. (Hakluyt Society Publication, No. 27.) *Maps.* 8°. 1860.

Jackson, Frederick George. A Thousand Days in the Arctic. 2 vols. *Maps.* La. 8°. 1899.

James, Capt. Thomas. The Strange and dangerous Voyage of, in his intended discovery of the North-west Passage into the South Sea.... *Map.* Sm. 4°. 1633.

—— *See* Fox, Luke.

Johnson, Henry. The Life and Voyages of Joseph Wiggins. *Maps and illustrations.* 8°. 1907.

Kane, Elisha Kent. The U.S. Grinnell Expedition in search of Sir John Franklin. *Map and illustrations.* New York, 1853.

—— Arctic Explorations: The Second Grinnell Expedition ... 1853–55. 2 vols. *Maps and illustrations.* 8°. Philadelphia, 1856.

Koldewey, Karl. The German Arctic Expedition of 1869–70. [Translated from the German.] *Maps and illustrations.* 8°. 1874.

Kotzebue, Otto von. A Voyage of Discovery into the South Sea and Beering's Straits. 3 vols. *Maps and illustrations.* 8°. 1821.

Lütke, Friedrich. Viermalige Reise durch das nördl. Eismeer ... 1821–24. [From the Russian.] 2 vols. *Map (separate).* 8°. Berlin, 1835.

M'Clintock, Sir Leopold. The Voyage of the *Fox* in the Arctic Seas. [Various eds.] *Maps and illustrations.* 8°. 1859, etc.

M'Clure, Capt. Robert C. M. *See* Osborn, Sherard.

Markham, Adm. Sir Albert H. The Great Frozen Sea.... Voyage of the *Alert*. *Maps and illustrations.* 8°. 1878.

Markham, Sir Clements R. *See* Baffin.

Middleton, Christopher. Attempts made for the Discovery of a passage into the South Seas by the North-west.... (In Harris's Collection of Voyages, vol. 2, 1748.)

Mikkelsen, Einar. Conquering the Arctic Ice. *Maps and illustrations.* 8°. 1909.

—— Lost in the Arctic.... Alabama Expedition, 1909–12. *Maps and illustrations.* La. 8°. 1913.

Mulgrave, Lord. *See* Phipps.

Müller, G. F. Voyages et Découvertes faites par les Russes le long des Côtes de la Mer Glaciale. 2 vols. *Map.* Sm. 8°. Amsterdam, 1766.

Munk, Jens, and others. Danish Arctic Expeditions, 1605–20. Ed. by C. C. A. Gosch. 2 vols. (Vol. 2: The Expedition of Capt. Jens Munk to Hudson's Bay ... in 1619–20.) (Hakluyt Society Publications, Nos. 96, 97.) *Maps and illustrations.* 8°. 1897.

Nansen, Fridtjof. The First Crossing of Greenland. 2 vols. *Maps and illustrations.* 8°. 1890.

—— Farthest North.... Voyage of Exploration of the Ship *Fram*, 1893–96. 2 vols. *Maps and illustrations.* La. 8°. 1897.

—— In Northern Mists: Arctic Exploration in early times. 2 vols. *Maps and illustrations.* La. 8°. 1911.

Nares, Sir George. Narrative of a voyage to the Polar Sea during 1875–76.... 2 vols. *Maps and illustrations.* 1878.

Nathorst, A. G. Två Somrar i Norra Ishafvet. 2 vols. *Maps and illustrations.* Stockholm, 1900.

Nordenskiöld, Baron A. E. The Voyage of the *Vega* round Asia and Europe. 2 vols. *Maps and illustrations.* 8°. 1881.

Osborn, Capt. Sherard. The Discovery of the North-west Passage by H.M.S. *Investigator*, by Capt. R. M'Clure, 1850–54. Ed. by Comm. S. Osborn. *Map and illustrations.* 8°. 1856.

Parry, Adm. Sir W. E. Journal of a voyage for the Discovery of a N.W. Passage ... in 1819–20. *Maps and illustrations.* 4°. 1821.

—— Journal of a Second Voyage ... in 1821–23. *Maps and illustrations.* Appendix to same. *Illustrations.* 4°. 1824.

—— Journal of a Third Voyage ... in 1824–25. *Maps and illustrations.* 4°. 1826.

—— Narrative of an Attempt to reach the North Pole ... in 1827. *Maps and illustrations.* 4°. 1828.

Payer, Julius von. New Lands within the Arctic Circle.... Discoveries of the *Tegetthoff*, 1872–74. 2 vols. *Maps and illustrations.* 8°. 1876.

Peary, Robert Edwin. Northward over the 'Great Ice.' 2 vols. *Maps and illustrations.* 8°. 1898.

—— Nearest the Pole. *Maps and illustrations.* La. 8°. 1907.

—— The North Pole. *Map and illustrations.* La. 8°. 1910.

Phipps, Capt. Constantine John (Afterwards Lord Mulgrave). A Voyage towards the North Pole ... 1773. *Maps and illustrations.* 4°. 1774.

Purchas, Samuel. Purchas his Pilgrimes. 4 vols. *Maps and illustrations.* Folio. 1625.

Rae, Dr John. Narrative of an Expedition to the Shores of the Arctic Sea in 1846 and 1847. *Maps.* 8°. 1850.

Ross, Sir John. Voyage of Discovery in H.M. Ships *Isabella* and *Alexander*. *Maps and illustrations.* 4°. 1819.

—— Narrative of a Second Voyage in search of a N.W. Passage ... including the reports of Capt. J. C. Ross. *Maps and illustrations.* 4°. Appendix to same. *Illustrations.* 4°. 1835.

Sverdrup, Otto. New Land. Four Years in the Arctic Regions. (Translated from the Norwegian.) 2 vols. *Maps and illustrations.* La. 8°. 1904.

Veer, Gerrit de. *See* Barents.

Wiggins, Joseph. *See* Johnson, Henry.

Wood, Capt. J. Attempt to discover a North-east Passage to China and Japan (*in* 'Account of several late Voyages and discoveries,' 8°. 1711).

Wrangel, Ferdinand von. Narrative of an Expedition to the Polar Sea in 1820–23. Ed. by Major E. Sabine. [From the German.] *Map.* 8°. 1840.

Young, Sir Allen. Cruise of the *Pandora*. *Map and illustrations.* 8°. 1876.

II. Antarctic

Amundsen, Roald. The South Pole.... Norwegian Antarctic Expedition in the *Fram*, 1910–12. 2 vols. *Maps and illustrations.* 8°. 1912.

Andersson, J. Gunnar. *See* Nordenskjöld, O.

Balch, Edwin Swift. Antarctica. La. 8°. Philadelphia, 1902.

Bellingshausen, F. G. Two Voyages of Exploration in the Antarctic Ocean ... in the Corvettes *Vostok* and *Mirnyi*. 2 vols, and Atlas. [In Russian.] 4°, Atlas, folio. St Petersburg, 1831.

[Also abridged German translation by Gravelius, Leipzig, 1902.]

Bernacchi, Louis. To the South Polar Regions. *Maps and illustrations.* 8°. 1901.

Borchgrevink, Carstens Egeberg. First on the Antarctic Continent.... British Antarctic Expedition, 1898–1900. *Maps and illustrations.* 8°. 1901.

[Brown, R. N. Rudmose, R. C. Mossman, and J. H. Harvie Pirie.] The Voyage of the *Scotia*. *Maps and illustrations.* 8°. 1906.

Bull, H. J. The Cruise of the *Antarctic* to the South Polar Regions. *Illustrated.* 8°. 1896.

Burn Murdoch, W. G. From Edinburgh to the Antarctic. An Artist's Notes and Sketches during the Dundee Antarctic Expedition of 1892–93. Chapter by W. S. Bruce. *Map and illustrations.* 8°. 1894.

Charcot, Jean B. Journal de l'Expédition Antarctique Française, 1903–05. Le *Français* au Pôle Sud. *Map and illustrations.* La. 8°. Paris [1906.]

—— *Le Pourquoi Pas?* dans l'Antarctique ... 1908–10. *Map and illustrations.* La. 8°. Paris, 1910.

Cook, James. A Voyage towards the South Pole and Round the World. 3 vols. *Maps and illustrations.* 4°. 1777.

Drygalski, Erich von. Zum Kontinent des eisigen Südens. Deutsche Südpolarexpedition ... 1901–1903. *Maps and illustrations.* 4°. Berlin, 1904.

Fanning, Edmund. Voyages round the World, with.... Voyages to the South Seas, etc., etc. *Illustrated.* 8°. 1834.

Gerlache, Adrien de. Voyage de la *Belgica*. Quinze Mois dans Antarctique. *Map and illustrations.* La. 8°. Paris and Brussels, 1902.

Mawson, Sir Douglas. The Home of the Blizzard. Story of the Australasian Expedition, 1911–14. 2 vols. *Maps and illustrations.* La. 8°. 1915.

Mill, Hugh Robert. The Siege of the South Pole. *Maps and illustrations.* 8°. 1905.

—— *See* Shackleton.

Morrell, Benjamin. A Narrative of Four Voyages to the South Sea ... 1822–31. *Portrait.* 8°. New York, 1832.

Mossman, R. C. *See* Brown, R. N. R.

Murray, John, and others. Narrative of the Cruise of H.M.S. *Challenger*, Vol. i. *Maps and illustrations.* 4°. 1885.

[And other narratives by Spry, Moseley, and Lord George Campbell.]

Nordenskjöld, Otto, and J. Gunnar Andersson. Antarctica, or Two Years amongst the Ice of the South Pole. *Maps and illustrations.* 8°. 1905.

Pirie, J. H. H. See Brown, R. N. R.

Ross, Sir James Clark. A Voyage of Discovery and Research in the Southern and Antarctic Regions during the years 1839–43. 2 vols. *Maps and illustrations.* 8°. 1847.

Scott, Robert Falcon. The Voyage of the *Discovery*. 2 vols. *Map and illustrations.* 8°. 1905.

—— Scott's Last Expedition. Vol. 1. Journals of Capt. Scott. Vol. 2. Reports of the Journeys and Scientific work undertaken by Dr E. A. Wilson, etc. Arranged by Leonard Huxley, with a Preface by Sir Clements R. Markham. 2 vols. *Maps and illustrations.* La. 8°. 1913.

Shackleton, Sir Ernest. The Heart of the Antarctic: being the story of the British Antarctic Expedition, 1907–09. Introduction by Hugh Robert Mill. Account of Journey to South Magnetic Pole, by Prof. T. W. Edgeworth David. 2 vols. *Maps and illustrations.* La. 8°. 1909.

—— South. The Story of Shackleton's Last Expedition, 1914–17. *Illustrated.* 8°. 1919.

Urville, J. S. C. Dumont D'. Voyage au Pôle Sud et dans l'Océanie ... pendant ... 1837–40. 22 vols. La. 8° and Atlas 7 vols, folio. Paris, 1842–54.

[Vols. 1–10 = Histoire du Voyage.]

Webster, W. H. B. Narrative of a Voyage to the South Atlantic Ocean in 1828–30, in H.M. Sloop *Chanticleer* under the command of Capt. Henry Foster. 2 vols. *Maps and illustrations.* 8°. 1834.

Weddell, James. A voyage towards the South Pole performed in the years 1822–24.... *Maps and illustrations.* 8°. 1825. Second ed. 1827.

Wilkes, Charles. Narrative of the U.S. Exploring Expedition, 1838–42. 5 vols. and Atlas. *Maps and illustrations.* La. 8°. Philadelphia, 1845.

FOOTNOTES

[1] *Névé* is the upper portion of a glacier, the top layers of which are more nearly in the condition of snow, and in the whole of which much air is mingled with the ice. It is rather frozen snow than ice.

[2] Dr Rink gives a list of 25 discharging glaciers. Of these, beginning from the south, the principal ones are:

(1) Sermilik (near Cape Farewell).
(2) Narsalik.
(3) Godthaab.
(4) Jacobshavn.
(5) Jasiusak (into the Waigat).
(6) Omenak Fjord.
(7) Stor Kangerdlugsuatsiak.
(8) Upernivik.

[3] It takes a very long time for lichens to form. The bones of the ptarmigan which Sir Edward Barry and his party had eaten on Melville Island in 1820 were clean and free from any growth when found 30 years afterwards.

[4] I paid very special attention to the vestiges of these wanderers when I served in those regions. All the articles mentioned were found by myself in 1851.

[5] By Colonel Feilden in 1877.

[6] Found by Dr O. Stolberg. *Nansen*, 11, 72.

[7] *Studies on the Material Culture of the Eskimo in West Greenland* (Kjøbenhavn, 1915), Morten P. Porsild.

[8] The work of Pytheas was known to Dicaearchus, a pupil of Aristotle, and the date of the voyage was, therefore, probably not later than the time of Aristotle.

[9] The word Thule, in its forms *Thyle*, *Thull*, *Tell*, means ‘a limit’ in ancient Saxon; and we thus have Telemarken in Norway.

[10] Pliny and Diodorus Siculus.

[11] The name of Viking is derived from *Vik*, a bay or creek, and the patronymic *Ing*, i.e. “Children of the bays,” whence they sallied forth as sea rovers.

[12] The *mausar*, which was highly prized, may have been some kind of maple or birch.

[13] According to the Flatey book, Bjarni, the son of Herjulf, was in Norway when his father left Iceland to settle in Greenland. Hearing this when he came to Iceland, he continued his voyage to join his father. He is said to have discovered a new land before reaching his father's homestead in Herjulfsfjord. This led to the voyage of Leif to visit the newly-discovered land. The two stories in the Hauk book and the Flatey book are so different that they cannot be fitted together, and it is necessary to adopt one and reject the other. That in the Hauk book is the older, the more coherent, and probably nearer to the truth.

[14] Professor Rafn, and those who have followed him, thought *Dagmalastad* and *Eyktarstad* denoted hours of the day, and that the former was 8 a.m. and the latter 4 p.m. This gave nine hours for the duration of the shortest day, which would be in latitude 42° 21′ N. But *Dagmal* and *Eykt* were points of the horizon, not hours of the day. The Norsemen had no means of knowing the hours. In 1885 Professor Gustav Storm gave the correct interpretation of the passage, and showed that the position must have been south of 49° N., but not far to the south of that latitude. The inhabitants met with by the Norsemen in Markland and called by them Skrællings are held by Tholbitzer to have been Eskimos. In Vinland the natives appear to have been Algonquin Indians.

[15] The different events which, according to the Hauk book, occurred in Karlsefni's voyage, are scattered over several voyages in the Flatey book, the companions of Karlsefni being made the leaders of separate expeditions at different times. There is a voyage of Thorstein which failed, a voyage of Thorwald who was killed by Skrællings, a voyage of Karlsefni, and a voyage of Fredis in company with two brothers whom he murdered. The two accounts are contradictory as regards some of the details.

[16] The Kakortak ruin was discovered by Hans Egede in 1723. It was visited by Lieut. Graah in 1827 who first described it, with careful measurements. It was again visited by Sir Leopold M'Clintock in 1860.

[17] These are recorded in the Icelandic annals, which commence in 1260. Another series is appended to the Flatey book and dates from 1395.

[18] A Norse festival which falls on April 28th.

[19] In 1246.

[20] July 25th.

[21] *Antiq. Amer.* XXXIX.

[22] The sailing directions of Ivar Bardsen were published in English by Purchas, from a copy which had belonged to Henry Hudson. Rafn, in the *Antiquitates Americanae*, gave the text of an early copy found in the Faroes, with a Latin translation. Mr Major, in his *Voyages of the Zeni*, gives an English translation of the Latin version.

[23] We learn this from a parchment MS., known as the Skalholt Annals, believed to have been written in 1347.

[24] The drawings by Christianised Eskimos of Godthaab which have been printed, and are supposed to represent traditions about their conquest of the Norsemen, merely represent what the Danes told them.

[25] Vigdis M.d. hvilir her glede gud sal hennar.

[26] *Voyages of the Brothers Zeni*, by F. W. Lucas (Stevens, 1897).

[27] There are several astrolabes in the British Museum, one of 1280, another of 1342; one at King's College, Cambridge (1540); two at Gonville and Caius College, one of early 14th century date, the other, rather later, formerly belonged to Caius himself; one at South Kensington (1374); one at Oriel College, Oxford, in rather bad condition; three at Merton College, one of 1350, another 1571, and a third very heavy one. At Merton there is also a very old quadrant of 12-inch radius, and a small disc of brass with pointers. At the Bodleian there is a Persian astrolabe. Mr Hyett's astrolabe at Painswick House has 21 stars marked and one ring at the back; 36 festivals are marked. The number of English Saints shows it to be English. The interesting astrolabe which belonged to Sir Francis Drake is at Greenwich, its date is 1572. It belonged to the Earl of Chesterfield, who gave it to the Rev. T. Bigsby in 1783. Mr Bigsby gave it to King William IV, who presented it to Greenwich in 1833.

[28] Father of Sir Philip Sidney, and of Robert, 1st Earl of Leicester of that family.

[29] The first wife of Sir Henry Willoughby, Sir Hugh's father, was Margaret, daughter of Sir Robert Markham of Cotham. His third wife was Ellen, daughter of John Egerton of Winehill in Cheshire. Sir Henry had four wives. His effigy on the monument at Wollaton has two small wives on each side.

[30] Besides Willoughby there were a master and his mate, six merchants, a master gunner, a boatswain and his mate, a carpenter, a purser, two surgeons, and 20 men.

[31] Moxon (1676) places Willoughby Land near the south-east corner of Spitsbergen. On the map in Harris's voyage (1748) it is an island half-way between Spitsbergen and Novaya Zemlya.

[32] I believe this is now in Lord Salisbury's collection at Hatfield.

[33] Reproduced by kind permission of the publisher, from Dr A. D. de Vries's *Oud-Holland* (Binger, 1882).

[34] Found by Purchas among the papers of Hakluyt, v. ante, p. 51.

[35] An excellent English edition of the voyage of Linschoten to the East Indies in two vols. was printed for the Hakluyt Society in 1885; edited by Mr Arthur C. Burnell and Mr Tiele of Utrecht.

[36] Linschoten wrote a very interesting account of this voyage with Tetgales in 1594.

[37] Linschoten's narrative of this second voyage was published in 1601, the 3rd edition in 1638. On his return Linschoten settled at Enkhuizen and became Treasurer of the town. Here he was the friend of Lucas Waghenaer, author of the best sailing directions of that time. Linschoten published a translation of the *History of the West Indies*, by Acosta. He died in 1611, aged 48. De Veer wrote an account of the proceedings of Barentsz's ship during the second voyage.

[38] In 1603 Stephen Bennet came to the same island and named it Cherrie Island, after his patron Sir Francis Cherrie, an Adventurer of the Russia Company.

[39] The *schuit* was a larger boat.

[40] The narrative of Gerrit de Veer was translated and edited for the Hakluyt Society by Dr Beke in 1852. A new edition was edited, at my request, by that gallant young Dutch Arctic officer Koolemans Beynen in 1876.

[41] Another Norwegian Captain named Gundersen reached the Ice Haven of Barentsz in August 1875.

[42] These relics were deposited in the model room of the Naval Department at the Hague.

[43] State Paper Office, *Holland*, lxxvii.

[44] Maldonado, a Spaniard, published an account of a navigable strait, called the Strait of Anian, from the east side of America to the Pacific, coming out north of Cape Mendocino in California.

[45] Chancellor had used the cross-staff. Frobisher had been supplied with a similar instrument called a "ballestilla," which he used in preference to the astrolabe, both being among the instruments and charts bought at a cost of £47. 0*s.* 8*d.* of Humphrey Cole and others. The cross-staff was described by Gemma Frisius, and Gunter's was a yard long, with a cross-piece of 26½ inches. The staff, which was of wood, was graduated, and the cross-piece was moved along it until, looking through the sight near the eye, the two objects were covered of which the angle was to be measured. In observing for the latitude the two objects were the sun and the horizon, the angle giving the altitude.

[46] The authorities for the Arctic voyages of Frobisher are first the interesting narrative of George Best (Hakluyt, III) and the narrative of Dionise Settle (Hakluyt, III); Christopher Hall's account in the Harl. MSS. 167, fol. 165; the Journal of the *Judith*, Harl. MSS. 167, fol 41; Edward Sellman, *Narrative of Thomas Ellis* (Hakluyt, III); State Papers (Dom., Eliz.). Admiral Sir Richard Collinson edited the *Voyages of Frobisher* for the Hakluyt Society. There is a well written and painstaking life of Sir Martin Frobisher by the Rev. Frank Jones (Longman, 1878).

[47] Mr Miller Christy very thoroughly investigated the question of the Land of Busse, and wrote an exhaustive monograph on the subject. See Hakluyt Society's No. XCVI, Appendix B.

[48] The following names were given by Frobisher to places discovered on his voyages:—

1. Beare's Sound.
2. Best's Bulwock.
3. Best's Cape.
4. Best's Blessing.
5. Dyer's Sound.
6. Hall Island.
7. Hall Sound.
8. Jackman's Sound.
9. Fenton's Fortune.
10. Five Men's Sound.
11. Jonas Mount.
12. Frobisher Strait.

13. Gabriel Islands.
14. Haidon's Nests.
15. Hatton Island.
16. Leicester Island.
17. Lok Island.
18. Meta Incognita (name given by the Queen).
19. Mistaken Strait (Hudson's Strait).
20. Oxford Mount.
21. Queen Elizabeth's Foreland.
22. Queen's Cape.
23. Sussex (Countess of) Mine.
24. Sussex (Earl of) Island.
25. Trumpet's Island.
26. Walsingham Cape.
27. Warwick Mount.
28. Warwick (Countess of) Sound and Island.
29. Winter's Furnace.
30. Yorke Sound (*in Greenland*).

[49] It must be remembered that Davis was entirely ignorant of the Norse colony and of the Icelandic Sagas, which were only brought to light by Professor Rafn in our own day.

[50] The narratives of the first and third voyages were written by Mr Janes, those of the second by Davis himself. They are all in Hakluyt, and, with the other writings of Davis, have been edited for the Hakluyt Society by Admiral Sir Albert Markham. The present writer's life of Davis, which records his great services in much more detail than is here possible, was published in 1889.

[51] An account of the contents of *The Seaman's Secrets* is given in the present writer's life of Davis, and it is printed *in extenso* in Admiral Sir Albert Markham's *Voyages of John Davis*.

[52] This is now in the Museum at Greenwich.

[53] The following names were given by John Davis in the Arctic regions.

1. Chidley (or Chudleigh) Cape, S. entrance to Hudson Strait.
2. Cumberland (Earl of) Gulf.
3. Darcy Island, Labrador.
4. Desolation Land and Cape, S. Greenland.
5. Dyer Cape, North point of Exeter Sound.
6. Exeter Sound, Baffin Land.
7. Farewell Cape, S. point of Greenland.
8. Furious Overfall, Hudson Strait.
9. Gilbert Sound, Greenland 64° 15′ (Godthaab).
10. God's Mercy Cape, N. entrance of Cumberland Gulf.
11. London Coast, West Coast of Greenland.
12. Raleigh Mount, Baffin Land.
13. Sanderson His Hope, 72° 12′ N., Baffin Bay.
14. Totnes Road, 66° 40′ N., Baffin Land.
15. Walsingham Cape, Baffin Land.

16. Warwick (Earl of) Foreland, Baffin Land.

[54] A portrait of Sir Thomas Smith was engraved by Simon de Passe, dated 1617. The engraving is bound up in T. Grenville's copy of the Embassy to Russia and in a book called the *Surgeon's Mate*, which is dedicated to Sir Thomas. By his wife Sarah, daughter of William Blunt, who married secondly Robert Sidney Earl of Leicester, Sir Thomas had a son, Sir John Smith, who married a daughter of Sir Philip Sidney's "Stella" and his son Robert married Waller's "Sacharissa."

[55] The works of Leonard Digges were edited and published by his son: *Tectonicum*, a book on land-surveying (4to, 1556), *Pantometria*, a geometrical treatise (folio, 1591).

[56] Thomas Digges wrote *Alæ sive Scalæ Mathematicæ* (4to, 1573), *Arithmetical Military Treatise* (4to, 1579), *Stvatioticos*, a geometrical treatise necessary for the practice of soldiers (4to, 1590), with an account of the proceedings of the Earl of Leicester for the relief of Sluys, also *Description of the Celestial Orbs* (1599), and *England's Defence* (folio, 1686).

[57] The eldest son, Thomas Digges, succeeded to Chilham and died in 1687. His son Leonard died in 1718 leaving a son Thomas, whose second son West Digges was a celebrated comedian. Chilham was finished in 1616 and the names of Sir Dudley Digges and his wife Mary Kempe are carved over the door.

[58] See the writer's volume *The Voyages of Sir James Lancaster to the East Indies*, edited for the Hakluyt Society in 1877.

[59] Purchas calls her the *Frost*.

[60] Mount Kakatsiak.

[61] Cape Sophia is Proestefjeld (1170 ft.), just north of Holsteinborg.

[62] Amerdluk Fjord, or Itivdlek, in the opinion of Steenstrup.

[63] In 1881 I first drew attention to a manuscript Report to the King of Denmark in the British Museum, with 4 maps (21 leaves, small 4to). It was printed for the first time in the Hakluyt Society's volumes on Danish Expeditions. Probably when Hall left Denmark he did not send it in, but took it with him and presented it to James I.

[64] This search was undertaken by the kindness of the late Colonel Chester. In the Parish Register of St Margaret's, Westminster, Richard, son of John Baffin, was baptised on Sept. 30th, 1603, Joseph, Elizabeth, and William Baffin died of the plague in 1609, and Margaret Baffin, a child, was buried on June 8th, 1612. In the Register of the church of St Thomas Apostle, in the City, there is one entry of the name: Susan, daughter of William Baffin, was baptised on 15th Oct. 1609. This church was burnt in the great fire, and was not rebuilt.

[65] John Gatonby may have been a native of Winestead, for he dedicated his narrative (in *Churchill's Voyages*) to Sir Christopher Hildyard of that place. Gatonby was a well-known Hull name. I have failed to find any further trace of young Huntriss, the Scarborough lad, though the name still exists in that town.

[66] Incorrectly called Cocken Sound on old maps.

[67] Navigation Instructor and for many years Map Curator to the Royal Geographical Society.

[68] Andrew Barker was an experienced seaman. He was admitted a younger brother of the Hull Trinity House in 1594, and was three times Warden. He presented one of the lights of the stained glass in the East window of the Chapel of the old Trinity House at Hull, a figure of St James the Less. There still hangs in the hall of the House the kayak presented by Barker.

[69] The names given in Greenland by Hall are as follows; those while with the Danish Expedition are marked (D). The persons after whom the places were named are given in brackets.

Anne Cape (D). (*Queen of Denmark*), in sight from Cape Sophia.
Bell's River. (*One of the Venturers*), branch of Godthaab Fjord corrupted to *Baal*.
Brunei Cape (D). (*Dutch Venturer*), *Burnitt* on Admiralty Chart is wrong. Oliver Brunei (see p. 130) was for some time in the Danish service.
Christian's Fjord (D). (*King Christian IV*), 66° 25′ N., close to Cape Anne; is called by Gatonby *King's Fjord*.
Cockayne Sound. (*Sir W. Cockayne*), incorrectly spelt *Cocken* on maps, 65° 25′ The modern Sukkertoppen.
Comfort Cape. (*Named by Gatonby.*)
Cunningham Mount (D). (*Leader of first Danish Voyage*), Itivdlek.
Cunningham Fjord (D). (*Leader of first Danish Voyage*), Itivdlek Fjord or Amerdluk, 67° 25′ N.
Gabriel Mount.
Hope Harbour. Gilbert Sound of Davis. Modern Godthaab, 64° 15′ N.
Huntcliff Mount. (*After Huntcliff Foot near Redcar*), in Godthaab Fjord.
King's Fjord. (See Christian's Fjord.)
Knight Islands. (*Captain John Knight*, see pp. 129, 130).
Lancaster River. (*Sir James Lancaster*), a branch of Godthaab Fjord.
Sophia Cape (D). (*Queen of Denmark*), Proestefjeld, 1770 ft., just N. of Holsteinborg.
Rommel's Fjord (D). (*Hendrik Rommel*), 66.54 N., now Holsteinborg.
Thoroughgood Island.
Wilkinson Isles. (*Merchant sent with Hall by the Adventurers.*)

[70] See *An Historical Enquiry concerning Henry Hudson*, by John Meredith Read (Albany, 1856).

[71] See my *Life of John Davis*, p. 29.

[72] Engroneland.

[73] *Purchas*, III, p. 464, reprinted by Asher in his *Hudson's Voyages*, p. 146. Among some protests of the Muscovy Company against Dutch encroachments, in the State Paper Office, there is one by a Captain Millworth in which *Hudson's Touches* is mentioned.

[74] The following were the names of the crew: Henry Hudson (Master), and his son John Hudson, Robert Juet (Master's Mate), Arnold Ladley (Mate), John Cooke (Boatswain), Philip Stacey (Carpenter), John Braunch (Cook), John Barnes, John Adrey, James Scrutton, Michael Pearce (or Pierce), Thomas Hilles, Richard Tonson, Robert Rayne, and Humphrey Gilby.

[75] "We were against Fair Foreland in 79° N." [north end of Prince Charles Island]. "The night was very clear with fair weather, also calm, by which I had a very good opportunity to find the sun's refraction. For beholding it about a north-north-east sun, by a common compass, at which time the sun was at the lowest, it was but one-fifth of his body above the horizon, having about four-fifth parts below, so near as I could guess. His declination for that instant was 10° 35′ N., being at noon in the 2° 7′ of Virgo, his daily motion was 58′ whose half being twenty-nine, to be added to the former, because it was at twelve hours after noon. I say his place at the instant was 2° 26′ of Virgo, whose declination was as before 10° 35′; the latitude of the place was 78° 47′ whose complement was 11° 13′ the declination being subtracted from the complement of the pole's elevation, leaveth 38′, four-five part of which 12′, which being subtracted from 38 leaveth 26′ for refraction. But I suppose the refraction is more or

less according as the air is thick or clear, which I leave for better scholars to discuss; but this I thought good to note for the better help of those who do profess this study."

[76] In December 1615, Captain Joseph was appointed to command the fleet of the East India Company, consisting of the *Charles* and *Unicorn* (the Journal is in the India Office, No. 20). In 1617 he was slain in a fight with a Portuguese carrack. His widow received a pension.

[77] The family of Fotherby was from Grimsby. Martin Fotherby of Grimsby had two sons, Charles, Dean of Canterbury, who died in 1619, and Martin, Bishop of Salisbury. There is an elaborate tomb of the Dean in Canterbury Cathedral. Robert Fotherby was of the same family. His narratives of his three Spitsbergen voyages show that he had received a classical education, was observant, intelligent, and a thorough seaman. He afterwards entered the service of the East India Company, probably made one voyage to India, and was agent to the company at Deptford and in 1621 at Blackwall. He probably died in that employment.

[78] In 1617 Captain Marmaduke proposed to the King that he should be employed to make the north-east passage, but I have failed to discover anything more of his history.

[79] Since found to be three islands; the proper name of the group being Wyche Islands.

[80] For instance Wyche's Sound, discovered by Baffin and Fotherby in 1614, if not by Marmaduke in 1612, is now called Wijde Bay, a name, as Sir Martin Conway has pointed out, that was never heard of before 1670.

[81] This reverend but mutinous gentleman had previously been in Persia with the Shirleys.

[82] These islands are off Cape Sophia on the Greenland coast, a fact that the writer has good cause to remember, as he was once aground on them, and in some danger.

[83] I found Knight's Journal among some other papers thrown aside in a very damp place in the tower of the India Office, and printed it at the end of my volume of Sir James Lancaster's voyages, edited for the Hakluyt Society. A version of it is given by Purchas, but much is omitted.

[84] Brunel was a Dutchman. He had proposed to Christian IV to discover the lost colony of Greenland, and was probably in Hall's first voyage. A Cape on the Greenland coast was named after him. The story of Oliver Brunel was brought to light by S. Müller and Koolemans Beynen, the very able young editor of the 2nd edition of the Barentsz voyages.

[85] The names and rank of the crew were as follows:

1. Henry Hudson (Captain).
2. John Hudson (Captain's son).
3. Robert Juet (Mate).
4. Robert Bylot (Mate).
5. John King (Mate).
6. Edward Wilson (Surgeon).
7. Francis Clements (Boatswain).
8. William Wilson (Boatswain).
9. John Williams (Gunner).
10. Philip Staffe (Carpenter)
11. Sylvanus Bond (Cooper).

12. Bennet Mathews (Cook).
13. Henry Green (Clerk).
14. Habakuk Prickett (servant of Sir D. Digges).
15. Thomas Woodhouse (mathematical student).
16. Arnold Ladley (or Ludlow), A.B.
17. Michael Pierce, A.B.
18. John Thomas, A.B.
19. Adrian Moter, A.B.
20. Syriack Fanner, A.B.
21. Adam Moore, A.B.
22. Michael Butt, A.B.
23. Nicholas Sims (Boy).

[86] Prince Henry died November 6th, 1613, aged 18 years and a half.

[87] This distance would be greatly in error, unless the declinations of both heavenly bodies were the same.

[88] John Searle, a licensed surgeon, published his ephemeris in 1609. It was from 1609 to 1617, and the book also contained a correction of time in respect of several meridians, a list of places with latitude and longitude in time, and a table for converting degrees and minutes into time. David Origanus was the author of an ephemeris for the years from 1595 to 1650. His meridian was Wittenberg.

[89] I have not been successful in my attempts to discover who Master Herbert was. He was probably a gentleman volunteer.

[90] This map is excessively rare. It is only to be found in one or two copies of Foxe's book. The British Museum copy has not got it, but a facsimile has been inserted.

[91] The Portuguese Admiral, Ruy Freire de Andrada, and 17 guns were captured when the Kishm fort was taken. Ormuz then surrendered and was handed over to Shah Abbas.

[92] La Peyrère's account in his *Relation du Groenland* is unreliable and inaccurate.

Munk's narrative, *Navigatio Septentrionalis* (Copenhagen, 1621), has been edited for the Hakluyt Society (1897) by Mr Gosch.

[93] This is the first place in which I have found the use of log and line mentioned, although it had been known for at least 60 years; indeed an obscure passage in Pigafetta seems to suggest its use by Magellan. Bourne, in his *Regiment of the Sea*, published in 1573, describes the log-ship as so made that it remains where it falls into the water, while the line runs out during a fixed interval by a minute glass. The intervals between the knots on the log line are to a minute as a mile is to an hour. In Bourne's *Inventions or Devices*, No. 21, published in 1578, the inventor of the log and line is said to be Humphrey Cole of the Mint in the Tower; the maker of the instruments for Frobisher's first and second voyages bought in 1576.

[94] It is interesting to note the equipment necessary to enable a mathematical captain to observe efficiently in 1631. Captain James had:—

A quadrant of pear-wood of 4 ft. semidiameter.
Equilateral triangle of 5 ft. radius.

Quadrant of 2 ft. semidiameter.
Staff of 7 ft., another of 6 ft.
Gunter's cross-staff.
3 Jacob's staves.
2 Davis's back-staves.
6 Meridian compasses.
4 Needles in square boxes.
6 Needles of 3 inches.
4 Special 6-inch needles.
A loadstone to refresh needles.
A watch-clock 6 inches in diameter.
A lesser watch.
Small sand-glasses.
Log-line.
Hakluyt.
Purchas.
The best mathematical books available.

[95] See p. 40.

[96] Hans Egede made out half a dozen words to be common to Eskimos and Norsemen. *Quan*, the word for angelica, is nearly the same in both languages. In Eskimo *Kona* is a woman, in Norse *Kone*; in Eskimo *Nerriok* to eat, in Norse *Naere*; *Nise*, the word for porpoise, is the same in both languages. Ashes is *Asket* in Eskimo, in Norse *Aske*. In Eskimo a lamp is *Kollek*, in Norse *Kolle*.

[97] Count Zinzendorf was the founder of the congregation from Moravia, formed to promote the conversion of the heathen. He built a station on one of his estates in 1728, which was called Herrnhut. From hence missionaries went forth—chiefly to the West Indies, Greenland, and Labrador—known as Moravian missionaries. "Herrnhut" means "the Lord's keeping."

[98] Egede was the author of two books, one on the history of the Greenland Mission, the other a description of Greenland.

[99] Paul Egede was afterwards a Professor at Copenhagen, and Provost of the Royal Danish Mission.

[100] "A cruel attack on the reputation of a skilful and intrepid navigator." *John Barrow.*

[101] Ledyard was one of those remarkable men that Arctic service so often produces. He had been befriended by Sir Joseph Banks, who encouraged him in his enthusiasm for travel. Having been to Kamschatka by sea, Ledyard resolved to find his way there by land. He crossed to Ostend with no more than ten guineas in his pocket, made his way to Stockholm, and walked thence, round the Gulf of Bothnia, to St Petersburg. There he obtained permission to accompany a party with stores to Yakutsk and thence to Okhotsk. But, for some unknown reason, he was arrested, hurried back across Siberia, and put across the frontier near Königsberg. Quite destitute, he ventured to draw a small cheque on Sir Joseph Banks which enabled him to reach England. The African Association had just been formed, and Sir Joseph selected this resolute and fearless traveller as the best man to execute the instructions of the Association. Ledyard was to make his way from Senaar to the Niger. He set out in June 1788, but his career was brought to a premature close by fever at Cairo.

[102] *Philosophical Transactions*, LXVIII, p. 1057.

[103] Second edition 1818. Daines Barrington was also the author of *Observations on the Statutes*, 1766; *Naturalist's Calendar*, 1767; *Miscellanies*, 1781; and of contributions to the *Archaeologia* and *Philosophical Transactions*. He died at the Temple on March 11th, 1800, aged 73.

[104] *A Voyage towards the North Pole*, 1773 (4to, pp. 76 and 177), Bowyer and Nichols, 1774. Sir Albert Markham also published the narrative of a midshipman named Floyd, who was serving on board the *Racehorse*, in a book entitled *Northward Ho* (Macmillan, 1879). Sir Albert obtained a correct list of the officers from the Admiralty.

[105] A Corresponding Member of the Royal Geographical Society, 1843. He died in 1876.

[106] F. Martens. *Voyage to Spitzbergen.* Translation edited for the Hakluyt Society by Adam White (1855).

[107] C. G. Zorgdrager. *Bloeyende Opkomst der Aloude en Hedendaagsche Groenlandsche Visscherij* (Amsterdam, 1720).

[108] A bentick boom is a long straight spar to which the clews of the foresail are secured.

[109] *Spek* is the Dutch for blubber.

[110] From the Dutch *afmaaken*, to finish or adjust.

[111] The Swedish steamer *Sophia* reached 81° 42′ in 1868.

[112] His life was written by his nephew, Scoresby Jackson.

[113] Commander Buchan again served on the Newfoundland coast in the *Grasshopper* from 1820 to 1823. Fifteen years afterwards he was lost in the *Upton Castle* coming home from India, that Indiaman being heard of for the last time on December 8th, 1838.

[114] Sir John Ross was much hurt at the doubting remarks and criticisms respecting the brilliant crimson on his plate of the crimson snow. They still rankled 32 years afterwards when the present writer served with him, and he wrote an article on the subject in our Arctic periodical, the *Aurora Borealis*. Mr Bauer, of Kew Gardens, it appears, pronounced the crimson snow to be of the genus *Uredo*, allied to "smut" in wheat, and he grew some in snow. It was first green, then as bright a crimson as in Ross's plate. Ross called it *Uredo nivalis* of Bauer in his 2nd edition.

[115] Much attention was given to the provisioning. There were the preserved meats and soups of Donkin and Gamble; Burkitt's essence of malt, hops, and spruce; lemon juice, vinegar, sauerkraut, pickles, and herbs as antiscorbutics. Coal was used for ballast, 70 chaldrons in the *Hecla*, 34 in the *Griper*. The Admiralty supplied warm clothing and wolf-skin blankets for the men without any charge.

[116] Cyrus Wakeman, in the *Dorothea* with Buchan, and the *Griper*, 1819–20, was afterwards at the battle of Navarino, where his splendid gallantry is recorded by Lady Bourchier in her *Memoirs of Sir Edward Codrington*, II, p. 102 (Longman, 1873). He died in the Niger expedition.

Sir Joseph Nias, K.C.B., was in the *Alexander*, *Hecla*, and *Fury* with Parry, 1818–23. He distinguished himself in the *Herald* during the first China war, at the capture of the forts of the Bocca Tigris and in all the operations in the Canton river, becoming Rear-Admiral in 1857. In 1855 he married Isabella, only child of John Laing of Montagu Square, where he died December 16th 1879.

[117] Bushnan, on his return, was appointed to Franklin's land journey, but died before starting, in 1825.

[118] All three were with Parry again in his third voyage.

[119] Mr Hooper was with Parry in his third voyage. Afterwards he for some time held the post of Secretary to Greenwich Hospital. He died in 1833.

[120] The Rev. G. Fisher was afterwards Head Master of Greenwich School from 1834 to 1863. He died in 1873.

[121] The instructions for Parry's second expedition were signed by Sir George Cockburn, Sir Henry Hotham, and Sir George Clerk.

[122] Captain Lyon served on board the *Albion* at the battle of Algiers. He made an important journey from Tripoli to Mouzourk and wrote an excellent account of a very little known country. In 1825 he married Lucy, daughter of Lord Edward Fitzgerald, who died in 1826. In 1828 he published a journal of travels in Mexico. This accomplished and much beloved officer died in 1832.

[123] Henry Foster, son of the Rev. Henry Foster of Woodplumpton near Preston, was born in 1796. He was a midshipman in the *Conway* with Captain Basil Hall on the Pacific Station, an excellent school for young officers; then in the *Griper* with Clavering, Assistant Surveyor in Parry's third voyage, and in the voyage of 1827, when he explored Hinlopen Strait. His magnetic work was published in the Philosophical Transactions of 1826, for which he received the Copley Medal of the Royal Society. In 1827 he became a Commander, and the Duke of Clarence gave him the command of a discovery ship owing to his exceptionally high scientific attainments. He commissioned the *Chanticleer* in 1827 with Horatio T. Austin as his first Lieutenant. Foster was chiefly engaged in pendulum observations, going as far south as the South Shetlands and surveying Staten Island. He was drowned in the Chagres river, when engaged in determining the meridian distance between Chagres and Panama on February 5th, 1833. The polar story would be incomplete without a notice of one of the most distinguished of Arctic scientific officers.

[124] Or rather connection. The step-mother of Flinders was Franklin's aunt on the mother's side.

[125] The Civil Lord of the Admiralty who signed Parry's instructions.

[126] This is manifestly an error for 1845–46.

[127] Under the title *Versus Tennysoniani* no less than 165 renderings of "Not here ..." etc., in Greek, Latin, Sanscrit, Arabic, German, Italian, and French, etc. were published by Canon Wright in 1882 at the Cambridge Press, written by Archbp. Benson, Canon Ainger, Dean Bradley, Prof. Butcher, Dr Haig-Brown, Dr Butler, Master of Trinity, Calverley, Prof. Cowell, Farrar, Gladstone, Jebb, Lord Lyttelton, Dean Merivale, Max Müller, Prof. Palmer, Lord Selborne, Bp. Wordsworth, and others. (Ed.)

[128] Ross died on April 3rd, 1861, after seventeen polar navigable seasons, and nine Arctic winters; Captain Bird retired an Admiral and died in his 83rd year on December 3rd, 1881.

[129] Pemmican is a preparation of beef from which all that is fluid has been evaporated over a wood fire. The fibre is then pounded, and mixed with an equal weight of pounded beef fat.

[130] M'Clintock's sledge crew in his first great journey deserve a niche in the Arctic temple of fame. James Wilkie, captain of the sledge, aged 33, was a splendid seaman, zealous, cheerful, and humorous. James Hoile, a fine, tall man of 25, excellent in all respects, a sailmaker. James Dawson, aged 23, was a good-looking foretopman. John Salmon, a small, wiry man, who was with M'Clintock in the *Enterprise*, was really the strongest of all. Hood and Jim Heels were Marines, the former a shoemaker, aged 31, the latter, aged 24, sang a good song.

[131] Captain Austin was afterwards Superintendent of Deptford Dockyard during the Crimean War, a post of great importance at that time, Admiral, K.C.B., and Admiral Superintendent of Malta Dockyard in 1863; he died in 1865. Captain Ommanney, in the *Eurydice*, commanded the squadron in the White Sea. In 1853 he had the *Hawke* in the Baltic; and the *Brunswick* in the West Indies until 1860. He was Captain Superintendent at Gibraltar in 1864, retiring a K.C.B. in 1874. He died in December 1904, aged 91.

[132] Mate in the *Resolute*, then aged 22, afterwards Sir George Nares, K.C.B., died January, 1915.

[133] Among these was a devotional book which Sir George Back had given to his old shipmate Gore. It was restored to Sir George, who to the day of his death always kept it on his drawing-room table under a glass case.

[134] The Observatory on Pendulum Island was in 74° 32′ 19″ N. and 18° 50′ W.

[135] Clavering's fate was a sad one. He sailed in command of the *Redwing* from Sierra Leone in the summer of 1827, and was never heard of again, though some wreckage was found on the coast.

[136] There had been two early attempts to explore the east coast before Graah's expedition. In 1752 Walloe got as far as 60° 28′, and Giesecke, a German, got to 60° 9′ in 1806.

[137] Captain Graah's narrative was translated by Gordon Macdougall, and published by the Royal Geographical Society in 1837.

[138] At my request the late Commodore Jansen searched the Dutch archives, and wrote an admirable memoir on the ice years in the Novaya Zemlya and Spitsbergen Seas, with notices of the chief Dutch voyages and discoveries. The same accomplished officer was the author of the chapter on Land and Sea Breezes in Maury's *Physical Geography of the Sea*.

[139] The instrument consists of four arcs graduated so as to read to 30 with the verniers. Two of these arcs, representing the altitude and latitude, are moveable. The two others, which represent the declination and hour circle, are fixed. In using it the verniers of the proper arcs are set to the declination, the altitude, and the latitude respectively. The readings on the hour circle will then show the hour angle.

[140] The northern lands which Payer thought he saw from Cape Fligely, and which he named Oscar and Petermann Lands, as well as the north-easterly extension of Kronprinz Rudolf

Island from Cape Fligely to Cape Sherard Osborn, have since been found by Captain Cagni to have no existence.

[141] The Franz Josef flora includes the ubiquitous *Saxifraga oppositifolia*, *Cardamine bellidifolia*, *Arenaria sulcata*, *Draba alpina*, *Cerastium alpinum*, *Papaver nudicaule*, and *Cochlearia fenestrata*. A rare and beautiful grass, *Pleuropogon sabinii*, was also found, only previously known at Melville Island, at one or two places up Prince Regent's Inlet, and in Novaya Zemlya, where it is abundant. Only 27 flowering plants have been collected in Franz Josef Land, and 25 mosses.

[142] The price of walrus hides has risen since they have been found to be the best material for burnishing parts of bicycles. The steamer *Balaena* was, therefore, sent to Franz Josef Land in 1897, and obtained 500 hides, while about 1500 were lost owing to the animals sinking when dead, so that this monstrous slaughter amounted to 2000, not counting the number of young that must also have perished.

[143] The great depth found by the *Sophia* to the north of Spitsbergen pointed to a deep ocean as existing north of the whole Spitsbergen and Franz Josef system. I formed this deduction in 1876, and Nansen's discovery afterwards proved it to be correct.

[144] I knew Dr Kane when he served in Grinnell's relief expedition, of which he wrote the history. His was certainly a charming personality, talented, cheerful, and enthusiastic.

[145] Kane adopted the Danish name of ice-foot (*Iis-fod*) for this permanent frozen ridge or terrace.

[146] It is a singular fact that the changing of names of Arctic vessels has frequently coincided with misfortune. The names of all the ships but one in the Franklin search were changed, and all were lost except the *Fox*, and her name was not changed.

[147] Length 160 ft., extreme breadth 33·4 ft., depth of hold 17 ft., tonnage 751, nominal h.-p. 60.

[148] Length 166 ft., extreme breadth 30 ft., depth of hold 18 ft., tonnage 668, nominal h.-p. 43.

[149] Each sledge had its flag, which, at my suggestion, was designed on proper heraldic rules. The cross of St George at the hoist, the fly swallow-tailed, party per fess with the colours of the sledge-commander's arms, and his crest or principal charge over all, a border or fringe of the colours of the arms. The same pattern was adopted for the sledge flags of Captain Scott's Antarctic expeditions.

[150] Hans Hendrik was born at the German missionary station of Fiskernäs in Greenland, and had become a good kayaker and hunter when he agreed to join Dr Kane's expedition, where he was under the protection of Carl Petersen. He was with Morton when he reported having seen the open polar sea. After Kane's second winter Hans joined the Arctic Highlanders and married a girl named Markut. Hans and his wife later joined Hayes's expedition, and afterwards settled at Upernivik. In August, 1871, they joined Hall's expedition, and were left on the floe which drifted down Baffin's Bay, where, as we have seen, Hans saved the rest of the party by his skill as a huntsman. He was most useful in some of the sledge journeys from the *Discovery*. In 1877 he wrote his memoirs in Eskimo, which were translated into English by Dr Rink (*Trübner*, 1878). He afterwards lived at Upernivik.

[151] Rawson was mortally wounded at the battle of Tel-el-Kebir, while serving as naval aide-de-camp to Sir Garnet Wolseley. Admiral Sir George Egerton, K.C.B., became Commander-in-

Chief at Devonport.

[152] Tidal observations, under the direction of Lieutenant Archer, were taken in 81° 45′ N., during 7 months; and in 82° 25′ N., for two months. They were reported upon by Professor Houghton (Nares, II, p. 356).

[153] *Ivigtut*, the cryolite mine, is about 16 miles up the Arsak fjord. Cryolite is a white mineral found on the gneiss of S.W. Greenland and nowhere else—a double hydro-fluorate of soda and alumina. In 1857 a licence was given to a company to work the mine to the amount of about 26 ship-loads yearly.

[154] In 1892 these two young Swedish enthusiasts started with the object of exploring the part of Ellesmere Island between Jones and Smith Sounds. They bought a small cutter of 37 tons at St John's, Newfoundland, and went up Baffin's Bay to the Cary Islands. In 1893 a whaler found her driven on shore at one of the Cary Islands and full of ice. There was a record written by Björling asking that, if nothing was heard of them in 1893, relief might be sent to Clarence Point on Ellesmere Island. They went away in an open boat. I appealed for funds and collected £100 as a help to Nordenskiöld's fund for sending a steamer. She went, but nothing more was ever found or heard of these gallant youths.

[155] Both his sons inherited much of the ability of their father. The eldest died young, but not before he had done valuable ethnographic work. The younger, Erland, now Baron Nordenskiöld, has made two journeys among the Amazonian Indians, with excellent ethnographic and linguistic results.

[156] Sir Fridtjof Nansen, in an Appendix to his *Through Siberia*, has lately made a record of all voyages across the Kara Sea from the voyage of Burrough in 1556 to the present day, with notes on the state of the ice in each year. His conclusion is that in the great majority of years it is possible to reach the Siberian rivers through the Kara Sea, though there are great variations in the quantity of ice in different years. He thinks it very improbable that these differences are caused by winds and sea currents from the north. His conclusion is that the ice that is met with is formed in the Kara Sea itself, and that the differences of ice conditions are caused by differences in the winters. In a cold winter, with little precipitation, more ice will be formed, and little ice will melt in a cold spring and summer. When there is a warm winter and heavy snow-fall succeeded by a warm spring and summer, the melting of the ice will proceed rapidly, and there will be a fairly ice-free Kara Sea. Nansen's remarks on the navigation of the Kara Sea are extremely valuable, based on the most complete information and long experience of ice conditions.

[157] Announced in the *Morgenblad* by Professor Mohn in 1884.

[158] Quite unknown to Nansen I had come to a similar conviction in contemplating the results of the Nares expedition. In my Report on the origin, proceedings, and results of this expedition (*R. G. S. Proceedings*, 1877), I pointed out that a current flowed across the polar sea from the eastern to the western hemisphere, that Franz Josef Land was part of the Spitsbergen group, rising from the same plateau with a deeper sea to the north, and that to overstep the boundary of the known polar sea, though attended by great difficulties, would reward with important discoveries the future explorer who boldly forced his way north in this direction. My Report came to Nansen's knowledge after his return home.

[159] Length of keel 102 feet, length of deck 128 feet, beam 36 feet, depth 17 feet, thickness of ship's side 24 to 28 inches. In the stern the oak beams were 4 feet thick.

[160] The British sledges 1850–9 were 3 feet wide, the runners of metal, 3 inches wide, and slightly convex.

[161] See Nansen's "Oceanography of the North Polar Basin" in Vol. III of the results of the expedition, the "Bathymetrical Features" in Vol. IV, also *The Sea West of Spitsbergen* (Christiania, 1912) and the oceanographic observations of the Isachsen Spitsbergen expedition, by Bjørn Helland Hansen and Fridtjof Nansen.

[162] *Through Siberia* (Heinemann, 1914). Appendix on the navigation of the Kara Sea.

[163] The writer was shipmate with one of them for more than a year, and there could not be a better disposed lad or a more reliable comrade when travelling.

[164] He may have adopted the position fixed by the observations of Lieut. Aldrich. The sun was below the horizon when Peary started.

[165] Commodore Jansen was one of the most active and accomplished of the honorary corresponding members of our Royal Geographical Society of his time and the chief promoter of the revival of Arctic voyages in Holland. He saw much service in the Royal Dutch Navy, joining its surveying branch, and was for several years engaged on a survey in the Riouw Archipelago, the Straits of Sunda, and elsewhere. As a Lieutenant on board the frigate *Prins van Oranje* he served in the West Indies, and during a visit to Washington in 1851 formed a life-long friendship for Maury, the great American hydrographer. He contributed the chapter on land and sea breezes to Maury's *Physical Geography of the Sea* and in 1864 published an important work *The Latest Discoveries in Maritime Affairs*. In the following year he became a Commodore in the Royal Dutch Navy, and was appointed to superintend the building of the ironclad *Prins Hendrik*, which he afterwards commanded. In 1868 he retired from active service, after a distinguished naval career of 35 years. At my request Jansen examined the Dutch archives with a view to a study of ice navigation in the Spitsbergen and Barentsz seas, and the results of his researches were published in the *R. G. S. Proceedings* (Old Series, IX. 9, 163). In 1873 he was appointed a Councillor of State, and attained the rank of Rear Admiral. He died in September 1894, aged 77.

[166] Beynen published *De Reis van de Pandora in den Zomer van 1876*.

[167] The Committee consisted of the Baron van Wassenaer van Catwyck, Councillor of State Commodore Jansen, Franzen van de Putte, Professor Buys Ballot, Professor Veth, Jonkheer J. K. J. de Jonge (*Treasurer*).

[168] Lady Markham's translation of the *Life of L. R. Koolemans Beynen* by Charles Boissevain was published by Sampson Low in 1885.

[169] Author of *Ice-bound on Kolguev*.

[170] *No Man's Land*, Camb. Univ. Press, 1906.

[171] The Danish Committee for the geographical and geological investigation of Greenland was formed in 1876, and a valuable periodical, the *Meddelelser on Grönland*, containing the

narratives of the explorers and the scientific results of the expeditions, has ever since been published at Copenhagen.

[172] "Botanical Exploration of the East Coast of Greenland between 65° 35′ and 74°30′ N." by Chr. Kruuse (1904), *Meddelelser on Grönland* (Heft. 30, Afd. I), Kjöbenhavn, 1907.

[173] Thalbitzer has published papers on the poetry and music of the East Greenlanders, on their *angekoks* or priests, and on their dialect.

[174] So called after a patriotic brewer named Carlsberg, who left his brewery to a Trust, the profits to be expended on scientific work. As the brewery is a lucrative business, the help to exploration from this source has been very important.

[175] A Swedish expedition under Professor Nathorst in the *Antarctic* had reached Scoresby Sound in July 1899, and afterwards explored and mapped the previously unknown and complicated system of fjords forming the inner branches of Davy Sound, proving that they were connected with Franz Josef Fjord. In September 1899 Nathorst left the coast, and his ship the *Antarctic* was used in the following year for the Carlsbergfondet Expedition.

[176] His Royal Highness Philippe Duc D'Orléans made a voyage to that part of the coast on board the *Belgica* with M. Gerlache as his master in 1905. He stood northwards along the land ice, and succeeded in effecting a landing to the north of Cape Bismarck in 77° 36′ N. On July 31st he was in 78° 16′, the furthest north ever attained by a ship on this coast, and he could see as far as 78° 30′. In August he again landed in 77° 36′, the place receiving the name of Cape Philippe.

[177] Freuchen, who came from Nykjøbing on the island of Falster, went on a voyage to West Greenland as a stoker in order to obtain preliminary training.

[178] The easternmost point is in 81° 24′ N. and 12° W.

[179] Peary's point at the place he calls "Navy Cliff," where he says he saw the sea and called it "Independence Bay," is over a hundred miles from the sea or any bay. He may have seen the end of the long narrow fjord which Erichsen discovered. But his channel across Greenland does not exist, and there is continuous land between the position Peary gives to his Navy Cliff and his Heilprin Land to the north.

[180] *Book of the Knowledge of all the Kingdoms*, p. 35 (Hakluyt Society, Series II, vol. XXIX, 1912.)

[181] Burney II, 198.

[182] Dalrymple and Burney take it seriously. I included it among the documents in my *Voyages of Quiros*, but I now quite agree with my old friend Benjamin Vicuña Mackenna that it is a fabrication. (See Vicuña Mackenna's *Historia de Juan Fernandez*.)

[183] Cook and Ross searched for this small island in vain, but several of Mr Enderby's sealing vessels found and visited Bouvet Island.

[184] Elder brother of Madame D'Arblay.

[185] This chronometer is now in the museum of the United Service Institution.

[186] Mr Poynter, Master's Mate, Mr Blake and Mr Bone, Midshipmen. Blake was eventually Admiral Patrick Blake, who did excellent service in the first China war, and was afterwards Captain of the *Juno* in the Pacific 1845–49.

[187] The writer's uncle, John Markham, was an acting Lieutenant on board the *Andromache*, and he made a copy of Mr Bransfield's first chart. There are 21 names on it.

[188] Mr Fanning wrote *Voyages round the World*, containing reports of the voyages of Pendleton and Palmer.

[189] At Pendulum Cove in King George's Island.

[190] Kendall wrote an account of Deception Island in the first volume of the *Journal of the Royal Geographical Society*.

[191] The name Australia had not then come into use.

[192] The present writer was personally acquainted with Admiral Bird, Lieutenant Phillips, Mr Tucker, Dr McCormick, Sir Joseph Hooker, Dr Lyall, Admiral Moore, Captain Davis, and Mr Abernethy.

[193] Rossbank Observatory was in latitude 42° 52′ 27″ S. and longitude 147° 27′ 30″ E., 205 feet above the sea.

[194] Gauss's position was 66° S. and 146° E. Scott's observations gave 72° 51′ S. and 156° 25′ E.

[195] On January 31st there was "an unaccountable decrease of variation from 96° E. to 77° E., and then an increase of 16°. Ross formed the opinion that they had passed one of those extraordinary magnetic points first observed during Sir Edward Parry's second voyage, near the eastern entrance of Hecla and Fury Strait." Sir James Ross, *Voyage to the Southern Seas*, 1, 229.

[196] Sir Joseph Hooker told me that Sir James was not only an accurate observer, but also a good collector, taking the deepest interest in the geological and biological researches.

[197] The following treat of Ross's Third Antarctic Voyage:—

(*a*) *A Voyage of Discovery and Research in the Southern and Antarctic Regions* 1839–43 (2 vols. 8vo.), by Sir James Clark Ross.

(*b*) *Voyages of Discovery in the Arctic and Antarctic Seas* (2 vols., large 8vo.), by R. McCormick.

(*c*) Captain J. E. Davis: Letter to his sister describing events of Sir James Ross's voyage, and especially the iceberg collision. Printed for the Royal Societies Antarctic Expedition.

(*d*) MS letter from C. J. Sullivan, armourer of H.M.S. *Erebus*, describing Antarctic scenery, the iceberg collision, and other events.

[198] A pupil of Captain Maury, the great American hydrographer.

[199] *Quinze Mois dans l'Antarctique, par le Commandant de Gerlache* (Hachette, 1902), 106 illustrations and chart, pp. 284.

"Exploration of Antarctic Lands," by Henryk Arçtowski, in the *Antarctic Manual*.

[200] *Antarctica, or Two Years amongst the Ice of the South Pole*, by Dr Otto Nordenskiöld and Dr Gunnar Andersson, 1905.

On the Geology of Graham Land, by Dr Gunnar Andersson. (Uppsala, 1906.)

[201] *Die gevidde Formation der Eisgeit* (Berlin, 1887), and *Grönlands Gletscher und Inlandeis*.

[202] *Zum Kontinent des eisigen südens*, von Erik von Drygalski (Berlin, 1904).

[203] The Committee consisted of the following persons:—

Sir Clements Markham, Pres.
Admiral Sir Leopold M'Clintock.
Vice-Admiral Pelham Aldrich.
Captain Ettrick Creak, R.N.
Admiral Sir R. Vesey Hamilton.
Admiral Sir Anthony Hoskins.
Rear-Admiral Sir George Egerton.
Sir John Murray.
Admiral Sir George Nares.
Admiral Sir Albert Markham.
Rear-Admiral Sir William Wharton.
Captain Field (Hydrographer).

[204] The house flag of the *Discovery* was made at Dundee:—the cross of St George at the hoist, the fly swallow-tailed, party per fesse, argent and azure (for ice and sea), and bearing the globe of the Royal Geographical Society. Bordure argent and azure.

[205] The sledge flags were of the same pattern as in the Arctic expedition of 1875–6. The cross of St George at the hoist to denote that, whatever family the bearer may belong to, he is first and foremost an Englishman. The fly is divided per fess with colours of the arms of the officer, undivided if one colour, with the crest or principal charge in the arms, swallow-tailed, with a border or fringe of the colours of the arms.

[206] The text of the Bishop's address was "Behold how good and how pleasant it is for brethren to dwell together in unity" (Psalm cxxxiii. 1).

[207] M'Clintock's sledges were 9 ft. and 11 ft. long, 3 ft. 2 in. wide, 11½ inches high, with 6 uprights and 6 cross bars, the runners were of ½-inch iron, 3 inches wide and slightly convex. All were lashed with strips of hide, put on warm and wet, so that they shrank and made all tight.

[208] The ration adopted by Scott was as follows in ounces per day:—Biscuit 12·0, oatmeal 1·5, pemmican 7·6, bacon and pea-flour 2·6, plasmon 2·0, cheese 2·0, chocolate 1·1, cocoa O·7, sugar 3·8. In addition, ¾ lb. of tea, ½ lb. of onion powder, ¼ lb. of pepper and ⅔ lb. of salt was allowed per week to each unit of three men.

[209] Sir Douglas Mawson was born in 1882, the son of Mr. R. E. Mawson, of Otley, in Yorkshire. He was educated at Sydney University and graduated as Bachelor of Mining Engineering 1901, Bachelor of Science 1904, Doctor of Science 1909. He was Lecturer in Mineralogy at Adelaide University in 1905.

[210] These were Anton and Demetri, the two Russian dog-drivers, and seven men of the Royal Navy:—Edgar Evans, Lashly, and Crean, who had all been on the *Discovery*, and Keohane, Forde, Hooper, and Clissold, the two latter respectively steward and cook.

[211] For their courageous services in this affair Lashly and Crean received the Albert Medal.

[212] Atkinson, Wright, Cherry Garrard, Gran, Lashly, Crean, Williamson, Nelson, Archer, Hooper, Keohane, and Demetri, formed the search party.

[213] Names in italics represent first discoveries.

[214] Names in italics represent first discoveries.

INDEX

Abernethy, Thomas, 233, 251, 265, 413
Abruzzi, Duke of, attempts to reach the Pole, 351
Active, 431
Adam of Bremen, chronicles visit of Norsemen to Greenland, 38
Adams, Lieut. J. B., 478, 479
— William, 390
Adelaide Island, 432, 442
Adélie Land, 407, 409, 477, 487
Admiralty Range, 415
Advance, 252, 298 *et seq.*
Adventure, 394
Aid, 86
Akbar, 223
Akuli Gulf, 230 *et seq.*, 235
Alabama, 376;
  loss of, 378
Aldrich, Admiral Pelham, 258 *et seq.*, 304, 307, 428, 446
Alert, 303 *et seq.*, 312, 313
Aleutian Islands discovered, 178
Alexander, 198, 201, 202
Alexander Island, 434
— Land, 397, 442
Alfland, 33
Alfred, King, translates *Orosius*, 33
Alten Fjord, 317
Altitudes, Antarctic, 473, 480, 484, 485, 500, 501
— in Greenland, 332, 333, 335, 336, 338, 381
Ambassador, Russian, visits England, 62
Amdrup, Lieut. G., 367, 368
Ameralik Fjord, 336
America, North, coast line of, surveyed by Franklin, 222;
  by Back, 228;
  by Dease and Simpson, 228
American Antarctic expeditions, 400, 408
— Arctic Coast, 18;
  birds of, 18;
  fauna and flora of, 18

Amsterdam Island, 360
Amundsen, Roald, undertakes N.W. Passage, 314 *et seq.*;
winters in King William Land, 314;
serves in the Belgian Expedition, 434;
his Antarctic expedition, 482 *et seq.*;
meets Scott's party, 493;
reaches the South Pole, 485
Andersson, Gunnar, 436, 439
Andrée, 344
Andromache, 398, 400
Angekoks, 23;
Greenland, 366
Angmagsalik, 365 *et seq.*, 381
Angrim stones, 53
Anian, Strait of, 82
Anjou, Admiral, surveys Liakhovs, 180
Ann Frances, 86
Anne Royal, 146
Annula, 124
Anoatok, 353, 355
Antarctic, 368, 436;
founders, 437
Antarctic Circle first crossed, 395
— exploration, story of, 430 *et seq.*
— explorations, Amundsen's, 482 *et seq.*;
Balleny's, 405, 414; Belgian, 433 *et seq.*;
Bellingshausen's, 396, 397;
Biscoe's, 403 *et seq.*;
Borchgrevink's, 433;
Bruce's, 439, 440;
Charcot's, 441;
Capt. Cook's, 394 *et seq.*;
D'Urville's, 407, 408;
Drygalski's, 440;
Filchner's, 442;
Foster's, 400 *et seq.*;
French, 407, 441;
Gerlache's, 433 *et seq.*;
German, 440, 442;
Kempe's, 405;
Mawson's, 486 *et seq.*;
Nordenskiöld's, 435 *et seq.*;
Norwegian, 433, 482 *et seq.*;
Ross's, 410, 418, 422 *et seq.*;
Russian, 396;

Scott's first expedition, 447 *et seq.*;
Scott's last expedition, 489 *et seq.*;
Shackleton's, 478 *et seq.*;
Swedish, 435 *et seq.*, 506;
The Societies', 444 *et seq.*, 455 *et seq.*, 466 *et seq.*, 471 *et seq.*;
Weddell's, 401, 402;
Wilkes's, 408, 409
— ice, 11;
icebergs, 11;
regions, 389 *et seq.*
Antarctic Manual, 453
Araucaria, 438
Archer, 503
— Colin, 347;
constructs the *Fram*, 340
Arctic, 302, 303
Arctic currents, 23
— discoveries, by Norsemen, 32 *et seq.*, 38 *et seq.*, 49 *et seq.*;
under Elizabeth, 157
"Arctic Highlanders," 24, 203, 253, 299, 301, 313, 338, 339, 352 *et seq.*, 379;
dress of, 24;
physical characteristics of, 24
Arctic quadrants, 4, 6, 13
Arctic regions, geology of, 384 *et seq.*
Arçtowski, Henryk, 434, 435, 453
Ardencaple Inlet surveyed, 375
Area of Greenland, 9
Areas, Polar, 3
Arenaria sulcata, 295
Arethusa, 223
Arias, Juan Luis, his memorial, 392
Armitage, Lieut. Albert, 292, 448, 463 *et seq.*, 480
Arnold, Bishop, 48
Art, Tchuktche, 17
Arte de Navegar, 151;
translated by Eden, 65
Assistance, 251 *et seq.*, 261, 264 *et seq.*, 349
Astrolabe, 407
Astrolabe, 53;
description of, 56, 57;
Drake's, 57
Astrup, Eivind, 337, 338
Atalayas, 125
Atkinson, Dr, 490, 491, 498, 499, 503, 504

Atlantic current, 30
Auks, Little, 199
Aurora, 486 *et seq.*
Austin, Capt. H. T., 216, 252, 255, 273, 401;
death of, 262
Axel Heiberg Island, 348, 349, 354

Back, Sir George, 223 *et seq.*, 276;
serves with Buchan, 199;
reaches Repulse Bay, 230
Baffin, 196
Baffin, William, 124, 125, 138;
patronised by Wolstenholme, 108;
sails with Hall, 113;
magnetic observations by, 115;
visits Spitsbergen, 116;
enters service of the East India Co., 146;
his Arctic voyages, 146;
his letter to Wolstenholme, 145;
his magnetic observations, 126;
explores Spitsbergen, 127;
his map of Hudson Strait, 139;
lunar observations of, 140;
visits Eskimo settlement, 140;
his third voyage, 142;
map of his discoveries, 144;
surveys Persian coast, 147;
captain of the *London*, 147;
death of, 147;
qualities of, 148
Baffin's Bay, 145, 305;
birds of, 99;
currents of, 6;
entered by the Norsemen, 50;
its existence doubted, 145;
lost, 146;
existence reestablished, 201
Baffin Island, 141
Baidor, 171
Balaclava helmets, 462
Balaena, 296, 431, 439
— *Biscayensis*, 125
Balleny, Capt. John, his Antarctic expedition, 405, 414
— Islands, 406, 408, 417, 477
Ballestilla, 89
Balloon, captive, 450, 457

Bardsen, Ivar, report on Greenland, 51;
his sailing directions translated by Barentsz, 70
Barentsz, Willem, 69;
his voyage to Novaya Zemlya, 70;
discovers Spitsbergen, 74;
crews attacked by scurvy, 75;
winters in Novaya Zemlya, 75;
dies, 76;
discoveries of, 77;
character of, 78;
winter quarters revisited, 78;
hut of, 79;
relics of, 79
— Sea, 297, 360
Barker, Andrew, 114, 115, 116
Barne, Michael, 449, 463, 471, 475
"Barren lands," 18
Barrier, The Great, 11, 416, 419, 433, 453, 456;
altered limit of, 457, 475;
height of, 457
Barrington, Hon. Daines, 172
Basaltic pillars, 324;
rocks, 295
Basques, the first whalers, 125
Bathurst Island explored, 268
Battye, A. Trevor, 361
Bay ice, 7
— of Whales, 483
Beach Province, 391
Beagle Channel, 436
Bear, 86
Bear, Nelson's adventure with, 173;
Bears, 296
Bear Island (or Cherrie Island), 73, 121
— Islands, 324
Beardmore Glacier, 498
Beaufort Island, 416
— Sea unexplored, 383
Beaufoy, 402
Beaumont, Lieut., 308
Bedford, 223
Beechey, Capt. F. W., 226 *et seq.*;
serves with Buchan, 198;
sails with Parry, 206

— Island, 241, 265, 311, 314, 349
Behaim, Martin, figures polar islands, 54
Belcher, Sir Edward, 264, 269, 349
Belgian Antarctic expedition, 433 *et seq.*
Belgica, 368, 434
Bertelsen, 370 *et seq.*
Bell, Richard, 108, 113
— Sound, 119, 187, 188, 285 *et seq.*
Bellerophon, 223
Bellingshausen, Capt., his Antarctic expedition, 396, 397
Bellot, Lieut., 262;
death of, 268
— Strait, 262
Bennet, Stephen, visits Bear Island, 73
Bennett, Gordon, 327
— Island, 179, 180, 329
Bering, Vitus, his voyages, 177;
death of, 178
— Island, 324
— Strait, 170
Bernacchi, Louis C., 433, 449, 475
Bernier, Capt., 362
Berry, Lieut., 329
Best, George, writes narrative of Frobisher's second expedition, 90
Bethell, Lieut., 428
Beynen, Koolemans, 311, 358;
death of, 360
Bird, Capt., 213, 216, 218, 411, 420, 424;
death of, 251
Birds, 314;
Antarctic, 423, 437, 455;
of American Arctic coast, 18;
of Baffin's Bay, 99;
of Cape Digges, 141;
of Cape York, 24;
of Davis Strait, 97;
of Franz Josef Land, 296;
of Fury Beach, 236;
of Novaya Zemlya, 185;
of Spitsbergen, 121;
of Waigatz Island, 64
Biscoe, Capt. John, his Antarctic expedition, 403 *et seq.*
Bishop Arnold, 48
— Eric, 48

— Olaf, 49
Bishops of Greenland, 47 *et seq.*, 51
Bjaaland, 484
Björling, 325
Black Dog, 101
Blake, Admiral, 398
Blessing, Dr, 341
Blijde Boodschap, 390
Blink Ice, 163
Blossom, 216, 226, 227, 234
Blubber, 193
Boats of Chukchis, 17;
of Eskimos, 20, 115
— used on Franklin's land expedition, 222;
used by Back on Great Fish River, 228;
used by Dease on the Mackenzie, 229;
of Franklin's retreat, 245
Bona Confidentia, 60
— *Esperanza*, 60
Book of the Knowledge of all the Kingdoms, 389
Booth, Sir Felix, 233, 237, 251
Boothia Felix, 234
Borchgrevink, Carstens, his Antarctic expedition, 433
Bourne's *Inventions or Devices*, 152
Bouvet, Capt. L., 393
— Island, 393
Bowers, Lieut., 490, 492, 495 *et seq.*, 500, 502;
death of, 503
Bransfield, Mr, 398, 400
Brattahlid, 41, 44
Breadalbane, 268
Briefe and True Relation, Purchas's, 145
Briggs, Henry, 151
"Briggs-his-Mathematics," 154
Briseis, 201
Britain, discovery of, by Pytheas, 27
British expeditions to Spitsbergen, 287
Brocklehurst, Sir Philip, 478, 480
Bromley, Lieut., 428
Brönlund, 370;
death of, 373, 374;
diary of, 373

Brooke Place, 105
Brooke's sounding apparatus, 426
Bruce, Mr, his Antarctic expedition, 439, 440
— Commander Wilfrid, 489, 491, 494
— Miss Kathleen, 489
Brunel, Oliver, 130;
  reaches the Obi, 68
Buchan, 198;
  death of, 200
Buchanan, J. Y., 428
Bulldog, 427
Burney, Capt. James, 169, 394
Burrough, Stephen, 63, 83;
  dies, 65
— William, 63;
  commands fleet, 65;
  his *Discourse of the Compass and Magnetic Needle*, 65, 100;
  dies, 65
Burrough's Strait, 64, 184
Bushnan, J., 201, 212
— Cove, 260
— Island, Meteoric boulders at, 24
Button, Sir Thomas, 136;
  reaches Hudson's Bay, 136;
  winters, 136, 137;
  dies, 137
Bygd, East, *v.* East Bygd;
  West, *v.* West Bygd
Bylot, Robert, 131, 134, 138, 142
Byron, Commodore, 394

Cagni, Capt., 293;
  attempts to reach Pole, 352
"Calving" of icebergs, 10
California, 166
Campbell, Lieut., 490, 492;
  his party winters in ice cave, 49
Canada, Arctic lands transferred to, 362
Canadian Arctic expeditions, 362 *et seq.*
Canynge, William, sends ships to the Arctic, 58
Capes
  Adare, 415, 417, 433, 456, 470, 477
  Armitage, 458, 496
  Bernacchi, 480

Bird, 470
Bismarck, 370
Bridgman, 371
Chelagskoi, 182, 183
Chelyuskin, 15, 323, 341
Chidley, 100
Colombia, 355 *et seq.*
Crozier, 456, 470, 471, 476, 492, 496
Elizabeth, 390
Evans, 492 *et seq.*
Farewell, named by Davis, 96;
sighted by Baffin, 114;
sighted by Munk, 150
Fligely, 290, 294
Horn, 390, 420
Jakan, 183, 324
North, 417, 477, 493
Riley, relics at, 253, 254
Royds, 479
Sparbo, 355
Taimyr, 323
York, 202;
birds of, 24
Carcass, 172 *et seq.*
Cardamine bellidifolia, 295
Cardigan Strait, 349
Carex arenaria, 342
— *vesicaria*, 334
Carlsbergfondet expedition, 367
Carlsen, Capt., circumnavigates Spitsbergen, 286
Carpenter, Dr, 427
Cary, Allwyn, 138, 142, 144
— Islands, 144, 261, 312, 313, 325
Castor, 431 *et seq.*
Cathay, passage to, 105, 106, 118
— Company, 85
Cavendish expedition, 101
Cerastium alpinum, 295
Challenger, 428
Challenger Expedition, 428
"Challenger Gap," 508
Chancellor, Nicholas, sails with Pet, 66
— Richard, sails with Willoughby, 60;
visits Moscow, 62;
narrative of his voyage, 63

Chanticleer, 401, 423
Charcot, his Antarctic expedition, 441
— Land, 442
Charles, 152 *et seq.*
Charles Darwin Island, 422
Chatham Island, 418
Chelyuskin, 176, 177
— Cape, 15, 323, 341
Cherrie Island *v.* Cherry Island
Cherry Island (Bear Island), 73, 121
Chesterfield Inlet, 166
Chidley Cape, 100
Chilham, 107, 108
Christian IV sends expedition to Greenland, 112;
claims Spitsbergen, 124
Christianity reaches Iceland, 42;
introduced into Greenland, 43
Christianshaab, 162, 164
Chukchis, *v.* Tchuktches
Churches, at East Bygd, 47, 48;
in Greenland, 51;
ruins of Greenland, 52
Churchill, 167
Churchward, John, 98, 99
Circum-polar coast, 18;
trees, 13;
tribes, 13
Clavering, Douglas, 279;
death of, 281
Clavus, Claudius, maps of, 54
Clements Markham Glacier, 380
Clerke, Capt., 171, 394
Clio, 238, 240
Clothing, Arctic, 292, 352;
M'Clintock's, 257;
Nansen's, 334, 342;
Peary's, 337
— Antarctic, Amundsen's, 482;
Scott's, 462;
Shackleton's, 478
Coal at Kudlisit, 312;
in Ellesmere Island, 350;
in Finmarken, 73;
in Spitsbergen, 361;

near Lady Franklin Bay, 309
Coats Land, 440
Cochlearia fenestrata, 295
Cockayne, Sir William, 106, 108, 113, 135
Cockburn Island, 423
Cod, 98
Codex Flateyensis, 38
Colbeck, Capt. William, 433, 467 *et seq.*, 476
Cole, Humphrey, inventor of the Log, 152
Collins, Grenville, 156
Collinson, Capt., 263
Collision of *Erebus* and *Terror*, 419
Commonwealth Bay, 487
Continental shelf, 340, 356;
Antarctic, 397, 435
Conway, Sir Martin, crosses Spitsbergen, 361 *et seq.*;
his books on Spitsbergen, 362
Cook, Capt. James, 169 *et seq.*;
explores neighbourhood of Bering Strait, 170;
his Antarctic expedition, 394 *et seq.*
— Dr Frederick, 337, 338, 434;
attempts to reach Pole, 353 *et seq.*;
winters in Jones Sound, 355
Copper, 167, 169
Coppermine River, 168, 169, 229
Cornwallis, 238, 240
Côte Clarie, 408, 487
Cove, 237
Crab-eating seal, 483
Creak, Capt. Ettrick, 446, 451
Crean, 490, 495, 498, 499, 503
Cresswell, Lieut., 263, 268
Crevasse, Scott falls into, 474
Crevasses, Antarctic, 474, 475, 479, 480, 481, 494, 498
Cross-staff, 56, 89, 102
Crow's nest, 189
Crozier, Commander, 213, 216, 239, 410, 414, 420, 424
Crozon, Frobisher besieges, 92
Cryolite, 164, 311
Cumberland Gulf, 95, 96, 98, 100
Cunningham, John, 112
Currents, Atlantic, 30;
Arctic, 23;

Baffin's Bay, 6;
Greenland, 5, 41;
Oceanic, in arctic, 5

Dailey, Mr, 471

Dalager, Lars, 331

Dalbyo, 325

Dame Europa's School, author of, 306

Dance, Commodore, 222

Danes Island, 344

Danish Arctic expeditions, 364 *et seq.*, 376 *et seq.*

Danmark, 369

Danmark Fjord, 372, 378;
Havn, 370

Dannebrog Islands, 365

David, Professor T. W. E., 478

Davidson, Dr, 468

Davis, John, 93;
sails on his first voyage, 94;
his provisions, 96;
his second expedition, 96;
names Cape Farewell, 96;
re-enters his strait, 96;
meets Eskimos, 95, 96, 97;
compiles Eskimo vocabulary, 97;
map of voyages of, 97;
his third expedition, 98;
magnetic observations of, 99;
commands *Black Dog*, 101;
commands *Desire*, 101;
commands *Drake*, 101;
joins Cavendish expedition, 101;
visits the Azores, 101;
death of, 102;
life of, 100, 102;
character of, 101;
narrative of his voyages, 100;
his quadrant, 102;
his *Seaman's Secrets*, 102;
his *World's Hydrographical Description*, 102;
place-names given by, 103

Davis, Capt. J. E. (Master of the *Terror*), 412, 425, 430

Davis Strait, 97

Day, Mr, 491

Dayman, Lieut., 426, 427

Dease, Peter Warren, 228

Debenham, F., 491
de Bruyne, Lieut. A., 359 *et seq.*
Deception Island, 400, 401
Dee, Dr, 83, 94
De Hozes, Francisco, 389
Del Cano, Sebastian, 389
Dellbridge, J. H., 464 *et seq.*
De Long, Lieut., his expedition, 327 *et seq.*;
retreat of, 329;
fate of, 329;
character of, 329, 330
Demetri, 495, 503
Dennis, 86;
founders, 88
Den Röd Löve, 112
d'Orléans, Duc, 368, 435
Deshneff, Simon, 175
Desire, 101
Des Voeux, 240
D'Urville, Dumont, 440;
his Antarctic expedition, 407, 408
Diana, 287, 288, 326, 431
Diary of Brönland, 373
Dickson, Baron Oscar, 322, 332, 431
— Dr, 425
Digges, Sir Dudley, 106, 107, 108, 135, 142
— Leonard, 106, 107
— Thomas, 107
Dinner to Scott's expedition, 453
Dirk Gerritsz Archipelago, 390
"Discharging glaciers," 9
Disco Bay, 48, 161, 162, 163, 164, 333
Disco Island, fossils in, 350
Discourse of the Compass and Magnetic Needle, 100
Discovery, Baffin's, 138 *et seq.*, 142 *et seq.*
— Button's, 236
— Clerke's, 169 *et seq.*
— Hudson's, 129, 131
— Moore's, 165
— Nares's, 304, 312
— Scott's, 451 *et seq.*;
plans of, 446, 447;

flag of, 447;
relieved by *Morning*, 470;
freed from the ice, 476;
ashore, 476;
damage to rudder, 477;
returns home, 477

Divers Voyages (Hakluyt), 110

Dobbs, 166

Dogs, 17, 337, 338, 354, 355;
in Antarctic, 462, 472, 482, 483;
Greenland, 23

Dorothea, 198 *et seq.*

Draba alpina, 295

Drake, 101

Drake, Sir Thomas, 389;
his astrolabe, 57

— R. N., Mr, 489

Dress of Arctic Highlanders, 24;
of Eskimos, 19

Drift, Antarctic, 435

— westerly polar, 5, 297, 310, 340, 342, 343;
Jeannette's, 328

Driftwood, 23

Dronning Luisa Land, 373, 378, 381

Drygalski, Erik von, his Antarctic expedition, 440

— Glacier, 481

Duse, Lieut., 436

Dutch, the, open trade with Russia, 68;
renew voyages to the North, 72, 73;
first visit to Spitsbergen by, 124;
despatch second fleet to Spitsbergen, 126

Dutch Arctic explorations, 358 *et seq.*

Dysentery attacks Shackleton's party, 480

Earl Camden, 222

East Bygd, 51, 159, 160;
settlement of, 40;
Augustinian monastery at, 47;
churches at, 47;
fate of, 51

East India Company, founded, 105;
undertake North-West Passage, 129;
Baffin enters service of, 146

Easter Island, visited by Cook, 396

Edward VI encourages Frobisher, 81;

patronises Arctic exploration, 59, 60
Edward Bonaventure, 60
Eendracht, 390
Eenhiörningen, 150
Egede, Hans, 158 *et seq.*;
discovers Kakortak ruins, 47;
history of his mission, 160 *et seq.*;
on Eskimo words, 160;
his family, 162;
dies, 163;
his books, 163
— Paul, 161 *et seq.*
Egedesminde, 163
Egerton, Admiral Sir George, 304, 306 *et seq.*, 446, 448
Eira, 290;
founders, 291
Eira Harbour, 294
Eis blink, 163
Eliza Scott, 405, 406
Elizabeth, 98, 99, 100
Elizabeth, Queen, encourages Arctic discovery, 79;
supports Frobisher, 82, 85;
decorates Frobisher, 86
Elizabethan Arctic discoveries, 157
Ellen, 98, 99, 100
Ellesmere Island, 265, 298, 299, 308, 325, 347 *et seq.*, 354, 362;
coal in, 350
Emanuel, 86
— (busse), 86, 91
Emperor penguins, 472, 476, 496, 497
Empetrum nigrum, 116
Enderby, Charles, 403 *et seq.*
— Land, 404
— Quadrant, 505
England, Lieut., R.N. 478
Engroneland, 118
Enterprise, 248, 250 *et seq.*, 263
Epitaph, Franklin's, 243
Equipment, sledging, Hearne's, 168;
Nansen's, 334;
Ross's, 256;
Scott's 450, 460;
Sverdrup's, 348;
Wrangell's, 182

Erebus (under Ross), 410 *et seq.*, 418 *et seq.*;
collision of, 419
— (under Franklin), 237 *et seq.*, 240 *et seq.*, 246 *et seq.*, 251;
sinks, 247
Erebus and Terror Bay, 422
Erichsen, Mylius, 369 *et seq.*;
death of, 374, 375
Erik, Bishop, 48
— the Red, 39;
Saga of, 38;
voyage of, 41
Eriksfjord, 113
Esk, 195
Eskimos, 17, 18, 84, 112, 113, 115, 142, 143, 229, 234;
boats of, 20, 115;
dress of, 19;
East Greenland, 365, 366;
harpoons of, 23;
iglus, 234;
physical characteristics of, 19, 20, 22;
priests of, 23;
snow-huts of, 20;
their folk-lore, 366;
vocabulary of, compiled by Davis, 97;
vocabulary of, Egede's, 160;
at Igloolik, 214;
of Boothia, 235;
in Greenland, 22, 335;
massacred by Indians, 168;
met by Amundsen, 314, 315;
met by Baffin, 140;
met by Davis, 95, 96, 97;
met by Egede, 159;
met by Hudson's mutineers, 134;
met by M'Clintock, 275;
met by Sabine, 280 *et seq.*;
visit Parry's vessels, 214
Evans, Commander, 489, 490, 492, 498, 499
— Edgar, 471 *et seq.*, 490, 495, 498, 500 *et seq.*;
death of, 502
Excellent, 238, 240

Faddiev, 179
Falkland Islands, 405, 420, 436
Farewell, Cape, sighted by Baffin, 114
Faroes, 121

Fauna, of American Arctic Coast, 18;
of Cape Sabine, 320;
of Franz
Josef Land, 296;
of Greenland, 96;
of Melville Island, 209;
of Spitsbergen, 119, 121, 128
Feather, T. A., 472
Feilden, Capt., 304
Felix, 251, 253, 254
Felspar crystals, 479
Fenton, Edward, 90
Ferrar, Hartley T., 449, 464 *et seq.*, 472
Ferrar Glacier, 465, 471
Fiala, Capt., 293
Field, Capt., 446
"Field ice," 7
Filchner, his Antarctic expedition, 442
Finmarken, 73;
coast explored by Ohthere, 34;
geology of, 73
Finneskos, 334, 342, 462, 478
Fish, abundance of, 98
Fisher, Dr, 209 *et seq.*
— Rev. George, 213
Fitzjames, James, 238 *et seq.*;
death of, 247
Fjords, Greenland, 9, 41
Flag of the *Discovery*, 447
Flags, sledge, Nares's expedition, 304;
Scott's, 450
Flatey Book, 38, 47;
account of voyage of Leif Erik, 43
Flensing, 192
Flinders, Capt., 222
Floe, Tyson's party adrift on, 301
"Floe-bergs," 7
Flora Antarctica, 418
Flora of American Arctic Coast, 18;
of Baffin's Bay, 116;
of Cockburn Island, 423;
of Franz Josef Land, 295;
of Greenland, 41, 96;
of Melville Island, 211;

of Novaya Zemlya, 185, 186;
of Waigatz, 64
Forster, Johann Reinhold, 394
Fort Enterprise, 224;
Providence, 224 *et seq.*
Fortune, 177
Fossils, Antarctic, 423, 431, 432, 436, 437, 440, 501, 506;
penguins, 438;
tertiary, 350
Foster, Capt. Henry, 216, 423;
his Antarctic expedition, 400 *et seq.*;
death of, 401
Fotherby family, 124, 126
Fox, 273, 311;
winters in Bellot's Strait, 274
Fox Channel, 154
Fox, Luke, 137, 151;
sails north, 152;
discovers relics of Button and Munk, 154;
meets Capt. James, 154;
his Narrative, 156;
map of, 145, 146, 155
Foyn, Svend, 433, 467
Fram (Nansen's), 340 *et seq.*;
dimensions of, 340;
drift of, 344;
arrives home, 344;
under Sverdrup, 347;
winters in Smith Channel, 347;
winters in Havnfjord, 348;
winters in Jones Sound, 349
— (Amundsen's), 482 *et seq.*
Français, 442
Francis, 86
Francke, Rudolf, 353 *et seq.*
Franklin, Lady, 251
— Sir John, 222, 238 *et seq.*, 413, 414;
serves with Buchan, 198;
at Trafalgar, 223;
his land journey, 223 *et seq.*;
marries Miss Porden, 226;
his second land journey, 226;
marries Miss Griffin, 227;
last expedition sails, 241;
death of, 243;

Tennyson's epitaph on, 243;
his record, 243, 244;
retreat of his party, 245 *et seq.*;
search for, 248 *et seq.*;
his winter quarters discovered, 254;
his relics found, 272, 275, 276, 314
Franklin Island, 415
Franz Josef Land, 289 *et seq.*, 345, 360;
explorers of, 293;
described, 293, 294;
flora of, 295;
fauna of, 296;
birds of, 296;
part of Spitsbergen, 340;
Nansen reaches, 343
Frederikshaab, 163, 331
Freeman, Ralph, 106
French Antarctic expeditions, 407, 441
Freuchen, Herr, 370, 380
Friesland (or Frieslanda), 55, 56, 83, 85, 88, 95, 160
Frisland *v.* Friesland
Frobisher, Martin, 81;
starts his Arctic voyage, 83;
meets Eskimos, 84;
supposed discovery of gold by, 85;
his second expedition, 85;
his provisions, 90;
authorities for his voyage, 91;
life of, 91;
character of, 91;
dies, 92;
place-names given by, 92
Frobisher Strait, 152, 159
Frozen soil, depth of, 16
Fulford, Faith, 93
Furious Overfall, The, 100, 123, 131
Furnace, 165
Furs, 482
Fury, 212, 216;
wrecked, 234
Fury Beach, 234, 236, 249, 303
Fury and Hecla Strait, 214, 216

Gabriel, 83, 86
— (Bering's), 177

Gabrielsen, Tobias, 370 *et seq.*
Gael Hamke Bay, 279 *et seq.*
Gamaliel, 124
Ganges, 240
Garrard, Mr Cherry, 491, 494, 496, 498, 503, 504
Garwood, Mr, 361
Gatonby, John, 114
Gauss, 362, 440, 441, 451
Gauss, Prof., 417
Gaussberg, 508
Geology, of Antarctic regions, 429, 434, 435, 438, 480, 501, 505;
  of Arctic regions, 384 *et seq.*;
  of Finmarken, 73
George, 65
Gerlache, M. de, 368, 390; his Antarctic expedition, 433 *et seq.*
Gerlache Channel, 434
German Antarctic expeditions, 440, 442
Germania, 282
Gerritsz, Dirk, 390
Giffard, 304
Gilbert, Adrian, 94, 96, 98
— Sir Humphrey, his *Discourse on a North-west Passage to Cathay*, 82, 94
Gilbert Sound, 95, 109, 114;
  Egede reaches, 159
Gilliflower, 113
Gjoa, 314, 315
Glaciers, Antarctic, 471;
  Greenland, 9;
  discharging, 9;
  in Novaya Zemlya, 186;
  movement of, 331, 332
Globes, Molyneux, 55, 104
Godenoff, Boris, 105
Godspeed, 129
Godthaab, 95, 114, 116, 160, 316, 336
Goggles, 462
Gold, supposed discovery by Frobisher of, 85
Goodsir, Dr, 240
Goose Land, 185
Gore, Graham, 240, 243, 245
Gore-Booth, Sir Henry, 360
Graah, Capt., 217;
  explores East Greenland, 281

Graham Land, 405, 406, 431, 432, 434, 442, 506
Granite, 456
Grant, W. J. A., 359
Gray, Capt., 283
Great Bear Lake, 226
Great Fish River, 228, 275
Great Slave Lake, 224, 228, 316
Greely, Lieut., 316; work of, 320
Greely expedition, 317 *et seq.*
Greenland, altitudes in, 332, 333, 335, 336, 338, 381;
area of, 9;
attempt to re-discover Norse colony in, 112;
Bardsen's report on, 51;
Bishop Arnold of, 48;
Bishop Erik of, visits Vinland, 48;
bishops of, 47 *et seq.*, 51;
churches of, 51;
first bishop of, consecrated, 47;
Christian IV sends expedition to, 112;
Christianity introduced into, 43;
coast explored by Nares's expedition, 308;
current of East coast of, 41;
Danish expeditions to, 364 *et seq.*, 376 *et seq.*;
devastated by smallpox, 162;
East coast mapped, 368;
Egede's map of, 161;
explorations in, 279 *et seq.*;
later explorations in, 376 *et seq.*;
fauna of, 96;
first attempt to approach East coast of, 98;
first governor of, 160;
fjords of, 9, 41;
flora of, 41, 96;
glaciers of, 9;
ice-cap of, 9;
inland ice of, 9, 331, 332, 336;
map of, 377;
Moravian missions to, 162, 163, 164;
crossed by Nansen, 334;
by Rasmussen, 379;
by Quervain, 381;
by Koch, 381;
Nordenskiöld attempts crossing, 325;
Norsemen in, 38;
name of, applied to Spitsbergen, 118, 124;
Peary's journeys in, 338, 368, 369;
products of, 163, 164;

ruins of churches in, 52;
runic inscriptions, 52;
stations of, 163;
ship visits Iceland, 51;
sighted by Davis, 95;
colonies, population of, 51;
colonies, their fate, 51;
Current, 5;
Eskimos, physical characteristics of, 22
Greyhound, 72
Griffin, 72
Grinnell, 252
Grinnell Land, 269
Griper, 206 *et seq.*, 212, 215, 233, 280
Gron, Tryggve, 491, 503
Groneland, 118
Guillemard, Jeanne, 227
Gull, Ivory, 296;
Ross's, 296, 343;
Sabine's, 203

Haarfager, Harold, 35, 36
Hadley's Quadrant, 102
Hagen, Lieut. H., 370 *et seq.*;
death of, 374
Hakluyt, Richard, 109 *et seq.*, 135;
his *Divers Voyages touching the Discoveries of America*, 110;
his *Principall Navigations*, 110
Halgoland, 61
Hall, 300
— Christopher, 88, 90;
master of *Gabriel*, 83;
island named after, 84;
quarrels with Frobisher, 89
— James, 112, 113, 114, 116;
is killed, 115;
place-names given by, 112, 114, 116
Hamilton, Admiral Sir R. Vesey, 446
Handsley, 471, 472
Hansa, 282
Hansen, B. H., 345
— S. Scott, 341
Hanson, 433
Hanssen, 484
Hare (boy), accident to, 459

Harpoon, 190;
Eskimo, 23
Hartz, Herr, 367, 368
Hassel, 484
Hauksbok, 38, 39, 47;
account of voyage of Leif Erik, 43;
author of, 46
Hayes, Dr, 299
Hearne, Samuel, his first journey, 167;
explores the Coppermine River, 168;
taken prisoner by the French, 169
Heartsease (Greenland voyage), 113 *et seq.*
— Marmaduke's, 126
Hecla, 206 *et seq.*, 212;
under Parry, 216 *et seq.*, 233
— Ryder's, 367
Hedenström surveys the Liakhovs, 180
Heemskerk, Jacob van, 72
Heiberg, Axel, 347
Hendrik, Hans, 305
Henrietta, 192
Henrietta Maria, 154
Henson, 337, 357
Herald Island, 183, 328
Hertha, 431, 432
Highlanders, Arctic, 24;
Ross's, 202, 253, 299, 301, 313, 338, 352 *et seq.*, 379;
dress, 24;
physical characteristics of, 24
Hinlopen Strait, 127, 285, 288
Hodgson, Thomas V., 449
Hoidtenland Islands, 343
Hold-with-Hope, 118
Holm, Lieut. G., 364 *et seq.*
Holsteinborg, 112, 115, 163
Hondius's map of 1611, 77
Hood, Robert, murder of, 225
— Dr, 106
Hooker, Sir Joseph, 412, 415, 418, 420, 423, 445
Hooper, 503
"Hoosh," 461
Hope, 72
— Adams's, 390

— Egede's, 158 *et seq.*
— Young's, 291
Hope Bay, 436, 437
Hopewell, 86
— Knight's, 117 *et seq.*, 130
Hoskins, Admiral Sir Anthony, 446
Hudson, Henry, 117;
his first voyage, 118;
his second voyage, 122;
names of crew of his second voyage, 122;
visits Novaya Zemlya, 122;
results of his voyages, 123;
his last voyage, 131;
names of crew of his last voyage, 131;
sights Iceland, 131;
winters in his Bay, 132;
mutiny of his crew, 132 *et seq.*;
his character, 135
— Thomas, 117
Hudson's Bay, first so-called, 131;
map of, 167;
voyages to, 129
Hudson's Bay Company, 228;
founding of, 165;
early voyages of, 165
Hudson Strait, 152;
discovery of, 89
Hudson's Touches, 121
Hull Trinity House, 116
Huntriss, William, 113

Ibis, 326
Ice, Antarctic, 11;
thickness of drift, 5
"Ice blink," 8, 163
Ice-cap, Antarctic, 473, 474, 477, 506, 507
"Ice-foot," 8, 298
Ice, nomenclature, 7;
phenomena, 326;
thickness of, in Arctic, 5
Icebergs, 9, 10;
Antarctic, 11, 12;
colour of, 10
Iceland, Christianity introduced into, 42;
physical features of, 36;

reached by the Vikings, 36;
settlement of, 37;
sighted by Hudson, 131;
visit of Greenland ship to, 51;
voyages to, 58
Icy Cape, 170, 171
Igloolik, Parry winters at, 214
Iglus, 21, 22
— Eskimo, 234
Independence Bay, 339, 373
Independence Sound, 372, 373
Inglefield, Admiral, 265, 268, 270, 298, 348
Ingulf, 364
"Inland Ice" of Greenland, 9, 331, 332, 336
In Northern Mists, Nansen's, 346
Instruments nautical etc., 56, 89, 102, 110, 115;
Cook's, 354, 355, 394;
invented by Leigh-Smith, 287;
Nansen's, for crossing Greenland, 335;
James's, 154;
Scott's, 452, 489
Intrepid, 251, 253, 254, 261, 264 *et seq.*, 347
Inventions or Devices, Bourne's, 152
Investigator, 222, 248, 251, 263 *et seq.*;
loss of, 270
Irizar, Capt. Julio, 437
Iron, meteoric, 202
— (meteoric) weapons, 24
Isabella, 198 *et seq.*, 233, 237
Isachsen, G. I., 347 *et seq.*
Isbjörn, 289, 360
Iversen, Iver, 376 *et seq.*
Ivory Gull, 296

Jackson, F. G., 291;
rescues Nansen, 293
Jacobshavn, 381
James, Thomas, 152;
portrait of, 153;
instruments taken by, 154;
meets Foxe, 154;
winters in Hudson's Bay, 154
Jane, 402
Janes, John, 94, 95, 98, 100

Jansen, Commodore, 285, 358
Jáshak, naval battle of, 147
Jason, 431
Jeannette, 328;
drift of relics of, 340
Jeffreys, Gwyn, 427
Jenkinson, Antony, on N.E. Passage, 82
Jensen, Lieut., explores Greenland, 333
Johansen, 370 *et seq.*
— F. H., 342 *et seq.*
John and Francis, 124
Joinville Island, 421, 431
Jonah in the Whale, 188
Jones, Sir Francis, 106, 108, 135, 124
Jones Sound, 347, 348, 355;
Fram winters in, 349
Jorgensen, Capt., 376 *et seq.*, 442, 443
Joseph, Benjamin, 124 *et seq.*
Juan Fernandez, 392
Judith, 86
Julianshaab, 164
Jurassic flora in Antarctic, 438
— life, first in Arctic, 4

Kaiser Wilhelm II Land, 487, 488
Kakortak, ruins of, 47, 52, 160
Kallstenius, 325
Kamschatka, 171
Kane, Dr, 255, 298, 353
Kara Sea, 72, 327, 360;
expeditions, 346
Karlsefni, Thorfin, descendants of, 46;
reaches Labrador, 45;
Saga of, 39
Katten, 112, 129
Kayaks, 20, 22, 95, 113, 115, 342 *et seq.*, 353, 365
Kellett, Capt., 264, 268
Kempe, Capt., his Antarctic expedition, 405
Kempe Land, 405, 508
Kendall, 401
Kennedy, William, 262
Keohane, 495, 498, 503
Khabarova, 15, 341

King Edward VII visits the *Discovery*, 454
King Edward VII Land, 477, 492, 506
King George IV Sea, 402
King William Island, 230, 274 *et seq.*
King William Land, 235, 242, 314
Kingiktorsuak, 49
Kingoa-dal, ruins in, 48
Kishim, 147
Kites in sledge travel, 258
Knight, John, 112;
  his expedition and death, 129, 130
Koch, Johan Peter, 370 *et seq.*, 381 *et seq.*
Koettlitz, Dr, 292, 295, 449, 464 *et seq.*
Koettlitz Glacier, 476
Kola Peninsula, 13
Koldewey, Karl, visits Greenland, 282;
  visits Spitsbergen, 282
Koldewey Island, 370
Kolguev Island, 14, 361;
  discovered, 64;
  visited by Munk, 150
Kolyma River, 324
Kostin Shar, 185
Kotelnoi Island, 179, 341
Kroksfjord, 49
Kruuse, H. C., his Greenland botanical work, 366, 367

Labrador, 98;
  discovered by Karlsefni, 45
Lady Franklin, 251
Lady Franklin Bay, 317
Lambert Land, 371, 373
Lamont, Mr, 287
Lamprenen v. *Lamprey*
Lamprey, 150, 151
Lamps, cooking, 342, 461
Lancaster, Sir James, 106, 108, 113, 135, 142
Lancaster Sound, 144, 207, 234, 241, 253, 311, 312
"Land of Busse," 91
"Land of Desolation," 95
Landnamabók, 37
Lane, Henry, 104
Lapps, 13;

in Greenland, 332, 335
Laptef, Cheriton, 177
La Roche, Anthony, 393
Larsen, Capt., 431, 432, 440
Lashly, 471 *et seq.*, 490, 495, 498, 499, 503
Laub, Lieut., 376 *et seq.*
Ledyard, John, 171
Leif Erik, Flatey book account of voyage to Vinland (Newfoundland), 43;
marries Thorgunna, 42;
reaches Vinland, 42
Leigh-Smith, Benjamin, 287, 288;
visits Franz Josef Land, 290;
revisits it, 291;
winters in it, 291, 294
Le Maire, Jacob, 390
Lena, 323
Lena River, 316, 324, 329;
discovered, 175;
descended, 177
Levick, Dr, 490, 493
Liakhov Islands (New Siberian Islands), 177, 179, 328, 329, 341, 384
Lichtenfels, 163
Lievely, 217, 347
Lightning, 427
Lillie, Mr, 491, 494
Lindenow, Goolske, 113
Linschoten, J. H. van, 70 *et seq.*;
dies, 72;
his narrative, 72
Lion, 91
— Pickersgill's, 171
Lively, 403 *et seq.*
Loads for sledges, 23, 176, 265, 472, 479
Loaysa, Garcia Jofre de, 389
Lock, Michael, 82 *et seq.*
Lock's Island, 88
Lockwood, Lieut. James, 317 *et seq.*;
death of, 320
Lodias, 63
Log, use of the, 152
Logarithms, introduced by Briggs, 151
London, 147
London Coast, 99

Londonderry, founded by Cockayne, 108
Longhurst, Cyril, 450, 453, 467
Longstaff, Mr, 466;
  supports The Societies' Expedition, 445
Lowther Island, 259
Lumley, Lord, 152
Lutke Land, 186
Lyall, Dr, 412
Lyon, Capt. G. F., 212 *et seq.*;
  voyage of, 215;
  death of, 216
Lyons, Israel, 173
Lyttelton, New Zealand, 455, 469, 470, 477, 478, 491

M'Clintock, Admiral Sir Leopold, 249 *et seq.*, 264 *et seq.*, 303, 427, 446, 453;
  his sledges, 256;
  his sledge crew, 259;
  his sledge journey, 356;
  commissions the *Fox*, 273;
  knighted, 278;
  death of, 278
M'Clure, Capt., 248;
  winters in Prince of Wales Strait, 264;
  his record found by Mecham, 265
McCormick, Dr R., 412, 425
Mackenzie, Alexander, explores Mackenzie River, 169
Mackenzie River, 169, 226;
  exploration of, 169, 384
Maclear, Lieut., 428
M'Murdo, Archibald, 411, 420
M'Murdo Bay, 416
— Sound, 456, 457, 492, 493
Macquarie Island, 455, 486
Magallanica, 391
Magellan, 389
Magnetic force, irregular, 455
— observations, 99, 115;
  Antarctic, 475, 476
— Pole, Sir James Ross discovers, 236;
  South, 417, 475, 480, 481;
  position of, 415
— storms, 417
Magpie, 405
Mahu, Jacob, 390

Maigaard, Lieut., 333
Maldonado on Strait of Anian, 82
Mammoth ivory, 179, 180, 184
Maps, Baffin's discoveries, 144;
Barentsz's discoveries, by Hondius, 77;
Claudius Clavus's, 54;
Davis's voyages, 97;
Egede's, of Greenland, 161;
Foxe's, 155;
Frobisher's discoveries, 87;
Graham Land, 399;
Greenland, 377;
Hudson Bay, 167;
Hudson Strait, by Baffin, 139;
medieval, 55;
by Mercator, 55, 95, 391;
North-eastern Siberia, 181;
North-western Siberia, 181;
Olaus Magnus and Zamoiski, 55;
Ortelius's (1570), 55, 391;
Parry Islands, 210;
Settlement of East Bygd, 40;
South Shetlands, 399;
Spitsbergen, 120;
Zeni, 54
Markham, Admiral Sir A. H., 301, 313, 360, 446, 447;
sails on whaler, 302
— Sir Clements, 446;
serves on the *Assistance*, 252;
his *Threshold of the Unknown Region*, 302
— Lady (Clements), 447
— Lieut. John, 400
Markland (Labrador), discovered by Karlsefni, 45
Marmaduke, Capt., 124;
his explorations in Spitsbergen, 127
Marshall, 479
— Captain, 197
Maryner's Book, 151
Massacre of Eskimos, 168
Matonabi, 167 *et seq.*
Matthew, 124
Matyushin Strait, 184, 185, 360
Maury, 358
Mawson, Sir Douglas, 478, 480;
his Antarctic expedition, 486 *et seq.*

May, Lieut., 304
Meares, Mr, 489, 491, 498
Mecham, Frederick, 259, 261, 264 *et seq.*;
finds M'Clure's record, 265;
his great sledge journey, 270, 356;
character of, 271;
death of, 271
Meddelelser om Grönland, 364, 366
Melampyrum sylvaticum, 64
Melville Bay, 143, 202, 273, 303, 314, 338
Melville Island, 208 *et seq.*, 259, 260, 265 *et seq.*;
fauna of, 209;
flora of, 211;
interior explored, 209
Melville Peninsula, 214;
explored by Rae, 231
Mercator, his maps, 55, 95, 391;
Atlas, 391
Merchant Adventurers, 104, 113;
Company, 59
"Merchants of London, Governor and Company of," 135
Mercury, 69
Mermaid, 96, 97
Mertz, Dr, 486;
death of, 487
Meteoric iron, 202, 339;
weapons, 24
Michael, 83, 86
Micmac Indians, 98
Middendorf, 184
Middle Pack, 100, 142
Middleton, Capt. Christopher, winters in Hudson's Bay, 166
Mikkelsen, Einar, 368, 376 *et seq.*, 384
Milton, history of Muscovia, 62
Miocene, Antarctic, 438
Molyneux globes, 55, 104
Monastery (Augustinian) in East Bygd, 47
Montreal Island, 272, 275
Monument to Vince, 476
Moon, 86
Moonshine, 94, 95, 96, 97, 98
Moore, Admiral, 411, 425
Moravian missions, 162, 163, 164;

in Greenland, 162, 163
Morning, 466 *et seq.*, 476
Moseley, 428
Mosquitos, 15
Motor-car, Shackleton's, 478
Motor Sledges, 490, 497
Mount Erebus, 416, 458;
ascended, 479, 504
— Haddington, 422
— Jason, 431
— Longstaff, 464
— Markham, 464
— Melbourne, 493
— Moberly, 404
— Sabine, 415
— St Elias discovered, 178
— Terror, 416
— William, 404
Mountain sickness, 480
Mourier, Commander, 364
Müller, Baron, 431
Mulock, Lieut. G. F. A., 470 *et seq.*
Munk, Jens Eriksen, 149;
visits Iceland, 150;
visits Kolguev, 150;
his narrative, 151;
death of, 151
Murman Coast, 13, 63
Murray, Mr J., 478
— Sir John, 428, 446;
on Antarctic exploration, 444
Muscovy Company, 105, 123, 124;
receives charter, 62;
discourages Frobisher, 82;
protests against Dutch encroachments, 121;
despatches fleet to Spitsbergen, 124;
despatches N.W. expedition, 130
Musk ox, 22, 267, 281, 318, 338, 339, 347, 349, 371, 372, 374, 380
Mutineers, Hudson's, sail with Button, 136

Nai, Cornelis, 69, 70
Nanortalik, 364, 365
Nansen, Fridtjof, 340 *et seq.*, 386;
rescued by Jackson, 293;

crosses Greenland, 334 *et seq.*;
his instruments for crossing Greenland, 335;
scientific papers of, 345;
his *In Northern Mists*, 346
Nares, Admiral Sir George, 267, 304 *et seq.*, 446;
his expedition sails, 304;
arrives at Lievely, 305;
his winter quarters, 305;
results of his expedition, 309;
commands the *Challenger*, 428
Narwhals, 143
Nathorst, Professor, 368
Natives, Polar, 13
Nelson, Horatio, 173
— Mr, 490, 503
Nemtinoff, Lieut., 285
Neumeyer, Prof., 440, 441
New Attractive, 100
New Guinea, 391
New Siberian Islands, *v.* Liakhov Islands
Newfoundland, 98;
(Vinland), discovered by Leif Erik, 42;
re-discovered, 58
Newland, 118, 119
Newton, Professor Alfred, 287
Nias, Sir Joseph, 201, 212
Nicholas of Lynn, 53
Nimrod, 478 *et seq.*
Ninnis, Lieut., 486;
death of, 487
Nodal, the brothers, 390
Nonsuch, 165
Nordenskiöld, Erland, 325
— Nils Adolf Erik, Baron, 322 *et seq.*, 386;
on Omoki, 16;
visits Spitsbergen, 286 *et seq.*;
explores Greenland, 325;
results of his voyage, 324;
character of, 325;
his explorations in Greenland, 322
— Otto, 368;
his Antarctic expedition, 435 *et seq.*;
results, 438, 439
Nordsetur, 49

Norman, Robert, his *New Attractive*, 100
Norse colony in Greenland, attempt to re-discover, 112
— methods of reckoning time, 45
— Settlement of East Bygd founded, 41
Norsemen, the, 30, 32;
  Arctic discoveries by, 32 *et seq.*, 38 *et seq.*, 49 *et seq.*;
  in Greenland, 38
North Cape, rounded by Ohthere, 34;
  named by Burrough, 63
North East Passage, 322;
  attempted by Wood, 156
North Georgian Gazette, 208
North Pole, attempts to reach, 351 *et seq.*
North Somerset, 251
North Star, Davis's, 96;
  Saunders's, 250, 265
North West Passage, 155, 268, 275, 314;
  attempted by Frobisher, 81;
  attempted by Ross, 233;
  rewards for discovery of, 172
Norwegian expeditions, Antarctic, 433, 482 *et seq.*;
  Novaya Zemlya, 288;
  Spitsbergen, 286
Novaya Zemlya, 157, 289, 316, 360;
  description of, 184 *et seq.*;
  discovered by Willoughby, 61;
  visited by Hudson, 122
Nunataks, 331, 333, 335, 372, 373, 378, 381

Oates, Capt., 490, 491, 498, 500 *et seq.*;
  death of, 502;
  cairn to his memory, 503
Obi River, 323, 326
Observations, lunar, by Baffin, 140;
  magnetic, 99, 115;
  magnetic, Antarctic, 475, 476;
  Peary's, 357;
  pendulum, Antarctic, 400;
  stations for synchronous, 316, 414;
  synchronous, Antarctic, 420, 451
Observatory, Rossbank, 414
Ocean, depth of, 296, 297, 344, 345
Oceanic currents in Arctic, 5
Oceanography, Antarctic, 426 *et seq.*
Odin's horse (Sleipner), 31

Odometer, 372
Officers of Nares's expedition, 304
Ohthere, 33;
  voyage of, 34
Olaf, Bishop, 49
Olaf Tryggvason, Saga of, 38
Ommanney, Erasmus, 237, 251, 252;
  death of, 262
Omoki, 16, 20
"One-ton Depôt," 494, 498
Onkilon, 16, 20;
  relics of the, 21
Origanus, David, 141
Orleans Channel, 434, 436
Ormuz, siege of, 147
Ornen, 113
Orosius, 33
Ortelius, map of world (1570), 55, 391
Osborn, Sherard, 251, 261, 264 *et seq.*, 268, 301, 302
Ostiaks, 16
Otter, Sea, 178
Ox, Musk, 22

Paar, Major, first governor of Greenland, 160
Pack ice, 8;
  Antarctic, 12
Pagoda, 425
Palander, Lieut. Louis, 287, 323
Pancake ice, 7
Pandora, 311 *et seq.*, 327, 359;
  name changed to *Jeannette*, 328
Papaver alpinum, 96
— *nudicaule*, 295
Parr, Lieut., 304
Parry, Sir Edward, 201, 205, 206;
  discoveries by, 207;
  winters in Melville Island, 208 *et seq.*;
  his second voyage, 212;
  winters on Melville Peninsula, 214;
  winters at Igloolik, 214;
  results of his second voyage, 215;
  winters in Port Bowen, 217;
  marries, 218;
  his fourth voyage, 218;

his later work and death, 220
Parry Archipelago, 347 *et seq.*, 362;
currents of, 5
Patience, 113, 114, 116
Paulet Island, 437
Payer, Julius, 288, 289, 316;
visits Greenland, 282
Peary, Robert, his explorations in Greenland, 333;
his second expedition to Greenland, 337;
his third expedition to Greenland, 338;
attempts to reach the Pole, 352 *et seq.*;
further attempt on Pole, 355;
his sledge journey, 356;
his observations, 357;
Greenland journeys, 368, 369;
his record found, 380
Pemmican, 256, 450, 461, 469, 479, 483
Pendulum Island, 280, 282
Pendulum observations, Antarctic, 400
Penguins, Emperor, 472, 476, 496, 497;
fossil, 438
Pennell, Lieut., 490, 493, 494
Penny, Capt., 251 *et seq.*
Pepys, Samuel, approves Wood's voyage, 156
Pet, Arthur, 63;
commands Arctic voyage, 65;
discovers Waigatz, 66
Pet Strait, 72, 323
Petchora River, 14
Peter Island, 397, 442
Petermann Island, 442
Petersen, Carl, 258, 273
— Johan, 365, 366
Philip and Mary, 62
Philomel, 420
Phipps, Hon. Constantine, 173;
narrative of his voyage, 174;
death of, 174
Phoenix, 255, 268
Physical characteristics of Arctic Highlanders, 24;
of Eskimos, 19;
of Greenland Eskimos, 22
— features of Iceland, 36
Pickersgill, Lieut., 171, 394

Pike, Arnold, 344
Pillars, basaltic, 324
Pioneer, 251, 253, 254, 261, 264 *et seq.*, 347
Place-names given by John Davis, 103;
by Frobisher, 92;
by Hall, 112, 114, 116
Plankton, 426
Playse, John, his journal, 118
Pleuropogon Sabinii, 186, 295
Plover, 251, 263
Point Victory, 235
Polar areas, 3
— conference, 316
Polaris, 300, 301
Pole, South magnetic, 417
Polyphemus, 222
Ponies, in Arctic travel, 292, 293;
in Greenland travel, 381;
in Antarctic travel, 478, 490, 494 *et seq.*, 497, 498
Ponting, Mr, 491
Poole, Jonas, visits Spitsbergen, 105;
completes Hudson's survey, 123;
death of, 123
Population (Norse) in Greenland, 51
Porcupine, 427
Porpoise, 222
Possession Island, 415
Pourquoi Pas, 442
Priestley, Raymond, 478, 480, 491, 493, 504
Priests of the Eskimos, 23
"Primus" lamp, 342, 461
Prince Albert, 252 *et seq.*, 262
Prince Albert Mountains, 417
Prince of Wales, 241
Prince of Wales Island, 274, 277
— Land, 259
— Strait, M'Clure explores and winters in, 264
Prince Patrick Island, 266, 267
Prince Regent Inlet, 207, 217
Principall Navigations (Hakluyt), 110
Prontchishcheff, 176
Prosperous, 156

Proteus, 317 *et seq.*;
founders, 319
Provisions, Davis's, 94, 96;
Dease and Simpson's, 229;
Frobisher's, 90;
Lockwood's, 318;
Nansen's, 334, 342;
Parry's, first voyage, 207;
Parry's, second voyage, 213;
Parry's, land journey, 209;
Parry's, Spitsbergen boat voyage, 219;
Rae's, 231;
Scott's first expedition, 450, 461;
Shackleton's, 479;
Sverdrup's, 348;
for sledge journeys, M'Clintock's party, 256, 257, 259;
Ross's, 249;
Scott's, 462, 494
Pullen, Mr, 306
Purchas, Samuel, 111
Purchas hys Pilgrimes, 111
Purchas's *Briefe and True Relation*, 145
Pyrites found by Frobisher, 85, 90
Pytheas, voyage of, 26, 27

Quadrant, Davis's, 102;
Hadley's, 102;
Weddell's, 442;
Ross's, 507
Quadrants, Arctic, 4, 6, 13, 57
Queen Adelaide Island, 404
Quervain, Dr de, 381
Quiros, Pedro Fernandez de, 392

Racehorse, 172 *et seq.*
Rae, Dr John, winters in Repulse Bay, 231;
reports news of Franklin's expedition, 272
Rainbow, 227, 230
Raised terraces, 186
Raleigh, Sir Walter, supports Davis's projects, 94;
drafts instructions for Arctic voyage, 135
Ranunculus glacialis, 96
Rasmussen, Knud, 379 *et seq.*
Rate of sledge travel, 23, 356;
Aldrich's, 308;
Amundsen's, 484, 485;

Hamilton's, 265;
M'Clintock's, 260, 266, 269;
Mecham's, 265;
Payer's, 283;
Peary's, 338;
Rasmussen's, 380;
Scott's first expedition, 464, 472, 475
Ravens, 332
Ravenscraig, 301
Rawson, Lieut., 304, 306, 307;
death of, 307
Record, Peary's, found, 380
Records of *Alert* and *Discovery*, 312, 313
Regiment of Medina, 57
Reindeer, 14, 267;
introduced into Spitsbergen, 287
Reliance, 227
Relics, of the Onkilon, 21;
of Erichsens' party, 378;
of Franklin found, 272, 275, 276, 314;
of Parry's expedition, 260
Rennick, Lieut., 490, 493, 494
Repulse Bay, 166, 213, 230, 231
Rescue, 252, 255
Resolute, 251, 253 *et seq.*, 264 *et seq.*
Resolution, Button's, 136
— Cook's, 169 *et seq.*, 394 *et seq.*
— Scoresby's, 192, 194, 195
Revenge, the, action described by Linschoten, 71
Rhodostethia rosea, 343
Rhytina Stelleri, 179
Richard and Barnard, 124
Richardson, Dr, 223 *et seq.*, 226;
shoots Michel, 225
Rijp, Jan Cornelis, 72, 73, 78
Ringnes, Herrn, 347
Ringnes Islands, 348, 349, 355
Rink, Dr, 332
Rivers of Siberia, 15
Robertson, Dr, 412
Robertson Bay, 433, 456, 493
Rodgers, 329
Roe, Sir Thomas, 152

Roosevelt, 355, 356
Ross, Sir James, 201, 212, 216, 218, 233 *et seq.*, 410;
character of, 424;
his first Antarctic voyage, 410;
second Antarctic voyage, 418;
third Antarctic voyage, 422 *et seq.*;
bibliography of third Antarctic voyage, 425;
discovers magnetic pole, 236;
winters at Fury Beach, 236;
goes in search of Franklin, 248;
death of, 251
— Sir John, 201, 233, 349;
discovers Arctic Highlanders, 24, 203;
his first voyage, 202;
knighted, 237
Ross Island, 494;
Quadrant, 507;
Sea, 12
Ross's Barrier, *v.* Barrier, Great
Ross's Gull, 296, 343
Rossbank Observatory, 414
Royal George, 102
Royds, Lieut. Charles, 448, 452, 475
Ruins of Greenland churches, 52;
of Kakortak, 47, 52, 160;
in Kingoa-dal, 48
Runic inscriptions in Greenland, 49, 52
Rupert, Prince, founds Hudson's Bay Company, 165
Russia, Dutch open trade with, 68
Russian Ambassador, first, visits England, 62
— expeditions, Antarctic, 396;
Arctic, 175;
Spitsbergen, 187, 285
Russians with Scott, 489, 490, 495
Ryder, Lieut. C., 367

Sabine, Colonel, 201;
sails with Parry, 206;
visits Greenland, 280;
on terrestrial magnetism, 410
Sabine Peninsula, 267
Sabine's Gull, 203
Sabrina, 405, 406
Sabrina Land, 406, 430
Saga, of Erik the Red, 38;

of Olaf Tryggvason, 38;
of Thorfin Karlsefni, 39
St Lesmes, 389
St Paul, 177
St Peter, 177, 178
"Sallying," 8, 195
Salomon, 86, 88
Samoyeds, 14, 16, 184, 185;
described by Digges, 107
Sanderson, William, 94, 96, 98, 104;
supports Davis's expeditions, 104
"Sanderson his Hope," 99, 142, 202, 207
Sandridge, Davis's birthplace, 93
Sandwich Land, 403
Sartorius, Sir George, 401
Sastrugi, 182, 501
Saxifraga oppositifolia, 295
Schouten, Willem Cornelisz, 390
— William, Junior, 191, 194 *et seq.*;
takes holy orders, 196;
his life, 197;
visits Greenland, 279
— William, Senior, 188, 191, 194, 195;
describes Spitsbergen, 119, 121
Scoresby Sound, 367
Scotia, 439
Scott, Capt. Robert Falcon, his first expedition, 447 *et seq.*;
made Commander, 448;
his staff on *Discovery*, 449;
objects of, 452;
crosses Antarctic Circle, 456;
falls down crevasse, 474;
his last expedition, 489 *et seq.*;
marries, 489;
his staff on last expedition, 490 *et seq.*;
meets with heavy gale, 491, 492;
meets Amundsen's party, 493;
his winter quarters at Cape Evans, 495;
starts for the S. Pole, 498;
finds Amundsen's record at the S. Pole, 500;
reaches S. Pole, 501;
death of, 502;
discovery of bodies of his party, 503;
results of his work, 504;
memorial service to, 504;

character of, 504
Scott Island, 469
Scurvy attacks Baffin's crew, 145;
Barentsz's crew, 75, 76;
Bering's crew, 178;
Biscoe's crew, 404;
Egede's colony, 159, 160;
Evans's party, 498;
Middleton's expedition, 166;
Munk's expedition, 150;
Nares's expedition, 306, 308, 309;
Ross's expedition, 250
Sea-cow, 179
Sea-elephant, 405
Sea-leopard, 402
Sea-otter, 178
Seal-meat, 482
Seals, Southern fur, 400
— Weddell's, 483
Searchthrift, 63
Searle, John, his ephemeris, 141
Seebohm, Henry, 326
"Senegraes," 342, 478
Sermilik Fjord, 365
Seymour Island, 423, 431, 436
Shackleton, Sir Ernest, 449, 463 *et seq.*, 470;
breaks down, 464;
his Antarctic expedition, 478 *et seq.*
Sherer, Lieut., 213, 216
Shilling, Capt., 147
Ships, Viking, 35
Sibbald, Lieut. John, 411, 420
Siberian rivers, 15;
trade on, 326
Sibirikoff, 322, 323, 326
Sidney, Sir Henry, 81
Simpson, Dr, 491, 498
—Thomas, 228
Sir George Seymour Island, *v.* Seymour Island
Sir Thomas Smith Channel, 347
Sir Thomas Smith Sound, 143
Skelton, Reginald, 449, 471, 472
Ski, 335, 450, 462, 482

Skrællings (natives of America), 45, 46 *n.*, 49, 50
Sledge dogs, 17, 337, 338, 354, 355;
in Antarctic, 462, 472, 482, 483;
Greenland, 23
— flags, Nares's expedition, 304;
Scott's, 450
— journeys, Arctic contrasted with Antarctic, 459, 460;
Aldrich's, 307, 308;
Amundsen's, 483;
Amundsen's party, 315;
Beaumont's, 308, 309;
Danish, 371 *et seq.*;
Hamilton's, 268;
Hayes's, 299;
Lockwood's, 318;
M'Clintock's, 249, 250, 266, 274 *et seq.*, 356;
Markham's, 307;
Mecham's, 267, 356;
Mecham's great, 270;
Payer's, 283, 289;
Peary's, 356;
Rae's, 231;
Ross's, 235, 237;
Scott's first expedition, 458, 463, 465, 471, 472;
Scott's last expedition, 494, 498;
Sverdrup's, 348;
Allen Young's, 276
— — provisions for, M'Clintock's, 256, 258, 259;
Ross's, 249;
Scott's, 462, 494
— travel, rate of, 23, 356;
Aldrich's, 308;
Amundsen's, 484, 485;
Hamilton's, 265;
M'Clintock's, 260, 266, 269;
Mecham's, 265;
Payer's, 283;
Peary's, 338;
Rasmussen's, 380;
Scott's first expedition, 464, 472, 475
Sledges, Tchuktches, 17;
Eskimo, 234;
Greenland, 23;
M'Clintock's, 256;
Russian, 176;
Samoyed, 14;
Wrangell's, 181

— dimensions of, 292;
Cook's, 354;
Nansen's, 334, 342;
Peary's, 333;
Scott's, 450, 460, 472;
Shackleton's, 478
— hauling-gear, 462
— loads for, 23, 176;
M'Clintock's, 265;
Scott's, 472;
Shackleton's, 479
— motor, 490, 497
— of Franklin's retreat, 245;
of Hearne's expedition, 168
Sledging equipment, Hearne's, 168;
Nansen's, 334;
Ross's, 256;
Sverdrup's, 348;
Wrangell's, 182;
Scott's, 450
Sleeping bags, 460, 478
Sleipner (Odin's horse), 31
Smallpox devastates Greenland, 162
Smeerenburg, 127, 128, 174, 360;
abandoned, 188
Smith, Sir Thomas, 105, 106, 113, 129, 142
Smith Channel, 265, 347
Smith Sound, 317;
route by, 298 *et seq.*;
U.S. expedition to, 317 *et seq.*
Snow, crimson, 202, 253
Snow Hill Island, 436
Snow huts of Eskimos, 20
Snow-shoes, 168, 335;
of Tchuktches, 17
Sobral, Lieut., 436
Societies' Antarctic Expedition, The, 444 *et seq.*, 455 *et seq.*, 466 *et seq.*, 471 *et seq.*;
Committee of, 446
Sofia, 366
Sophia, 251, 296, 332
Sounding apparatus, deep sea, 426
Soundings, deep sea, 427 *et seq.*, 440
South Georgia, 393, 396, 402, 436
South Magnetic Pole, 417, 475, 480, 481

South Orkneys, 400, 439, 440
South Shetlands, 398, 401, 422 *et seq.*, 434, 436, 438
South Polar Times, 459, 496
Southampton Island, 166
Southern Cross, 433
Speedwell, Scoresby's, 191
— Wood's, 156;
wrecked, 157
"Speksioneer," 190
Speyer, Sir Edgar, 489
Spitsbergen, 105, 117, 188, 317, 361;
birds of, 121;
called "Greenland," 118, 124;
coal in, 350;
Conway's books on, 362;
described by Scoresby, 119, 121;
description of, 128;
discovered, 74;
explorations in, 285 *et seq.*;
fauna of, 119, 121, 128;
icebergs, 9;
map of, 120;
scenery of, 119, 121;
visited by Baffin, 116;
first visited by Dutch, 124;
claimed by Christian IV, 124;
Dutch despatch second fleet to, 126;
English first winter in, 128;
Muscovy Company despatch fleet to, 124;
Russian expeditions to, 187
Stanmore church, 108
Staten Island, 389, 396, 401
Stations for synchronous observations, 316
Steller, Georg Wilhelm, 178
Stone, William, 106
Stone huts, 21
Storms, magnetic, 417
Story of the Alabama Expedition, 379
Sukkertoppen (the modern), 115, 116, 163;
Old, 97
Sulphur brought from Iceland, 150
Sunshine, 94, 96, 98, 99, 100
Superb, 240
Svartevæg, 349, 354

Sverdrup, Otto, 335, 341 *et seq.*, 347
Swan, 69, 72
Swedish expeditions, to Antarctic, 435 *et seq.*, 506;
to Spitsbergen, 286 *et seq.*
Sweepstakes, 156
Synchronous observations, Antarctic, 420, 451;
plan for, 316;
Ross's, 414

Tahiti, visited by Cook, 395
Taimyr, Cape, 323
Taimyr Peninsula discovered, 177
Taylor, Mr Griffith, 491
Tchuktches, 16, 17, 170, 175, 325
Tegethoff, 289, 297
Temperatures, 315;
Antarctic, 471, 473, 474, 496, 501, 502;
deep sea, 427;
lowest registered, 16
Tennyson's epitaph on Sir John Franklin, 243
Tents of Tchuktches, 17
"Terra Australis," 391, 396
Terra Nova, 476, 483, 489 *et seq.*;
surveys New Zealand waters, 493, 494
Terraces, raised, 186
Terror (under Ross), 410 *et seq.*, 418 *et seq.*;
collision of, 419
— (under Franklin), 230, 231, 238 *et seq.*, 240 *et seq.*, 246 *et seq.*;
founders, 247
Tertiary fossils, 350
Tetgales, Brant, 69
Thalbitzer, W., 366
Thames, 326
Thomas, 86
Thomas Allin, 86
Thomasine, 126, 127
Thomson, Sir Charles Wyville, 427, 428
Thorne, Robert, counsels Arctic voyages, 59
"Three-Degree Depôt," 498
Threshold of the Unknown Region, 302
Tierra del Fuego, circumnavigated, 391;
part of Terra Australis, 392
Tiger, 124

Time, Norse method of reckoning, 45
Trade's Increase, 105
Trees, circumpolar, 13;
  discovered at Cape Manning, 267
Trent, 198 *et seq.*
— (Franklin's), 222, 223
Tribes, circumpolar, 13
Trinity House (Hull), 116
Tripe de Roche, 224 *et seq.*
Trost, 112
Trostrup, C. and G., 370 *et seq.*
Tryggvason, Olaf, Saga of, 38
Tschitschagoff, Capt., 285
Tucker, Mr, 412, 413
Tula, 403 *et seq.*
Tundra, 14, 15
Tunguses, 16, 177

Udröst, 33
Umiaks, 20, 22, 115, 365
United States, 299
United States expedition to Smith Sound, 317 *et seq.*
Upernavik, 142
Uredo nivalis, 202
Ushuaia, 436

Valdivia, 429
Valorous, 304
Veer, Gerrit de, 76;
  narrative of, 78
Vega, 322 *et seq.*;
  winters, 324
Vessels employed in Polar discovery:
  Active, 431
  Advance, 252, 298 *et seq.*
  Adventure, 394
  Aid, 85, 86
  Akbar, 223
  Alabama, 376;
    loss of, 378
  Antarctic, 368
  Alert, 303 *et seq.*, 312, 313
  Alexander, 198, 201, 202
  Andromache, 398, 400

Ann Frances, 86
Anne Royal, 146
Annula, 124
Antarctic, 436;
  founders, 437
Arctic, 302, 303
Arethusa, 223
Assistance, 251 *et seq.*, 261, 264 *et seq.*, 349
Astrolabe, 407
Aurora, 486 *et seq.*
Baffin, 196
Balaena, 296, 431, 439
Bear, 86
Beaufoy, 402
Bedford, 223
Belgica, 368, 434
Bellerophon, 223
Black Dog, 101
Blijde Boodschap, 390
Blossom, 216, 226, 227, 234
Bona Confidentia, 60
Bona Esperanza, 60
Breadalbane, 268
Briseis, 201
Bulldog, 427
California, 166
Carcass, 172 *et seq.*
Castor, 431 *et seq.*
Challenger, 428
Chanticleer, 401, 423
Charles, 152 *et seq.*
Churchill, 167
Clio, 238, 240
Cornwallis, 238, 240
Cove, 237
Danmark, 369
Den Röd Löve, 112
Dennis, 86;
  founders, 88
Desire, 101
Diana, 287, 288, 326, 431
Discovery (Baffin's), 138 *et seq.*, 142 *et seq.*
— (Button's), 136
— (Clerke's), 169 *et seq.*
— (Hudson's), 129, 131
— (Moore's), 165
— (Nares's), 304, 312
— (Scott's), 451 *et seq.*;

plans of, 446, 447;
flag of, 447;
relieved by *Morning*, 470;
freed from the ice, 476;
ashore, 476;
damage to rudder, 477;
returns home, 477
Dobbs, 166
Dorothea, 198 *et seq.*
Drake, 101
Earl Camden, 222
Edward Bonaventure, 60
Eendracht, 390
Eenhiörningen, 150
Eira, 290;
founders, 291
Eliza Scott, 405, 406
Elizabeth, 98, 99, 100
Ellen, 98, 99, 100
Emanuel, 86
— (busse), 91
Enterprise, 248, 250 *et seq.*, 263
Erebus (under Ross), 410 *et seq.*, 418 *et seq.*;
collision of, 419
— (under Franklin), 237 *et seq.*, 240 *et seq.*, 246 *et seq.*, 251;
sinks, 247
Esk, 195
Excellent, 238, 240
Felix, 251, 253, 254
Fortune, 177
Fox, 273, 311;
winters in Bellot's Strait, 274
Fram (Nansen's), 340 *et seq.*;
dimensions of, 340;
drift of, 344;
arrives home, 344;
under Sverdrup, 347;
winters in Smith Channel, 347;
winters in Havnfjord, 348;
winters in Jones Sound, 349
— (Amundsen's), 482 *et seq.*
Français, 442
Francis, 86
Furnace, 165
Fury, 212, 216, 234
Gabriel, 83, 86
— (Bering's), 177
Gamaliel, 124

Ganges, 240
Gauss, 362, 440, 441, 451
George, 65
Germania, 282
Gilliflower, 113
Gjoa, 314, 315
Godspeed, 129
Greyhound, 72
Griffin, 72
Griper, 206 *et seq.*, 212, 215, 233, 280
Hansa, 282
Heartsease (Greenland voyage), 113 *et seq.*
— (Marmaduke's), 126
Hecla, 206 *et seq.*, 212;
(Parry's), 216 *et seq.*, 233
— (Ryder's), 367
Henrietta, 192
Henrietta Maria, 154
Hertha, 431, 432
Hope, 72
— (Adams's), 390
— (Egede's), 158 *et seq.*
— (Young's), 291
Hopewell, 86
— (Knight's), 117 *et seq.*, 130
Ibis, 326
Ingulf, 364
Intrepid, 251, 253, 254, 261, 264 *et seq.*, 347
Investigator, 222, 248, 251, 263 *et seq.*;
loss of, 270
Isabella, 198 *et seq.*, 233, 237
Isbjörn, 289, 360
Jane, 402
Jason, 431
Jeannette (formerly *Pandora*), 328;
drift of relics of, 340
John and Francis, 124
Jonah in the Whale, 188
Judith, 86
Katten, 112, 129
Lady Franklin, 251
Lamprenen v. *Lamprey*
Lamprey, 150, 151
Lena, 323
Lightning, 427
Lion, 91
— (Pickersgill's), 171
Lively, 403 *et seq.*

London, 147
Magpie, 405
Matthew, 124
Mercury, 69
Mermaid, 96, 97
Michael, 83, 86
Moon, 86
Moonshine, 94, 95, 96, 97, 98
Morning, 466 *et seq.*, 476
Nimrod, 478 *et seq.*
Nonsuch, 165
North Star (Davis's), 96
— (Saunders's), 250, 265
Ornen, 113
Pagoda, 425
Pandora, 311 *et seq.*, 327, 359;
name changed to *Jeannette*, 328
Patience, 113, 114, 116
Philip and Mary, 62
Philomel, 420
Phoenix, 255, 268
Pioneer, 251, 253, 254, 261, 264 *et seq.*, 347
Plover, 251, 263
Polaris, 300, 301
Polyphemus, 222
Porcupine, 427
Porpoise, 222
Pourquoi Pas, 442
Prince Albert, 252 *et seq.*, 262
Prince of Wales, 241
Prosperous, 156
Proteus, 317 *et seq.*;
founders, 319
Racehorse, 172 *et seq.*
Rainbow, 227, 230
Ravenscraig, 301
Reliance, 227
Rescue, 252, 255
Resolute, 251, 253 *et seq.*, 264 *et seq.*
Resolution (Button's), 136
— (Cook's), 169 *et seq.*, 394 *et seq.*
— (Scoresby's), 192, 194, 195
Richard and Barnard, 124
Rodgers, 329
Roosevelt, 355, 356
Royal George, 102
Sabrina, 405, 406
St Lesmes, 389

St Paul, 177
St Peter, 177, 178
Salomon, 86, 88
Scotia, 439
Searchthrift, 63
Sofia, 366
Sophia, 251, 296, 332
Southern Cross, 433
Speedwell (Scoresby's), 191
— (Wood's), 156;
wrecked, 157
Sunshine, 94, 96, 98, 99, 100
Superb, 240
Swan, 69, 72
Sweepstakes, 156
Tegethoff, 289, 297
Terra Nova, 476, 483, 489 *et seq.*;
surveys N.Z. waters, 493, 494
Terror (under Ross), 410 *et seq.*, 418 *et seq.*;
collision of, 419
— (under Franklin), 230, 231, 238 *et seq.*, 240 *et seq.*, 246 *et seq.*;
founders, 247
Thames, 326
Thomas, 86
Thomas Allin, 86
Thomasine, 126, 127
Tiger, 124
Trade's Increase, 105
Trent, 198 *et seq.*
— (Franklin's), 222, 223
Trost, 112
Tula, 403 *et seq.*
United States, 299
Valdivia, 429
Valorous, 304
Vega, 322 *et seq.*, 324
Victory, 233 *et seq.*
Warkworth, 326
Willem Barentsz, 359 *et seq.*
William, 65;
founders, 66
Williams of Blythe, 398
Windward, 292
Ymer, 322
Zélée, 407
Victoria Island, 227, 230
— Land, 456, 469, 481;
surveyed, 315

— Range, 458, 505, 507
Victory, 233 *et seq.*
Vigdis, tomb of, 52
Viking ships, 35
Vikings, 35, 36;
  reach Iceland, 36
Vince, T., death of, 459;
  monument to, 476
Vinland, 42, 45
Vocabulary, Eskimo, compiled by Davis, 97
Vogel Hoek, 118
Volcanic action, in Arctic, 4;
  in Antarctic, 400, 415, 416, 432, 465
von Toll, Baron, 341
Voyage of the "Discovery," 477
Voyages, of Thylde, 58;
  of Willoughby, 59

Waigatz Island, 15, 64;
  birds of, 64;
  flora of, 64
Wakeman, Cyrus, 212
Walrus, 122, 144, 170, 173, 296, 343, 349;
  attacks Trent's boats, 199
Walsingham, Sir Francis, 94, 96, 98
Warkworth, 326
"Water sky," 8
Weapons, 24
Weddell, Capt. James, 404, 440;
  his Antarctic expedition, 401, 402
Weddell Quadrant, 442, 507
Weddell's Seal, 483
Wellman, 293
West Bygd, settlement formed, 47
Wetheringsett, Hakluyt rector of, 110
Weyprecht, Lieut., 288, 289, 316
Whale, breaking up of, 192 *et seq.*;
  captured by Ross, 217;
  jaw-bones of, 193;
  killed by ship, 88;
  fishery, 128, 150, 188 *et seq.*;
  initiation of, 123;
  in Baffin's Bay, 204;
  boats, 190;

lines, 190, 192
— fishing, 125
Whale Fish Islands, 241
Whale Sound, 145, 338
Whalebone, 193
Whalers, 189, 283, 284, 431;
Scotch, in Antarctic, 431;
disaster to, 302
Whales, 143, 422;
Balaena Biscayensis, 125
Whaling, 190, 192
Wharton, Admiral Sir William, 446
Whymper, Edward, visits Greenland, 331
Wiggins, Joseph, 325 *et seq.*;
his scheme for Siberian trade, 326;
death of, 327
Wild, Frank, 428, 479, 486
Wilkes, Capt., his Antarctic expedition, 408, 409
Willem Barentsz, 359 *et seq.*
Willemoes-Sühn, 428
William, 65;
founders, 66
Williams of Blythe, 398
Williamson, 490, 503
Willoughby, Gabriel, 60
— Sir Hugh, 59;
his first Arctic voyage, 60 *et seq.*;
sights Halgoland, 61;
discovers Novaya Zemlya, 61;
winters in Lapland, 61;
death of, 62
Willoughby Land, 61, 123
Wilson, Edward, surgeon with Hudson, 131, 134
— Dr Edward, 449, 463 *et seq.*, 490, 494, 496, 498, 500 *et seq.*;
death of, 503
Windward, 292
Wisting, 484
Wolfall, Frobisher's chaplain, 90
Wollaton, tombs in church at, 60
Wolstenholme, Sir John, 106, 108, 135, 138, 142;
sends Hawkridge on polar voyage, 149
Wolstenholme Sound, 143, 145, 203
Wood, John, attempts North East Passage, 156

Wrangell, Baron, his sledge journeys, 181 *et seq.*
Wrangell Island, 184, 329
Wright, Edward, 106
— Mr, 491, 498, 503
Wyatt, Mr George, 489
Wyche, Richard, 106, 135
Wyche Islands, 286

Xema sabinii, 203

Yakutsk, 16
Yenisei River, 15, 175, 323, 326, 345
Ymer, 322
York, Cape, 202;
  birds of, 24
Yorke, Gilbert, 85, 90
— Sir John, 81
Young, Sir Allen, 273, 274, 276, 291, 311 *et seq.*, 327, 359
— James, 117, 118, 121
Young Island, 405
Yuraks, 16

Zélée, 407
Zeni map, 54
Zeno, Niccolo, 55;
  errors of his map, 160
Zeuglodon, 438
Ziegler expedition, 293
Zinzendorf, Count, founds Moravian mission, 162
Zorgdrager, C. G., 188

CAMBRIDGE: PRINTED BY J. B. PEACE, M.A., AT THE UNIVERSITY PRESS.