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A HISTORY OF POLAR EXPLORATION

"Who is the third who walks always beside you? When I count, there are only you and I together But when I look ahead up the white road There is slways another one walking beside you " T S Ettor, The Wate Lond Into 3 (5-15)

# A HISTORY OF POLAR EXPLORATION

by L. P. KIRWAN

Director of the Royal Geographic Society





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### Contents

Preface	poge ix
PART I: THE AGE OF DISCOVERY	
L GREEKS, NORSEMEN, AND MONKS	3
II. A NORTHERN PASSAGE TO CATHAY	15
III, DUTCH AND ENGLISH RIVALRY IN THE ARCTIC	28
PART II: THE AGE OF EXPLORATION	ſ
IV. Arctic and Antarctic: The Age of Strat. and Exploration	egy 41
V. COOK AND THE FIRST CROSSING OF THE ANTARG CIRCLE	лтс 58
VI. AFTER THE NAPOLEONIC WARS	73
VII, THE ROYAL NAVY TAKES THE LEAD	81
The first attack on the North-West Passage	84
Farry's attempt on the Pole The discovery of the North Magnetic Pole	90
Land explorations of the Canadian Arctic of	past 9\$
VIII. THE FIRST SIGHTINGS OF THE ANTARCTIC	
CONTINENT	99
IX. RUSSIA ENTERS THE ANTARCTIC	108
X. A BRITISH SEALER CIRCUMNAVIGATES THE CONTINENT	120
XI. THE UNITED STATES EXPLORING EXPEDITION	126
XII, EUROPE REVIVES ANTARCTIC EXPLORATION	139

page

С	he	P	te	7

T .....

157
177
190
206
214
232
253
267
284
297
297
297 319
297 319 339
297 319 339 355

### Illustrations

between pages 193 and 199

- Scott's hut at Cape Evans, built in 1911 and last used by Shackleton's Trans-Antarctic Expedition in 1917. Photographed through a broken window-pane during the U.S. 'Operation Deepfreeze' in 1956 Photograph Jolas F. Reiter O Nutonal Georphile Society.
- The Dutch prepare for the first Arctic wintering, 1596

From De Bry, Verages Indes Orientales, I, plate xiv, 1598.

- Parry's 'Attempt to reach the North Pole in Boats Fitted for the Purpose', 1827 From Parry's Nametine of an Assesse. ..., p. 90.
- Top-hatted officers of Franklin's Second Expedition explore the Arctic coast of America. Drawn by Capt. Back, 1826 From Franklin's Noracity of a Second Expedition ..., p. 170.
- Cook's Antarctic 'Ice Islands', January 1773 From Cook's Verge towards the South Pole ..., pp. 36-7, London, 1777.
- Bellingshausen's Russian Antarctic Expedition, 1819-21 From the Atlas of the Voyage of Capt. Bellingshausen, St. Petersburg, 1831.
- 'View of the Antarctic Continent.' As seen by Wilkes's United States Exploring Expedition, January 1840 From Wilkes's Narraire..., II, p. 325, Philodelphia, 1845.
- James Clark Ross discovers Mount Erebus, January 1841 From Ross, Veyage . . . in the Antartic Regism, I, p. 216.
- Weddell's brig Jane and 65-ton cutter Beaufoy, typical early nineteenth-century Antarctic sealers From Weddell's Forege towards the South Fole, 1823.
  - A gale in the pack.' H.M.S. Erebus and Terror in the Antarctic, January 1842 From Ross, Forege..., In the Antarctic Regione, I, p. 216.

- \*Critical Position of H.M.S Investigator The Franklin Search, August 1851 From a drawing by Lieut S Gumey Creswell in the possession of the Royal Geographical Society
- 'Crossing the Ice Belt at Coffee Gorge ' Kane's Yankees in the Arctic, 1854 From Elpha Kent Kine, Arctic Explorations, I, p 92
- The Navy advances across the 'Great Ice Barrier' Scott's Antarctic expedition, 1901-4 By courtery of the Royal Geographical Society
- On the Polar Plateau Scott's last expedition, 1910-13 Copyright, Paul Popper Ltd
- Amundsen's dog-teams reach the South Pole, December 1911 From R. Amundsen, The South Pole, John Murray, London, 1912
- Scott and his men find the Norwegian flag flying at the Pole, January 1912 From a film found at Scott's last camp Copyright, Full Popper Ltd
- The Peary Arctic Club's S S Roosevelt, 1906 From R E Peary, Norrest the Fole, p 358
- The United States Navy lands at the South Pole, 31st October 1956 Copyright, Planet News Ltd., London

### MAPS AND DIAGRAMS

The North Polar Regions	Front endpaper
From Peter Apian's Cosmographia (1551), show posed relationship between America and	ing the sup- Antarctica
The North-West Passage	
Ice drift in the central polar basin After V F Burkhanov New Series Investigations in the Accile	Moscow, 1955
The Ross Dependency	
The Partition of the Antarctic	
The South Polar Regions	Back endpaper

#### viiı

### Preface

T may seem an impertinence that one who has no personal experience of the polar regions, whose own field-work in fact has been in hot and not cold deserts, should write a book about polar exploration. However, I can claim at least some close acquaintance with polar affairs over the past twelve years. in this book moreover-and I believe the treatment to be relatively new-I have been more concerned with the evolution of polar exploration in its historical and social context than with an analysis of geographical achievement or with the development of polar techniques. And I have been concerned especially with the motives and impulses-economic, strategic, personal and political -which have given rise to polar exploration. This has of course involved working outwards from the centre, from the hub, of polar activity in each case. It has similarly involved an attempt to weave Arctic and Antarctic into one continuous story instead of treating each region separately as has generally been done. The events of the last forty years are an exception and, largely because of the difficulty of achieving historical perspective at such close range, these have been more summarily described, reference being made only to the main happenings and to some of the principal influences and trends.

The bibliography at the back of the book gives some idea of the extent of my debt to those on whose published work I have so much depended. It also contains references to certain unpublished material in the possession of the Koyal Geographical Society or of the Scott Polar Research Institute at Cambridge, England. To the authorities of both these organizations I am likewise much indebted for permission to use this.

The opinions expressed in this book are my own. But I mustlike so many other writers on polar exploration-record my gratitude to Dr Brian Roberts of the Scott Polar Research Institute for many valuable factual comments at proof stage, made out of his encyclopacedic knowledge of polar exploration. I am also grateful to Mr G. R. Crone, Librarian and Map Curator at the Royal Geographical Society, for helpful comments on the introductory Part I, to Mr G S Holland and his colleagues at the Royal Geographical Society for their expert preparation of the maps, and to Miss Frederica Estill for much assistance in the preparation of the manuscript

Finally, I must acknowledge my debt to my write, not only for her encouragement and her pattence during the writing of a book done at the cost of a good many lessure hours, but also for her skill in helping to clarify the final proofs

LPK

CHELSEA AND LONGMORE, 1959

## PART ONE THE AGE OF DISCOVERY

Greeks, Norsemen, and Monks

T is not surprising that the Age of Aristotle, alight with the trestlessly inquisitive spirit of the Greeks, should have seen the birth of the first polar explorer: Pythess, from the Greek colony of Massilia, the modern Marstilles. Pythess was more than a bold adventurer determined to chance a voyage through the allegedly haunted seas which lay beyond the limits of the "Habitable World" of his time. He was an Intellectual, a scientific explorer, a meticulous observer, a skilled anvigator learned in astronomy, and the ingenious inventor of an instrument, a "gnomon", which emabled him to calculate the latitude of his mitre city with extraordinary accuracy for those days.

In origin, the motives of this first polar expedition were, like thore of most expeditions to the polar regions until the eighteenth century, primarily economic. When Pytheas sailed about 320 B.c., he sailed in search of the tin which had mysteriously papeared from time to time in the markets of Massilla, coming, to rumour said, south through Gaul from some remote and unknown northern land. He sailed also, in the interests of his sponsors, the merchants of the colony, on an attempt to break the blockade of the Atlantic trade routes which for years had been monopolized by Phoenician ships.

Navigating by sun and stars, Pytheas steered his square-sailed Greek galley out of the sunlit Mediterranean, past the warning pillars traditionally set up by Hercules (at the Straits of Gibraltar), and on through grey and boisterous seas to Brittany and to Cornwall, the source of in.

Pytheas is famous in history for his discovery and circumnavigation of the land of the 'painted' Britons. It was during his exploration of Britain that he first heard of a land, far to the north, called Thule. To explore towards the Arctic was no part of his original mission, but he determined nevertheless to search for Thule, and after sailing for six days he sighted land; a land, its

3

inhabitants told hum, which by at times on the very edge of a firozon' or 'curdied' sea It was evidently an Arctic land, probably lecland, for Pythess grees a very recognizable descrip tion of the Midnight Sun, and he witnessed there a phenomenon tow hich he gives the curious and much disputed name of 'sea lung', a ubitance neither land nor air uor water which was impossible to men and basts, a word picture, perhaps, of the gentle and rhythmical undilution of the tex rusing and falling with the movement of the sea, linked possibly with some suggestion of the exhalitions of the tex mist which so often hangs, cold and dank, show the tice edge in the Arctie

It has been the sid fite of many polar explorers that their claums to discovery should have been contemptiously rejected by later generations in Roman times, the geographer Strabo, who could not tolerate even the melusion of freiand within the limits of his definition of the Habitable World, relised to believe that man could survive so far to the north on the very edge of a world of ice and he rejected Pythes' story as an extravagant traveller's tale. This first polar discovery thus passed into oblivion. Only in comparatively recent times has Pythesa been recognized as the first civilized man to travel north as far as the Aretic Cirele.

This first contact with the new world of cot and snow was followed, though not until the early centuries of the Christian ers, by the discoveries of linsh monks and Norsemen pirates, seldom the result of deliberate exploration. The irish monks, descendants of those who had followed St Patrick, were intent not on aiding to geographical knowledge but on the discovery of remote islands to the north and east of irlenda to whuch they might escape from a too gregorous community life to one of solitude and contemplation. Saining in hade covered coracles or curragis, flung about on the tumbling sease, they found refuge among the western siles of Scotland and from there, driven out by the Norsemen, spread to the Orkape, Shetlands and Faroot Some, hardier and more adventurous scamen, had a more ambutous plan Living in monsteries, round the mouth of the Shannon, they had stem how each year at the first sign of spring flock after flock of wild geese migrated northwards to summer breeding Founds, and it was probably by following the flight of these spectacular and noisy birds that the Irish monks reached Iceland. When the Norsemen, the Vikings, reached Iceland about A.D. 870, they found, the Sagas record, monks and priests, 'papar' with their 'bells, books, and croziers', already there.

The Norsemen discovered Iceland when the longship of the Viking chieflain Garda was blown westwards off its course on a journey from Norway to the Faroes. Discovery led to settlement, and settlement to colonization, as year after year the Vikings, making landfall by releasing ravens and other shore-sighting birds, spread their stone farmsteads and churches over the island. On these now regular voyages from Norway, the Norsemen experienced all those hazards which were to bewilder and exhaust and often to destroy the Arctic navigator through the ages; the impenetrable forg, the roving menace of ice, the blustering, freezing squalls and violent storms. On one Norse voyage twelve ships, conveying colonists, their wives and children, their cattle, all their meagre and threadbare possessions, sink out of a fleet of twenty-five. During one of these storms, in the tenth century A.D., a Norseman, Gunbjorn, was swept past Iceland to within sight of the Greenland coast.

"Gunbjorn's discovery led to the first landing on Greenland by a Viking chieftain, Eric the Red. He had been outlawed from locland as the result of a blood-feed and appears to have landed somewhere near the modern Angnugsalik, on the south-east cost, shout A.D. 985. But this cost was (and remained for many centuries) too barren and icebound for settlement, so the Norsemen moved round to their native Norway. Farms of stone and peat multiplied as new colonists arrived from Norway and Iceland, and in a clinate much milder than today, they appear to have flourished. In summer there was deep green grass for the cattle; hares and reindeer and foxes were hunted; and it was not long before the Norsemen began to trade with the 'Skraelling' or Eskimoes, exchanging com and iron from Norway for walrus ivory and the skins of bear and seal.

It is not easy to elicit from the stark and enigmatic language of the Sagas the precise extent of Norse explorations in the Arctic. In their search for new hunting grounds, the Norsemen voyaged, no doubt, far op the west coast of Greenland Green land, moreover, was the base for the great Norse discovery of the New World, for the epte voyages to Wineland and Markland, the voyages of Bjarm Jerjulfsson, of Leff Ericsson (son of Eric the Red who brought Christianity to Greenland) and Thorfinn Karlsfin which carried the high prowed and groteaquely figured shups of the Yiking to Baffin Island, to Nora Scotta and Labrador, and even as far south as the coast of Maryland

In A D 1261 the Norse settlements in Greenland became a crown colony of Norway But already this Arctic prelude was drawing to a close The milder climate which had enabled farming to flourish in Iceland and Greenland in the Viking Age began gradually, and unaccountably, to change The cold returned Ice closed slowly in over land and sea At the same time, Norwegian sea power began to decline in the face of the thrustful competi tion of the growing northern scaports of the Hanseatic League Oppressed by the new harshness of the climate, deprived of the resources of the mother country, the Norse farmers in Green-land in A D 1345 were excused payment of tithes by the Pope Ten years later, alarming (but unwarranted) rumours reached Norway that in their desolation they had forsaken Christianity for the pagan beliefs of the Eskimoes, and missionaries were sent to their rescue But the sight of the sails of a ship off Greenland was now a rare event In 1492, a letter of Pope Alexander VI declared that the Norse settlers in Greenland were eking out a miserable existence on dried fish and a little milk and that no ship had reached them from either Norway or Iceland for eighty years And, indeed, excavations of the Norse cemetery of Herjolfness in South Greenland show windly to what straits the abandoned Norsemen had been reduced Their bodies, mummified by the ice, were found to be emaciated, diseased, and deformed by years of intermarriage Many had obviously been the victums of Eskimo attacks Beneath the ice encasing their rough wooden coffins were traces of happier days in the form of tree roots and plants, relics of the warmer climate which their ancestors, the early colonists, had once enjoyed A few survivors may have lived on until the early sixteenth century, for about A D 1550 there is a record of a ship bound for Iceland, but blown off her course, whose captain landed on one of the small islets or skernes off the Greenland coast which the Viking Ganbjorn had first seen six centuries before. Clambering over the ruins of an old stone farmhouse, he came suddenly upon the body of a Norseman wearing a hood and cloak of coarse wool and sealskin. This man was the last of the Norse settlers of Greenland to be seen by a European.

Iceland and Greenland and the eastern fringes of the Canadian Aretic were not the only Arctic lands to be discovered by the Norsemen. About A.D. 880, soon after the first Norse settlement in Iceland, a Viking named Ochtere, then living in northern Norway, sailed from Helgoland on a voyage of exploration and trade in walrus tusks, round North Cape and eastwards round the Kola Peninsula into the White Sea. The exploits of the Norsemen of Iceland and Greenland were for generations recited annually at Scandinavian 'things' or festivals and were not committed to writing until long after the event. The story of Ochtere's voyage, however, with its details of the tribes he encountered along the north Russian coast, has survived as a contemporary record because on his return he told it personally to King Alfred of England, who inserted it in his translation into Anglo-Saxon of a history of the world which had been written by a Spanish priest, Orosius, in the fifth century A.D. There, it replaces the wholly fabulous description of the Far North which Orosius had compiled. It is the first surviving contemporary record of an Arctic expedition.

What memory, what knowledge of these early Aretic wanderings persisted in later medieval times? To judge by the works of the schoolmen, of the geographers, the cosmographers and the historians, writing in Latin, immersed in the intricacies of dasty argument, the Norse voyages might never have happened. But these men mored in a world of royal courts and palaces, of cattles and manor-houses, a world of books and of learning derived from Greece and Rome. They were remote from the salt smell of the sea and from the talk of seamen, and it was among the seamen, on the cobled quays or in the smok yourns of a port like Bristol, that the legends of the great Viking voyages in the Aretic survived.

But knowledge of these earliest Arctic discoveries was not only a matter of verbal tradition. From the days of Henry III until the fifteenth century, English and Scottish merchants and ship owners were constantly in Norway and kept agents there and contrived to share in the profits of the fisheres off Iceland and Greenland, especially in whaling an increasingly profitable luxury trade since it was the source of biobser of for lighting and provided perfume (ambergris) and whalebone for the ladtes of the ocurt. There in negative evidence, moreover, that the English themselves fished and hunted in Greenland waters until the second quarter of the fifteenth century. In a 1432, for example, in the regin of Henry VI, when the Scandmavan Kingdom exishished by treaty is rights to the Greenland trade, it was stipulated that all English ships should be excluded from these watters Visits of the Brastol fishing fleet in search of cod and herring of Iceland were also an annual event

What geographical discoveries these fishermen made is unrecorded There are, however, two Arctic voyages of the fourteenth century of which some contemporary record has survived One was by a young Franciscan minor firar, Nicholas of Lynn (mentioned in Chaucer's Essay on the Astrolabe), fragments of whose works were preserved by sixteenth century writers From these it appears that about A D 1360 Nicholas, sailing from Norway, reached a sea, far to the north, which froze in winter, a land whose inhabitants were no more than four feet high and where along the coast timbers of ancient wooden ships and the ruins of ancient homesteads could be seen. This strongly suggests that Nicholas of Lynn reached southern Greenland, met the Eskimoes and saw vestiges of the old Viking settlements there On his return, he drew up a scheme for the broad geography of the Arctic The Pole he pictured as glistening black magnetic rock standing in the midst of a whirlpool, the whole surrounded by a circle of mountainous lands divided by numerous channels through which the sea, sucked towards the central whirlpool, rushed so swiftly that no ship could survive. It is by no means a wholly imaginary scheme of the general arrangement of Arctic land and occan, and it is considerably nearer the truth than some of the fantatic theories about the geography of the Arctic basin evolved during the eighteenth and mineteenth centuries

Another Arctic voyage, reputed to have been made in the fourteenth century by two Venetian brothers, Niccolo and Antonio Zeno, was published with a map by their descendants in 1558. This dubious voyage has a unique place in Arctic history, not for its alleged discoveries but for the way in which the Zeno map, a maze of fact and fancy, was to mislead future generations of Arctic explorers. On it, in deference perhaps to a cherished medieval theory that since civilization sprang from one centre or cradle, all lands must be linked together, Greenland is shown swinging round to the east and south, to meet the orthermost coast of Norway. Enclosed within this great bend of land lies leeland and other islands, while far to the west numerous islands are strung about, carrying a variety of fanciful names, It was disastrous that so much of this ingenious piece of cartography should have been incorporated in the maps and jobes of the great Flemish cartographers Mercator and Ortelius in the sixteenth century because these for centuries were accepted as the cartographical basis of Arctic exploration. The course of Arctic exploration from that time might indeed have been very different had it not been for the fibrications in 1538 of the descendants of the brothers Zeno.

In the fifteenth century, a fresh impulse to Arctic exploration appears, involving a new and quite specific objective: the search for a northern route to the Indies, to China, to Japan; those kingdoms, as they were called, of Cathay, news of whose unimagined wealth, brought back by Marco Polo's desert caravan, had dazzled the civilized European world of the thirteenth century. Here, in the vision of these lush and opulent hands, the adventure: saw fortune, and governments the answer to all their economic ills. For many years, however, Cathay was thought by sea, for did not the Scriptures teach that the earth was not a globe as the Greeks believed, but a flat disk, four-square, centred on Jerusiam, an earth surrounded by a continuous and impassable ocean which divided mankind from Paradise? Seen thus, Cathay was burget, and had long since been barred, by the warriors of lahm. By the fifteenth century, all this was changed. The idea of the sphericity of the earth was, by educated people at all events, generally accepted, and in 1409, a development which transformed geographical thought and cosmographical ideas occurred, the translation into Latin of Ptolemy's Geography With its lists of longitude and latitude, this provided cartowith its lists of tongitude and izituide, this provided carto-graphers with a basis for the fixing of positions on the terrestrail globe Rudimentary as awagation was bound to be until the solution of the problem of longitude in the eighteenth century, the Age of Discovery by long sea voyages could now begin With globes in use and charts and maps beginning to take modern shape, voyages of circumanegation round the world (foreseen shape, voyage of intermining anoth robust the vorte (correction) by some as early as the fourteenth century) became generally accepted as being possible and seamen subing under the rival flarg of Fortugal and Spain embarked on a host of great voyages to east, west and south to seek a scaway to the Orient To the south and east, the explorations promoted by Prince Henry the Navigator and those of Bartholomew Diaz on the west coast of Africa led in 1497 to the rounding of the Cape of Good Hope by Vasco da Gama, a fest already accomplished by Arab seamen, as some geographers of the time appear to have known Here was one scaway to Cathay in the west, too, there was hope There the discovery by Columbus of Islands of the so-called West Indies-territories in a region where, it was thought, wealth must necessarily be created by the life giving rays of a perpetual sum-suggested that these were outliers of Cathay and that in this westward direction a way through to Cathay would be found This hope, however, was short lived The Genoese John Cabot, from Bristol, sailed west and north as far as Newfoundland and Labrador but found no way through indeed, from Cabot's voyage and from those of others searching for a western passage to Cathay it soon appeared that not islands but an entire continent barred the way

With this wetward route thus closed, what were the alternatives confronting the three principal nations engaged at the end of the filternth century in planning worgers to Cativary There was the way south down the Atlantic, and thence eastwards round Africa or westwards (of a way could be found) round the southern extremity of America Or, as could be seen from the globe, here was the possibility of a sourchern ice inflected route, a route across the summit of the world, but a poor alternative to the temperate and torrid waters of the South Atlantic These waters lay however within the domain of Spain and Portugal whose relative roles in their exploration were defined by the Treaty of Tordesillas in 1494; in time, but only just in time, to prevent a rivalry which seemed likely to lead to a catastrophic split in Christendom. A line of demarcation running south roughly along the meridian through the centre of the north Atlantic Ocean was agreed, the right to exploration and discovery on the west being granted to Spain, and on the east to Portugal. For these great seafaring countries, this division was not unsatisfactory. But for the merchants and seamen of other countries, excluded by this joint monopoly, only the northern routes to Cathay, through the ice and fogs and blizzards of the Arctic, remained. 'Out of Spain, 'an Englishman, Robert Thome, complained in 1541, 'they sail all the Indies and seas occidentals, and from Portugal they sail all the Indies and the seas orientals, so that between the way of the Orient and the way of the Occident they have encompassed it was a dismal prospect. For was it not generally acknowledged that the frozen lands of the north, far from the rays of the equinoctial sun which nourished the precious metals of the torrid zone, could not in themselves offer hopes of wealth? But a way through them must be found, a North-East or a North-West Passage to Cathay. It was thus that the search for a northern passage became the dominant motive behind the English, Dutch and French explorations of the Arctic for two centuries or more.

The search for a route to Cathay from the South Atlantic by Portugal and Spain led also to another kind of polar exploration, towards the search for an Antarctic Continent, conceived not as the glacitact, virtually lifeless land which it has since been found to be, but as a rich and fertile continent stretching northwards into the temperate zone. The idea of a great southern continent, lying at the opposite extreme of a spherical earth, was of ancient origin. Aristotle had argued that just as a habitable zone existed below the Arctic Pole, so the symmetry and balance implicit in the concept of the earth as a perfect sphere required equally a habitable zone in the south. In this global scheme northern and southern habitable zones were pictured as divided by an impenetrable belt of fire, the belt of the torrid equatorial regions it was acheme which found much frown in Roman times, and Cacero and Pomponus Mela both allode to a southern habitable zone But to the lathers of the Church, for whom the earth was a fit dist, it was generally asathema, and it & Augustine in particular objected to the notion just men could thus 'plant their footstep' opposite to our feet'. Nevertheless, throughout the Middle Ages, there were men who, whatever the Church might say, adhered to the Greek waw of the sphericarty of the earth, and one of them in the fourteenth century, Sir Joha Mandeville, author of the Torreli, echoed the classical argument for an Antarctic Continent 'For ye wit well,' he declared, 'that they that be toward the Antarctic, they be straight, feet agoinst foet, of them that dwell under the Transmontaic (the immovable north, star) For all parts of the sea and lands have their opposites, habitable and trespasable '

That men could reach this southern or Antarctic habitable torner semed at fart inconcervable because of the intermediate torner regions. But the crossing of the Equator by Lopo Gonquiers in the third quarter of the fifteenth country brought the Antarctic within the realms of human exploration. Scamen and merchants, geographers and governments began then to watch keenly for the first light of a rich and fertile southern continent, and until 1438 when the temperate costs of south west Africa were navogated by Bartholomew Diaz, more than once the ulsea arose that these might prove to be the northward projection of that great southern continent which the logic of goography demanded

Beltef in the existence of a continent abjouring Africa vanished finally when Visco ds Gama rounded the Cape in 1497 But the southern coasts of America had yet to be explored When Ferduand Magellan, on his first voyage of circum marginon, say in 1522 beyond the strat which bears has name the land he called 'Land of Fires', Tierra del Fuego, he con cluded, irom the sound and movement of the sca, that this new land was an archipelago. But the geographers, as so often in the heatory of exploration, knew better. As the years went by, the legend of a temperate Antarche continent grew and on maps such as that of Orontus of 1531 Tierra del Fuego appears as the northern up of a continent, 'Taro anurchi recenter intents and



nondum plene cognita', separated only by the narrow Strait of Magellan from the mainland of South America

Until the eighteenth century, the main motive of voyages in the Arctic was penetration rather than discovery, the search for a northern passing through the Arctic to the Pacific and the oriental kingdoms of Cathay. In the Antarctic, discovery was the am the discovery of a continent which, geographers imagined, would prove no less rich, no less seductive than those kingdoms of the East which English and Dutch aimed to reach in the sixteenth and sewnites the way of the Arctic seas

## A Northern Passage to Cathay

RICHARD CHANCELLOR, a great Arctic voyager of the Elizabethan Age, once explained (to the young schoolmaster commissioned to write the story of his adventures) the reasons which first impelled his countrymen to search for a sea route to cathar.

'At that time,' he said, 'our merchants perceived the commodities and wares of England to be in small request with the countries and people about us, and near unto us, and that those merchandises which strangers in the time and memory of our ancestors did carnestly seek and desire were now neglected, and the price thereof abated, although by us carried to their own ports, and all foreign merchandises in great account and their prices wonderfully raised, certain grave citizens of London and men of great wisdom and careful for the good of their country began to think with themselves how this mischief might be remedied. Neither was a remedy (as it then appeared) wanting to their desires. For seeing that the wealth of the Spaniards and Portuguese by the discovery and search of new trades and countries was marvellously increased, supposing the same to be a course and mean for them also to obtain the like, they thereupon resolved upon a new and strange navigation.'

In such circumstances, the result of a decline in England's traditional trade with France and with the Netherlands, the first English voyages into the Arctic of the sixteenth century, no less than those to the New World, can be seen as part of the general expansion of overses enterprise which wrought such changes, social, economic, and intellectual, in the pattern of life in Elizabethan England.

Like the voyages to discover and colonize the New World, the Arctic voyages were no haphzard, impetuous adventures. On the contrary, they were most carefully planned. The men behind them included not only the Court, the city companies, the rich

merchants who were the principal investors of funds, but a highly efficient group of technical advisers, specialists in economics, in navigation and in the geography of distant lands, many of whom navigation and in the geography of distant lands, many of whom were also shrewd men of business. Outstanding amongst these planers was Richard Hakluyt, author of the great collection, *The Principall Navigations, Vouges, and Discoveries of the English Nation,* whose publication the year after the Armads filled the minds of Englishmen, young and old, with thoughts of adventure, and of profit, overseas: A perceptive geographer, Hakluyt was admirably qualified to sift from a great mass of picturesque but often fictutions travellers' tales the geographical and economic faces essential to his plans for exploration. His cousin, Richard Hakluyt anotherplanner, was lawger and an expert in dyes and of xing. Taking's motify muter, was any call and the principal export and in the woolling pools which were England s principal export No less important, in planning the new Arctic voyages, was the training of seamen in the theory and practice of navigation, in which England lagged so far behind her rivals, Portugal and Span New text books had to be written, new instruments devised And professional pilots had to be instructed in the latest navigational developments in this field, the leading adviser was a brilliant young Welshman John Dee, a mathematician from Cambridge who had studied at Louvain with the great European Sources and the state of the second state of t of his day

The first question confronting the planners, as they studied their globes (now in general use), was in which direction should the first expectitions be sent Should they search for a North East or a North West Passage to Catlay? Until the year 1538 when the famous map of the Venetian brothers. Niccolo and Antonio Zeno was published, the north cast appeared more hopeful As far as the North Cape of Norway, the seas were familiar to English ships and had been found to be ice free, beyond North Cape, Russian fisherment were known frequently to sail at least as far as the River OD The north cast router, moreover, offered some compensation if an expedition failed to reach Pacific waters Along 11, along the shores of the Old Workl, 'eveil people', prospective customers, were known to live, while beyond the Ob—if the cartographers who showed Tartary and Scythia joined to north-east Asia were correct—there were possibilities of an even more lucrative trade with the outlying kingdoms of the East.

To the west, by contrast, the outlook was less hopeful. John Gabot from Bristol, probing northwards in 1497 as far as Labrador, found no trace of any passage or strait to Cathay. Nor could the two Basque brothers Miguel and Gaspar Cortereal in A.D. 1500 find any limit to the northward-stretching coast of the American continent. If the discovery by the Breton seaman Jacques Cartier of the mouth of the St Lawrence had been known when he returned from his voyage in 1536, those who argued in frour of a western route might have been more encouraged, for thirty years later when Cartier's Canadian discoveries first appeared upon the maps, it looked as if here at last was the opening of a North-West Passage. However, as so often, publication lagged far behind geographical discovery. The north-east, therefore, was the direction chosen.

The next problem for the planners was finance. They had a host of powerful friends at Court and in the City, and with their help The Mysterie and Companie of the Marchants Adventurers for the Discoverie of Regions, Dominions, Islands, and Places unknowen' was established on 12th December 1551, its first Governor being Sebastian Cabot, son of the John Cabot who had explored the coast of Labrador at the end of the previous century. This Company of Merchant Adventurers became the focus and hub of all the earliest activities directed towards the search for a North-East Passage and one of the Company's first acts was to appoint the leader of their first expedition, and to recruit as his second-in-command a professional Chief Pilot. As Captain-General they chose, according to custom, a distinguished soldier, a courtier, Sir Hugh Willoughby, who knew nothing of navigation. His second-in-command was a professional seaman, Richard Chancellor, who was known throughout England as 'the odde (i.e. outstanding) man of his time for matters touching the sea'.

Willoughby, who was to sail in the 'Admiral of the Fleet', the Bona Esperanza of 120 tons, had William Gefferson as master of his ship, while Chancellor in the Edward Bonorenture carried as master a man destined to become famous as an Arctic pilot, Stephen Borough The third ship of the Arctic squadron, the Bona Confidentia, had a Dutch master, Cornelius Durforth

Bona Confidento, had a Datch master, Cornelius Durforth These men, with the merchants who hoped to trade along the route and an Cathay, and those generally known as 'the ignorant and unruly marmers', comprised the expedition All Willoughby ships, armed merchant ships, shallow enough in draught to be able to navgate the great rivers which some maps showed flowing into the Arctic from central Asia, were specially strengthened, a sheathing of lead being devised to protect their bottoms agains the attacks of a particularly virulent and purcing worm which was said to infect the torrid waters off Cathay. It was a presentione characteristic of the arbitet continue Cathay It was a precaution characteristic of the robust optimism Lanay it was a precaution characteristic of the roots optimised with which these Elizabethan scenees, in sciling sinse of a hundred tons or less, set out on a voyage through the Arctit to the Far East, along a route heavily encombered with roce, obscured continuity by fog and must, a seaway which was not completely margited until late in the nuncterest occurry Among the documents of permanent importance to the polar

historian are the instructions given to the leaders of polar mouth are the instructions given to the feature of plant expeditions. The instructions drawn up by the Governor of the Company for the use of Sir Hegh Willoughby (and preserved by Ruchard Hålduy) are worth recording Inrefly because they give not only a Wild picture of what was expected of a sixteenth century expedition voyange through Arctue and other unknown regions, but throw light on some of the problems, internal as well. as external, confronting the leader of an Arctic expedition at this time One of the great problems, evidently, was the preservation of discipline among the crew, and there are strict vation of discipline among the crew, and there are strict injunctions that 'no bapphenimumg of God, or destable swearing, be used in any ship, nor communication of ribility, fally tales, or ungody talk to be suffered in the company of any ship, neither ducing, carding, tabling nor other deviking gime to be frequented, whereby ensueth not only powerty to the players, but also strife, variance, brawling, fighting and oftentimes muriter is in on wonder that not only in the oathy, juramente, taken by each man to the Captian General, but throughout the Instructions, which were to be read about each week, 'unity, love, conformit's and holdmere's are constant anomed. conformity, and obedience' are constantly enjoined

More important, because so revealing of the shrewd and practical attitude of those who drafted them, are the clauses lying down rules of behaviour for the expedition on its arrival in a new land. The use of force was forbidden except in the last resort; women above all were to be respected; courtery combland with caution were to be the watchwords of the landing parties; and tolerance, especially in religious matters. 'If the people', Willoughby is told, 'shall appear gathering of stones, gold, metal or other like on the sand, your pinnaces may draw nigh, marking what things they gather, using and playing upon the drum or such other instruments as may allure them to harkening, to fantaxy, or desire to see and hear your instruments and voices. But keep you out of danger, and show to them no sign of rigour or hostility'. 'Only so could these Arctic navigators of the sixtent century expect to obtain what the Company wanted, a full account of the new peoples and countries, detailed information about natural resources, and opportunities to develop trade.

In May 1553, through the warm air of an English summer day, the three ships of Willoughby's Arctic expedition moved slowly down river from Deptford. The Court was in residence at Greenwich at the time, and as the ships of the Arctic expedition came in sight, there was great excitement. 'The courtiers', an onlooker relates, 'came running out, and the common people flocked together, standing very thick upon the shore. The Privy Council, they looked out at the windows of the Court, and the rest ran up to the tops of the towers.' The ships, in response to this ovation, fired a salvo in salute 'in so much that the tops of the hills sounded therewith, and the waters gave an echo', and the sailors 'shouted in such sort that the sky rang again with the noise thereof. One stands on the poop of the ship, and by gesture bids farewell to his friends . . . another walks upon the hatches, another climbs the shrouds, another stands upon the mainyard, and another in the top of the ship." After 'divers gentlemen and gentlewomen' had come aboard to drink the health of ships and crews (to whom they gave 'right liberal awards'), Sir Hugh Willoughby's Arctic fleet made for the open sea.

For Willoughby the expedition ended in tragedy, a personal tragedy of the kind which was to darken many another expedition foundation of the Muscovy Company for the development of the highly lucrative Muscovy and Persian trade by way of the northern Dvina route. And it led three years later to the foundation of the famous port of Archangel. In the realm of Arctic exploration, however, Chancellor's voyage added little to geographical knowledge. Indeed, it carried the search for a North-Last Passage no further than the Viking Ochtere had done in the days of Alired the Great.

The search for a North-East Pasage was now taken over by the newly-established Muscovy Company, and Stephen Borough, former master of the Edward Bonarentue (Chancellor having been drowned at sea), was invited to follow up the explorations which Willoughby and Chancellor had begun. Like Chancellor, under whom he had served, Borough was a professional seaman, an expert at his trade, trained in the latest practice of navigation by John Dee. In 1556, after a banquet with music and dancing given at the 'Sign of the Christopher' at Gravesend by the aged Sebastian Cabot, Borough suiled in the Searchitelf, a firsy ahip, smaller even than Chancellor's Edward Bonerentue. He had better fortune than Chancellor, and reached as far east as the Kar Sea. But at its entrance, south of Novay Zenlya, his way was blocked by a mass of ice churned up by the winds, an impenetrable barrier which was to be the despair of many an expedition during the sixteenth and seventeenth centuries.

For tventy years, the new and immensely profitable trade with Russia wholly preoccupied the merchants of the City of London. Nevertheless there were many, among the nobility, among the landed gentry and in the learned world, who were not so concerned with immediate gain, men for whom the study of geography, of cartography, and of navigation had become a fastonable intellectual pursuit, and who were prepared to support a further search. In Elizabeth's reign, however, the direction of the search was changed. The quest was now for a North-West Passge. There were reasons for this change of policy. On the one hand, the publication in 1558 of the Zeno map showed Greenland swinging eastwards, thus barring the castern route; on the other, was the incorporation in the Flemish geographer Ortellus' map of 1564 of Jacques Carter's discorp of the mouth of St Lawrence River. The year 1563 saw a great foundation of the Muscovy Company for the development of the highly lucrative Muscovy and Persian trade by way of the northern Dvina route, And it led three years later to the foundation of the famous port of Archangel. In the realm of Arctic exploration, however, Chancellor's voyage added little to geographical knowledge. Indeed, it carried the search for a North-East Passage no further than the Viking Ochtere had done in the days of Alfred the Great.

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For twenty years thereafter Arctic exploration was directed westwards And in the spring of 1576, Martin Frobisher, a bold and praetised seaman who was to win fame during the Armada, a man who was the quintessence of the Elizabethan adventuring spirit, sailed with two pinnaces, each of only twenty tons, on another Arctic enterprise Frobisher's first landfall was the southern tip of Greenland, but Greenland being on his maps far away to the east, he called his new land West Friezeland, identifying it with one of the many islands dotting the Western Arctic on the Zeno map From Greenland, Frobisher sailed westwards until he reached a 'Strait' now known as Frobisher Bay, at the south east end of Baffin Island These are the 'straits' or 'streights' to which Richard Hakluyt refers in his account of Frobisher's voyage 'And that land upon his right hand as he sailed Westward he judged to be the continent of Asia, and there to be divided from the firme of America, which lieth upon the left hand over against the same This place he named after his name, Frobishers streights '

As Frobusher and his men approached the coast of this new Arctic land, they saw an astonubing sight For, darting out from the zee bound shore, eame a fleet of skin covered cances, the 'kayaks' of the Eskimoes, the first they had ever seen. The appearance of these small men especially excited them With their pronounced Astatic, Mongoloud features, surely these, they thought, must be men from Marco Polo s Cathay As proof that here was Cathay at last, or at least an outlier of it, an Erkino and his kayak were hauled aboard and were brought back in trumph to London

Martin Frobisher's arrival in London with his 'Pyknean' or 'Strange Man of Cathay caused a considerable sensation 'And so', said a contemporary, 'they came to London with their ship Gabriel the sixth day of October; and they were joyfully received with the great Admiration of the people, bringing with them their strange man and his Bote, which was such a wonder unto the whole city, and to the rest of the Realm that heard of it, as seemed never to have happened the like great matter to any men's knowledge....' The Eskimo (who died of a cold scon after he landed) was not the only, nor indeed the most sensational, prize brought back by Frobisher's must from the Arctic. Some brought back Arctic flowers, and some green grass. One brought back Arctic flowers, and some green grass. One brought back Arctic flowers, and some green grass. One of Discourse of a Discovery for a Nor Passage to Cathola, 'It glistered with a bright marquesset of golde'.

with a origin marquest of gener. Martin Frobiher was convinced that, in his westward-heading Strait', be had found the entrance to a North-West Passage, and Strait', be had found the entrance to a North-West Passage, and his charts and the Mongoloid appearance of the Eskimo convinced even his instructor in navigation, the learned and discriminating glohn Dee. But when rumours apread that the black stones of Bafin Island had been identified as gold, all thought of the North-Bafin Island had been identified as gold, all thought of the North-Mest Passage was forgotten. A Gathay Company was formed, The Queen bought shares. Miners from the in mines in Cornwall -the mines which Pythess had sought in Aristole's timewere hastily recruited, and Frobiher and his officers, after kissing the Queen's hand at Lord Wawitk's house in Estex, sailed in 1577 on a second expedition to the Arctic.

States in 1577 on a second experiment to interval in Green-This time, on bis outward voyage, Fröbisher landed in Greenland, the West Friezeland of the Zeno map, to which he gave the bornely name of West England, and there he established ifrendly relations with the Eskimo inhabitants, trading 'bells, looking' glasses and divers of our country roys' for their dogs. He noted, ora, evidence of contact with 'drill people', relics of trade or iron; evidence of contact with 'drill people', relics of trade or or proof of more recent contact with whalers or fishermen whose voyages had never been recorded. Frobisher took possession of this new land of West England 'to the use of our soverign lafy the Queen's Majesty'. He was optimistic about the prospects for further exploration; it was a country, he said, which promised 'good hope of great commodity and riches, if it may be well discovered' He then sailed for Baffin Island and returned with two hundred tons of the black ore

Frobisher's third and last voyage to Baffin Island was in 1578, the year in which Drake, in his slup the Golden Hind, was the first to round Cape Horn This time it was a colonizing and not an exploring expedition, the first of its kind in the Canadian Arctic, and the fifteen ships which sailed from the Port of London carried miners, settlers, massive planks and timbers, and a large prefabricated wooden house to establish a mining settlement in Frohisher Bay But no sooner had they entered the so called 'Strait' than disaster overwhelmed the fleet A storm arose, sweeping down upon the ships a mass of churning, grind ing, ice floes which sank most of the supply ships and ended the whole enterprise When the remnants of the fleet, scattered by Atlantie gales, arrived at a number of different English ports, they were confronted by another and quite unexpected catas trophe The famous ore, identified by an unscrupulous Italian assayer as gold, proved to be worthless iron pyrites The Cathay Company was bankrupt, Martin Frobisher was disgraced, and his discoveries, his claims to have found a North West Passage and to have reached the very frontiers of Cathay, were utterly discre dited 'The passage to Cathay', commented sourly a contempo-rary, 'is left unto us as uncertain as at the beginning, though hereupon hath followed great charges to the Company ' Only from Russia was there any comfort for the disgraded explorer In January 1579, the Russians protested violently to the English Government Frobisher's Eskimo, the 'Strange Man of Cathay', they declared, was none other than a Russian Asiatic subject, kidnapped by a pack of English adventurers

The bankruptcy of the Cathay Company, in which the Court and the City of London were hearing involved, put an end for some years to expeditions to the western Arctic The planners now turned eastwards again, and in 1580 two sturdy and experienced English mariners, Arthur Pet and Charles Jackman, sailed in the pinnaces George and Williams to try for a North East Passoge but just as Stephen Borough had been held up a quarter of a century earlier, so their way was barred by the same impenetrable wall of pack ice which loomed up out of the fog at the entrance of the Kara Sa it was the last English attempt to seek a North-East Passage during the sixteenth century.

The Frobisher fasco, however, had not robbed the north-west of all its protagonists, and there were still among geographers and courtiers men who felt, like Frobisher, that only in the northwest lay the solution to the problem of Cathay. In 1584 they obtained from the Queen a charter for a new North-West Company and selected as the leader and chief pilot of the new enterprise a remarkable man, John Davis. Davis, a splendid seaman, was a quiet and modest man with no gallant flourish to his name like Frobisher. But he was by far the most accomplished navigation at sea which the Age of Discovery had compelled the English to invent. Moreover, in providing the first detailed descriptions of Eskimo life in Greenland, he shows a power of acute and meticulous observation, a capacity for vivid description, which in polar literature are hard to match.

Frobisher, it will be recalled, had been optimistic about the prospects for exploration in Greenland (West Friezeland, or "West England', as he called it), and Davis, on his first voyage in the Moonshine and the Sunshine in 1585, determined on a systematic exploration of the coasts. He landed first in southwest Greenland, near the modern Godthaab in Gilbert Sound, then sailed across Davis Strait to Cumberland Sound in Baffin Island, north of Frobisher's 'Strait', or bay. The following year, 1586, Davis divided up his four ships for simultaneous voyages along the eastern and western coasts, but the south-east coast, against which the pack ice is swept and massed by southwardflowing cold currents from the Arctic Sea, presented a formidable and frightening sight. 'The loathsome view of the shore and the irksome view of the ice', Davis wrote, 'was such as to breed strange conceits among us, so that we supposed the place to be wast and voyd of any sensible or vegitable creatures whereupon I called the same Desolation. . . . ' The east coast of Greenland, indeed, as many later expeditions were to find, proved both desolate and unapproachable and the two ships working there were forced by eastward-branching currents over towards the coasts of Iceland. Davis, meanwhile, after failing to land on the

southernmost promontory of Greenland (called, in happy com memoration of escape from shipwreck, Cape Farewell, now Kap Fared), made for his old anchorage on the south west coast, in GilbertSound The Eskimoes, remembering the musicand dancing with which Dawis sulars had delighted them the previous year, welcomed the Englishmen enhuissitically. They were, Davis found, a gay and simple but also a mischlerout and 'thersish' pople, who cut the ships' cables and stole the Moomhler's boat and pilfered, like jackdaws, anything in sight Davis made some curious discoveries in Greenland Like Frobisher, he saw many relies of trade with Europe, iron objects which the Eskimose orgavie of a Viding colonary, or of some Eskimo family converted by the Norsement to Christmant

<sup>7</sup> Davs took careful note of all he saw an south vestern Green land, of the trees, fit, sprace, and jumper, burch and willow, of the great avarms of seals wallowing in the sea or basking sleepily in the sunthine on the islands off the coast. He explored the deeply cut fords along which the Viking colonists had built their farms, flords so numerous, penetrating so far to the east, that he hought the land must be 'a great number of islands standing together' Inland, along this western coast in summer, he found 'a plan champaign country, with earth and greas, such as our moory and waste ground of England are but found onchang, nor saw anything, save onely gropes, ravens, and small birds, as larkes and lannets

John Davis, on his return, wa optimutic about prospects for the discovery of a North West Pasage On 3rd October 1585 he wrote to Mr Secretary Walsingham 'Right honorable most datyfully craving particular for this my rashe boldness, i am hereby, according to my duty, to signify funt oy of honor that the north west passage is a matter nothing doubtfull, but at any typne almost to be passed, the sea navigable, yoy of Jyze, the ayre tollerable, and the waters very depc 'It was therefore with high hopes that in 1586 and 1587 he made two further yoyges westwards from Greenland, ventume northwards on one occasion into the unexplored waters of Balin Bay to which a great English explored of the early seventementh century was to give his name
Twice he crossed over towards Baffin Island but was swept southward by drifting ice beyond Frobisber Bay. On the second of these voyages, drifting south, he found his small ships caught up and spinning in 'a mighty overfall', probably the turbulent waters at the entrance to Hudson Strait.

waters at the entrance to Findent Matter In 1587 John Davis returned to England, having contributed to geographical knowledge of the Aretic more than any of his predecessors. But for the English, Aretic exploration was now at an end, In July of the following year, the high castles of the Armada of Philip of Spain were sighted from the English coast and Elizabeth's seamen, Martin Frobisher, John Davis, indeed all those tested and trained in great voyages of discovery, were needed for more vital and immediate tasks than Aretic exploration or a search for an Arctic passage to Cathay';

increased for more vital and immediate tasks than Article explosite tion or a search for an Arctic passage to Cathay. John Davis, in *The Seaman's Serrets*, admirably summed up sixteenth-century views about the polar regions, bringing all his own personal experiences to bear in his remarks about the Arctic, 'The frozen zones', he wrote, 'are contained within the polar circle, the Antarctick frozen zone within the Antarctick polar circle which are also reported not to be habitable by reason of the great extremity of colde supposed to be in those parts because of the Sunnes far distance from those zones, but in these our days we find by experience that the number dones, but in these our days we find by experience that the number decographers had not the due consideration of the nature of these zones, for three times I have been within the Artick frozen zone, where I found the apre very temperate, yea and many times in calme wether marvellow hot; I have felt the Sunne beame of as forcible with the force of the section of the section of the section of the section is the section of the section of the section of the section of the section is the section of the section of the section of the section of the section is the section of the section of the section of the section of the section is the section of action in the frozen zone in calme neere unto the shore, as I have at any time found within the burning zone; this zone is also inhabited with people of good stature, shape and tractable conditions, with whom I have converced and not found them rudly barbarous, as I have found the Caniballs which are in the straights of Magilane and Southerne parts of America.' Davis's observations, the observations of an active and not a sedentary geographer, serve as an encouraging if optimistic preface to the Arctic explorations of the seventeenth century.

## Dutch and English Rivalry in the Arctic

Towards the end of the sexteenth century, the Dutch, bold and adventurous seamen, resourceful merchants so opulent that the wealth of their great trading citus, Antwerp and Amsterdam, had made the Netherlands the tressury of their Spansh overloads, emerged as rival to the English in the search for an Arctur oute to Cathay Since 1855 when the English Muscovy Company was established, the merchants of the Netherlands had looked with growing envy at the riches flowing unto the coffers of the City of London from Russia and lands further east But to the Dutch as to the English he kingdoms of Cathay were closed, barred by the Spansh-Portuguese monopoly of the South Atlanue routes So they too began to look to the north, for a north east sea or land passage to Asia, which might lise enable them to share in the intermediate Russian trade

In 1565, on the eve of the great revolt which was to liberate the Netherlands from Spam and lead, under William of Nassau, Prince of Orange, to the new of the Dutch Republic, a Dutch White Sea Trading Company was formed under an enterprising manager, Oliver Birunel Ennen Had already established a Dutch trading post on the Kola Pennsula (Kol'skay Poluostrov), and with Russan fishermen, whose contributions to Arctic exploration were probably far more extensive than has ever been recorded, had not only reached the islands of Novaya Zenlya which enfold the Kara Sea but after a remarkable eastward journey overland had travelled as far easts as the River Ob In an attempt on the North East Passage, however, Brunel in 1584 did no better than the Englobancen, Pet and Jackman, being forced back, like them, by the sce barrier at the entrance to the Kara Sea Nevertheless, he had hagh hopes and raised support for

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another attempt, sponsored this time by the rich merchants of Amsterdam, in commerce and sea-power the leading city of a Holland now supreme among the seven small republics federated by the Union of Utrecht of 1579.

The outstanding figure in this first Dutch Arctic enterprise was, however, not Brunel bat Willem Barents, the chief pilot on three successive voyages; voyages (according to Gerrit de Veer's account, published in England in 1609) 'so strange and wonderful that the like hath never been heard of before; done and performed in three years, one after another by ships of Holland and Zeeland ... towards the kingdoms of Cathaia and China. ...

Barents sailed with four ships in 1594, carrying with him (through the good offices of Richard Hakluyt, the English geographer) a Dutch translation of Pet and Jackman's log with its terrifying description of the great ice barrier stretching across the entrance to the Kara Sea. Because of this, no doubt, he made first for Novaya Zemlya, hoping to find an alternative way into the Kara Sea by rounding its northern point. All the way up the western coast he located the most prominent features of the land with remarkable accuracy. But on reaching the northern limit, he was held up by the pack which lay for miles ahead 'as if it had been a plain field of ice'. Barents then returned by the same route, noting on his way the channel, Matochkin Shar, which divides Novaya Zemlya in two, to find to his astonishment that his other ships had not only penetrated the dreaded Kara Strait but had actually entered and found completely free from ice the Kara Sea. This was a great stride forward in the navigation of a North-East Passage-it was not bettered until the nineteenth century-and indeed the Dutch if they had pressed forward might well, in the favourable ice conditions then existing, have reached the Bering Strait. Instead, they stopped. Greatly elated by their breaching of the notorious Kara Strait and further encouraged by a meeting with Russian fishermen who claimed that they made easy and frequent voyages along the coast as far as the mouth of the Yenesey River, they decided to return at once to Amsterdam with the great news that a way through to the East had been found.

The Dutch Government itself launched the next expedition which sailed in 1595 with a fleet of seven ships. But it was a bad ice year, and rather than risk their ships in a fresh attempt on the Kara Strait, the Dutch fleet returned to Amsterdam The States of the United Provinces were too discouraged to venture again, but they let it be known that if any town corporations or merchants were prepared to put up funds for another expedition, the Government would offer a handsome reward to the finders of a passage It was a sufficient inducement to the merchants of Amsterdam, and in 1596 a third Dutch expedition sailed, this time with only two ships The leader was Jacob van Heemskerck, a landsman, a man, like Willoughby, of noble birth With him went Barents, in Richard Chancellor's role, as chief pilot of the fleet

There was no reason this time why the Dutch should not have anticipated by nearly three hundred years the navigation of the North East Passage But the pilots of the fleet disagreed Some, like Barents, emboldened by earlier success, urged a fresh attempt across the Kara Sea But others were still fearful of ice risks in the Kara Strait and in the end instead of making for the Barents Sea they veered away to the north, aiming to reach Novaya Zemlya by a more northerly route than the previous expeditions There was, however, some reward for this unduly cautious decision These were seas never before explored and if they contributed nothing to the problem of a North East Passage they yielded important discoveries Early in June 1596 the Dutch saw the first ice floes in these new waters floating, in the words of Gernt de Veer, like white swans on the surface of the sea, a sea so green that they thought they must be nearing Greenland On 9th June Bear Island was discovered, a small snow covered island so called from the Dutchmen's battle with a great white bear which they slaughtered with muskets, halberds and hatchets Ten days later, still sailing northwards through the ice, they came upon the first of a group of islands pinnacled with ice which they called Spitsbergen, and coasting along the western ice-bound shores to beyond 80° of north latitude, they reached the most northerly point yet reached by man These were desolate lands But, in the seas around them, seals, walrus and whales abounded, maritime wealth which soon was to provoke fierce rivalry, amounting even to open warfare, between English and Dutch whalers and sealers, each nation, and others too, Arctic pirates like the Basques, determined to roonopolize these Arctic riches.

As the spitsbergen coast, Heemskerck and Barents (who had Off the Spitsbergen coast, Heemskerck and Barents (who had always favoured an attack on the Kara Strait) decided to make for the Strait by way of the north and west of Novaya Zemlya and the Strait by may of the north and west of Novaya Zemlya uning, winding through narrow leads in the ice were followed by days of gales which churned up the pack, threatning to crush the Mara Novaya Zerolya, the wind died down, but the ice continued to mount against the ship, its iron grip tightening inch by inch, pressing the hull upwards, until suddenly 'the ship burst out of the ice with such a noise and so great a crack, that they verily thought they were all cast away, knowing not how to save themselves'. It way of safety and not of the Kara Strait that they were thinking now. The coast being within reach, an education a shandoned ship and just managed to reach an indifferent triffogs.

The first wintering by Europeans in the Arctic is described in vivid detail by Gerrit de Veer, the chronicler of these Dutch expeditions. Their house, built out of driftwood and timbers from the forecastle of the ship, was surmounted by a high and tapering chimney. It was elaborately furnished. There were wooden sleeping bunks for the men, and, on the advice of the surgeon-barber, a Turkish bath made out of a wine barrel. From the ceiling hung a large lamp, lit with the fat of the 'cruell beares' which prowled around the house during the winter, and by its light the Dutchmen could sit around the central fire, reading such books as The Chronicle of Holland, Zeeland and Friezeland, by Albert Hendricus, or The history or description of the Great Empire of China, to search for which by way of the Arctic they had left their comfortable, gabled houses along the canals of Amsterdam. When the bear-fat ran out and they could no longer read, when the smoke from the fire became too suffocating, they lay in their bunks with hot stones at their feet listening to the thudding of the foxes across the snow-covered roof and to the cracking of ice-floes out at sea.

As the winter wore on, the cold became intense; the Dutch clock stopped, the wine froze, the sheets became stiff as boards. As they sat close around the fire, Gerrit de Veer wrote 'We froze behind our backs, and were all white as the countrymen used to be as they come into the gates of the town in Holland

with their sledges, after travelling all night ' By the New Year, scurvy had set in and one man had already ded But there was still no pale gleam from the Arctic sun to presage the coming of spring, no lessening of the ice which was piled high round the ship as if there had been whole towns made of ice, with towers and bulwarks round them' Barents all along had been convinced that their only hope lay in a boat journey to the nearest mainland, the Kola Peninsula, sixteen hundred miles away, and in mid June they determined to take this risk Loading the ship's boats with all the cargo they could hold, including the cloth, the linen and rich velvets destined for Cathy, the Duckmen then set out, rowing, sulling through heavy seas dragging the overhelen boats from one water channel to another over hummocky and preceptious see until they had completed a remarkable journey to the Kola Peninsula. But they arrived without Willem Birents who was not only the pilot but the dominant personality in these great Dutch voyages of the sixteenth century. He had died of cold and exposure while still within sight of Ice Haven, the scene of this first Arctic wintering

Nearly three hundred years later, there was a curious sequel to the Barents expedition in the eighteen seventles, some Norwegian scalers, rounding Novaya Zemlya, put into Ice Haven and there, still standing they found the balks and timbers of Willem Barents' winter house Its contents had been scattered far and wide by generations of marauding bears, but digging amidst the rocks and melting snow they found copper pans, swords, gun barrels flutes and drumsticks, and the remains of the Dutch chiming clock Among the charts and books still recognizable was a copy of the Dutch translation of Pet and Jackman's log which Barents had obtained from Richard Hakluyt, and among the other discoveries which bring to life this sixteenth century Arctic expedition was an old sea chest In this, frozen together in the ice, were prints and copper engravings depicting in elaborate Renaissance style classical scenes such as Pallas, Juno, and Venus in the presence of Paris, and biblical events such as the meeting of Esau with Jacob, all intended for the edification of the people of Cathay.

or Gituy. These Dutch expeditions which had achieved not only access These Dutch expeditions which had achieved not only access to the Kara Sea but the discovery of Bear Island and Spithbergen and a reconnaissance of the unknown western coast of Novaya Zemlya came to an end with the return of the Barents expedition. The reason lies in the course of Dutch history. The year 1957 when Barents and his men escaped from their winter quarters in Novaya Zemlya marked a great event, the liberation of Holland from the Spinish Army by the son of William of Orange, Maurice of Nassau. The Dutch in their war of freedom from Spanish rule had already defied Spain in the East. A Dutch fleet had visited China and Siam. Dutch factories had been established in the Spice islands of Cathay. Now, in open defance of the Spinish monopoly, the liberated Dutch established their own East India Company. They were, in consequence, no longer much concerned with an Arctic route to Cathay, and it was left to the English to resume the search for a northern passage in the persons of two great Arctic navigators and discovers, Henry Hudson and William Böfin.

rudson and Wittiam Datum. The discoveries of Hudson and Baffin in the western Arctic exceeded all those of previous expeditions and laid the first foundations of Canada's Arctic territories. Hudson, a profesfoundations of Canada's Arctic territories. Hudson, a profestional seama, had already gained a high reputation with the Dutch as a navigator and pilot in Arctic waters and had, as an employee of the English Muscovy Company, made an historie voyage in 1607, the first directed towards the North Pole. On this, in the waters west of Spitsbergen, he reached a latitude of 80° 23 N., a latitude not exceeded by any ship until the voyage of Captain Constantine Phipps in 1773. Hudson, homeward bound from this voyage, rediscovered Spitsbergen, calling it Newland (though he carried copies of Barents's charts), and southwest of Barents's Bear Island, added another territory to the Arctic map, a small Island which he called 'Hudson's Tutches'. This was soon to be rediscovered by a Dutchman, Jan May, and amed Jan Mayen island. On this first voyage Hudson erried with him not only Barents's charts but—ast Burents himself had done—a translation of the sailing directions for a voyage from Norwy to Greenland compiled by a Norse colonist living in Greenland towards the end of the fourteenth century Never theless, though Husbon sighted the east coast of Greenland more than once during his exploration of the waters west of Spitbergen, each sighting he identified with one of those numerous island which had decorated the western Arctic on the Zeno map

Which had decorated the wettern Arctic on the Zeno map On 15th September 1607 Henry Hudson returned to Tilbere Hope in the Thames His employers, "certaine worshipfull merchants of London, were not too disappointed, for he had advanced northwards further than any man before him and had, moreover, confirmed Barents's reports of the redfukerest wating to be exploited in the waters around Spitibergen and Bar Island Thry had reaso enough, therefore, to support another voyage, a voyage this time further to the east, in the water septored by the Datch horth and east of Novaya Zemly Its mun object was to scheve what the Datch had failed to schere the navigatioo of a North East Pasage

For this voyage, in the Hopewell, Henry Hudson had choice of three possible routes into the Kara Sea by way of the north of Novaya Zemlya, past Barents's old winter quarters at Ice Haven, by the channel called Matochkin Shar which, as Barents dis covered, separates the two islands of Novaya Zemlya, or finally, by way of the Vargach Strait, which, like the adjacent Kara Strait, leads directly into the Kara Sea from the west But by none of these did he succeed Between Spitsbergen and Novaya Zemlya, even in June, Hudson found (as Barents had found) that the sea was a mass of see stretching to the horizon The narrow channel dividing Novaya Zemlya he missed entirely As to the Vargach Strait, Hudson was in favour, but the crew, led by Hudson's new mate, a sly elderly man by the name of Robert Juet, resolutely refused The incident is important only in that it provides the first evidence of a fatal weakness in Hudson's character, a weakness in leadership which was to end in his death Mutiny, not the ice of the Kara or Vaigach strait, forced Hudson to bring the Hopewell back to England

Hudson's failure discourged the Muscovy Company from supporting another discourged the Muscovy Company from where, first in France, ther with has old employers the Dutch and the newly established East luda: Company of the Chamber of Amsterdam With them, on the Sth January 1609, be segred a contract undertaking 'to search for a passage by the North, around by the North side of Novaya Zemlya'. At the last minute, however, the directors of the East India Company changed their plans, from an extremard to a westward to a westward voyage, to explore not the North-East Passage but, in rivalry with the English, the North American coast. There were good reasons English, the North American coax. There were good reasons for this change. In 1609, the year in which Hudon signed bis contract with the East India Company, Holland forced Spain to grant her full rights to trade in Eastern waters. The Company thereupon abandoned the now needless Arctic adventure for a very much more lucrative project, colonization in the New World. This third voyage of Hudson's therefore belongs to the history of the discovery of North America rather than of the polar regions. It is the story of trading and fighting with Indians, of landfalls off Maine, off Cape Cod and in Chesapeake Bay, and of Hudson's penetration of the great Hudson River as far as Albany, a discovery which led to the foundation of the colony of New a discovery which led to the foundation of the colony of New Amsterdam, later named New York. This voyage, however, made one negative contribution to a great unsolved problem of Arctic exploration. Hudson was convinced as he sailed up the Hudson River that such shallow and narrow waters as these could not possibly lead to a northern passage.

not possibly lead to a northern passage. The merchants of the City of London, determined that so brilliant an English explorer should not again be employed 'to the detriment of his own country', now themselves commissioned Hudson 'to try if, through any of those inlet which Davis saw, but durst not enter, any passage might be found to the other occan called the South Sea'. This last voyage of Hudson's, which led to the discovery of Hudson By and to the explorations and Artcit trading of the Hudson's Bay Company whose stations dot the map of the Canadian Artcit today, led also to bis death. For the determined that the state of the search of th

The map of the Canadian AFEUE (DURY), feel and the Method From the day Henry Hudson entered Hudson Stralt (John Davis's 'mighty overfall') and sailed on into the waters of the 'great and whirling sea' which was Hudson Bay, he was consinced that he had discovered the western route to Cathaythe contrived, depite the fog and drifting ice in the strait, to He contrived, depite the fog and drifting ice in the strait, to and during early autumn he struck out into Hudson Bay to the west and north, aimlessly it seemed to his already murmuring erew He then turned south to James Bay and the mouth of the Rupert River II was now November, too late to turn back, for 'the nights were long and cold, and the earth covered with snow', and his ship was soon frozen m, beset for the winnter Already Hudson's men had writnessed omens of approaching disaster a savage sacrifice of 'fowles hanged by the neck' on Digges Island, a thunderstorm which broke over the paged cliffs as they landed, scattering the slowly encircling sea birds Daring the winter, the carpenter died, scurvy broke out, supplies, it became tragically clear, could not last the homeward voyage, and by Jume when at last Discorery weighed anchor, astopicion, mistrust, accussions of hoarding food, led mesorably to the final tragedy, the marooning of Hudson, has son and five loyal men, without food, without weapons, at dawn of Charlton Island

The mutineers had been led by Robert Juet, mate of the Hopewell, and Abakuk Prickett, servant of Sir Dudley Digges, author of The Circumference of the Earth or a Treatise of the North-West Passage, a patron of Hudson's expedition On their return they were brought before the Masters of Trinity House and the High Court of the Admiralty to answer for their crime, and were saved from the gallows only because of their foreight in bringing back Hudson's charts which recorded the great discoveries of the man whom they had so callously condemned to death Some where along the north western shores of Hudson Bay, they maintained, 'by a great flood or billow' which swept in from that direction, lay the entrance to the North West Passage Their arguments were so convincing their optimism so infectious, that the mutiny on the Discovery was forgotten, and in 1612 a new expedition under Sir Thomas Button, consisting of the Discovery and another ship the Resolution, was launched by the Governor and Company of the Merchants of London, Discoverers of the North West Passage Its object was 'to search and find out a passage by the north west of America to the Sea Sur, commonly called the South Sea' Bylot, mate of the Discovery under Hudson, was the chief pilot of the new venture, and in the course of two voyages, in 1612 and in 1615, Button explored the western shores of Hudson Bay as far north as Southampton Island

Sir Thomas Button was followed four years later by Jens Munck, a Dane, who wintered where the town of Churchill now stands, at the mouth of Churchill River. In 1631, Captain James, following in Hudson's wake, gyre his name to James Bay, and another Englishman the same year, Luke 'Foxe-'Northwest Foxe', he called himself-explored the waters round and north of Southampton Island and is commemorated in Foxe Peninsula and Foxe Basin. Further gaps in the great work of exploration of Arctic Canada were filed in by British voyages to Hudson Bay in the middle of the eighteenth ecntury. Needless to say, no exit from the bay to the west was ever found, but in the perspective of history, that is relatively unimportant. For the discoveries by Hudson and his immediate successors in the first half of the seventeenth century led to the founding in 1670 of the Hudson's Bay Company. Just as in the central Arctic the discoveries of Barents and Hudson had given rise to the whaling and sealing industry, so in the west a great fur trade was developed by menhanters, trappers, traders, voyageurs, pioneers—who in the succeeding centuries were to be primarily responsible for expanding the land frontiers of the Canadian North.

the land ironitiers of the Canadian rotation In 1616, while the coasts of Hudson Bay were being explored, a very remarkable English navigator and explorer, William a very remarkable English navigator and explorer, William to solving the problem of the North-West Passage than any until the inneteenth century. It is one of the miliortunes of polar history that owing to the indolence and parsimony of a popular inthologist, Samuel Purchas, only the bare outline of Baffin's anthologist, Samuel Purchas, only the bare outline of Baffin's material and the solution of both Hudson Bay and Spitzbergen material was also the first to take a lumar observation at sea. His detailed maps and journals, if Purchas had ever troubled to preserve them, would certainly have shortened by many years the search for a North-West Passage.

use search for a North-West rassign. Buffin knew from his own experiences of Hudson Bay that there was little prospect there of any outlet to the west; tides, currents, the movement of ice were all more in keeping with the conditions of an enclored sea. He decided therefore to try further north and to follow Davis's tracks up the west coast of Greenland and into Davis Strait where Davis had thought there were a number of possible directions where the entrance to a North-West Passage might be found. Buffin's ship was the same Discovery which Hudson had navigated into Hudson Bay and his mate was Bylot, one of the mutmeers, a man who, whatever his part in the muder of Hudson may have been, appears to have layed an important part in a number of these Arctice expeditions Keeping to the Greenland side of Davis Strati, Baffin anchored the Discovery near the present Dansh station of Upernavik, and then forced has ship, of only fifty tons, northwards through the pack to Melville Bay and beyond to where the United States air base of Thule now stands. In this region and westwards, Sir Thomas Smith's Sound--through which many American and British expeditions were to approach the Pole in the nuesteenth entury—Sir Francis Jones his Sound', and Sir James Lameaster's Sound were all discovered by Baffin on this one voyage, the last two leading, if he had bu known it, westwards through the Canadam Aretie archipelago to the open waters of the Beaufort Sa Natz Smith Sound, Baffin note the greatest variation in the compais known at that time, and must then have been in the venuity of the ever shifting North Magnetic Pole

Baffin returned to England in August 1616, with news of discovenes which were greater in extent and importance than any in this part of the Arctic until the nuneteenth century But unsupported by maps or journals, it was not long before they were discredized or forgotten. Netther Smith Sound, nor Lancaster Sound, nor Jones Sound, nor even Baffin Bay, appears on the maps of the Arctic which were published in England after the Napoleonie Wars, maps which were to serve as the basis for ther great revised of then the Arctic in the first quarter of the ancetench century

No further progress in the navestion of the North East Passage was made during the seventeenth century, nor any attempts beyond a futule and farcical expedition led by two drunken Englulamen, Wood and Hawes, in 1676 This served only to discourage further effort in the eighteenth century, however, Arcthe explorations were renewed, though less by English or Dutch ships than by the new Imperial Navy of Peter the Great, Tar of the explanding empire of Russia

## PART TWO THE AGE OF EXPLORATION

## Arctic and Antarctic: The Age of Strategy and Exploration

By the end of the seventeenth century, the broad pattern of Arctic geography had begun to take shape. Eastwards, along the desolate north Russian coast, English ships had reached, the Datch had entered, the Kara Sea. In the Barents Sea, the western coasts of the twin islands of Novaya Zemlya had been recommoirted while, further west, Spitsbergen, Bear Island, Jan Mayen Island had all been discovered and on their coasts and in the waters around thema greatrivalrybetween Dutch and English in the slaughter of whales, scals, and walrus had broken out. West of these snow-peaked islands, though knowledge comtinued to be greatly confused by the distortions of the Zeno map, the southern parts of the land mass which the Norsemen called Greenland (the English, midel by the cartographers, West Friezeland or West England) had emerged from a forgotten past. Along the southern coasts of Greenland, John Davis, the discoverer of Davis Strait, was the first to attempt some systematic explorations.

The most spectacular advance during this period, however, was in the Canadian Arctic. There, not only had the eastern frontiers of modern Canada (Labrador and Baffin Island) been roughly defined, but Hudson Strait, first detected by Davis, had been found by Hudson to lead into the broad waters of an open sea. This discovery, in reality Hudson Bay, gave new hope to those searching for an entrance to a North-West Passage. William Baffin's discovery, north of the Arctic Circle, of Baffin Bay and of the three large sounds leading from it. These, when they were rediscovered in the ninteetenth century, were to provide routes of access both to the North-West Passage and the Pole.

These maritime expeditions, launched by merchant guilds and city companies seeking a trade route through the Arctic to the rich oriental kingdoms bordering the Pacific Ocean, were not the only Arctic ventures during the seventeenth century Oher discoveries, though unrecorded, must have been made by the whalers which followed in the wake of these Arctic expedition Meanwhile, on land, the men of the Hudson's Bay Company, trappers and hunters, guides and voyageurs, who lived off the country and were learning from the Eskimo and the Induan how best to travel and survive, had already started, as they laid the foundations of a great fur industry, to push the Canadian fromtures towards the north

The Antarctuc, of which lattle has so far been said, remained throughout the seventeenth eentury in the realm of academic argument and speculation about the existence of a fertile southerm continent Each new discovery, every rumour of new lands in the southerm oceans, was halded as confirmation of all that the geographers had predicted When the Solomon Islands —endowed, their discoverers mainted, with all the wealth of Solomon-were discovered by the Spaniard Alvaro de Mendan and has Portugisese plot Pedro Fermadez de Quiros in 1568, they were at once identified as outliers of some continental El Dorido, projecting northwards mot the Pacific from a central pointion round the Antaretic Pole Not only the Solomon lianda, but ecolimes and Maranas, the New Hebrides, the Marquesar liands, discovered by Mendan and Quiros in 1595 and 1605, all these were thought to presage a neighbourng the continent which might at any moment energy.

indirectly, the Solomon laineds made at least a negative contribution to the problem, though it went quite unheeded at the time. When the news of Mendhan's discovery reached the curlized world's first Richard Grenwille and a group of enterprising West Country genilemen an England, with the discrete approxiand support of their Queen, were laying the first plans to break into Spanish prierves an the Pacific and along the probluited Atlantic trait of Migellan and up the west coast of America in search of a Strait of Amain or a North West Passage, and they now solid to this programme another project, 'the discovery', all and anylong for The Queen's Majesty and her subjects, of all and any long, submits and countries southwards beyond the equinoctial, to where the Pole Antarctic hath any elevation above the horizon'. These plans, made probably in 1573, are thought, like so many of the plans for Elizabethan discovery, to have been the work of the cousins Hakluyt. As far as Greaville was concerned, they proved abortive, the Queen withholding her permission because of temporarily improved relations with Spain. Four years later, however, when relations worsened once again, these same plans were revived and led to Drake's great voyage of circumnavigation of 1577-80.

Emerging from Magellan's Strait-where his ship the Pelican was renamed the Golden Hind-Drake was borne away by high winds to the south of Cape Horo and into the passage, Drake Passee, which bears his name. Of Magellan's architelage to the north of him, Drake wrote: 'The uttermost cape or hedland of all these ilands stars neere in 56° without which there is no maine or iland to be seene to the southwards, but that the Atlanticke Ocean and the South Sea meete in a most large and free scope.' With this one statement, Drake disposed of one fashionable theory, namely that a southern continent adjoined South America, Nevertheless, as was the case with Magellan when he rejected the notion that Tierra del Fuego was the tip of a southern continent, the geographers, not the seamen, were believed, and two hundred years later geographers were still speculating about the existence of a fertile southern continent stretching northwards into the temperate zone; speculation which persisted despite the claims of seamen, notably the English buccaneers Bartholemew Sharpe, Ambrose Cowley, Edward Davis and William Dampier, who roamed freely in these southern waters during the seventeenth century, that often on their voyages they had sailed their ships where continental land was plainly marked on the map.

While geographers were debating these extravagant notions, some truly Antarctic discoveries were probably being made. Dirck Geritz of the Dutch East Iadia Company, who it is claimed saw in 1599 the snow-clad mountains of a continent in  $64^\circ$  S, may, though it is very doubful, have been the first to set eyes on peaks of the South Shetland Islands, which lie south of Drake Passage and Cape Horn. In 1675, probably, a merchant captain, Antonio de la Noché, first saw the coasts of South Georgia, an Island often wrongly supposed to have been sighted nearly two centuries earlier by the Portuguese Amerigo Verpucci Howerer, such an isolated chance discovery as this was bound to be shifting and uncertain in the days before the solution of the visial problem of longitude enabled the position of ships and the position of landfalls to be accurately fixed. This was not accomplished until leaves the endeavely.

late in the eighteenth century Such, broadly speaking, was the state of discovery in the Arctie and Antarctic regions at the end of the seventeenth century. With the opening of the new century, under the influence of new political and strategic conditions and in response to new intellectual, new social and new technological developments, not only the motives but the methods of polar exploration changed Spain as the dominant imperial power, Holland as England's principal commercial rival, had faded from the European scene, to be replaced by France, the France of Louis XIV, determined not only to succeed to the former position of Spain, but to establish an even more extensive and more maguin ficent maritime, colonal and commercial empire During the long series of Anglo French wars-the War of the Austrian Succession, the Seven Years' War, the American War of Independence-which were waged continuously throughout the eighteenth century, the Aretic and sub Arctic lands of Canada, the trade routes across the southern ocean, even the prospect of colonial gains in the as yet undiscovered southern continent, played some part in the maritime and colonial strategy of the two great powers

In this period of strategic exploration, Arctic territory was also involved in another direction, when Peter the Great, Tzar of Russia (1682-1725), launched into Asia the first of a series of grandiose national projects for colonial expansion and develop ment These led in time to a spread of Russian settlements south of Bering Strait and along the Asian coast. To a Tzar so eager to emulate, indeed to eclipse, the exploratory achievements of the West, who was, moreover, the founder of the Russian Navy, the liscovery and navigation of a North East Passage was in itself a sufficient challenge and inducement to display, for the admiration of the West, Russian prowess in exploration and Russian techni cal skill But as her remote Pacific settlements grew and spread,

the North-East Passage gained for Russia a new and special and more urgent significance as a possible route by which such colonies and trading posts might be sustained more economically than by the long and wearisome caravan journeys through the forests and across the endless Siberian plains.

This new concern of governments with exploration led in turn to some basic changes in organization. In Holland, in England, in Russia too in her first advances towards the fur and sealing frontiers of Siberia, expeditions of discovery had been organized by private groups and corporations, merchant adventurers hiring vessels and seamen for purposes of private gain. But when exploration became, in the eighteenth century, largely an instrument of policy, it became the task of the ships and men of the national navies, British, French, and Russian alike. In Britain this use of the Nay in polar exploration became a traditional and established practice. From the time of Cook to the first expeditions of Robert Falcon Scott early in the twentieth century, officers of the Royal Nay played a dominant—some have thought, a too exclusive—role in the organization and conduct of polar exploration.

The most striking innovation, however, during the eighteenth century, when science began to approach its modern form, was the injection into polar exploration of a scientific motive. The eighteenth century saw the beginning of scientific exploration, and James Cook, who in the course of his three great Pacific and Antarctic voyages was to build for Britain a new maritime and commercial empire greater than the world had ever seen, was the first to show how effectively science and strategy could be blended. In the development of scientific exploration, the new national academies of science which sprang up in England, France, and Russia late in the seventeenth and early in the eighteenth century played an exceedingly important part as advisers of governments in all scientific matters. The foundation by royal charter of the Royal Society in England in 1660 was followed in 1666 by the foundation of the Académie des Sciences. But Russia, for centuries isolated in medieval darkness, remained untouched by this new national concern with scientific studies until, in 1697 and 1717, Peter the Great, the first Russian emperor to travel outside Russia, came to consult (so that he mariner's needs, the solution of the problem of longitude. In the choice of ships, the most notable development was in the the choice of ships, the most notable development was in the use by Cook of ships specially selected and adapted for exploring expeditions more revealing than the choice of ships. In the situenth and seventeenth centuries, cargo ships large enough to carry bulky merchandise were needed for the Arctic voyages to Cathay. In the eighteenth century, a century of war, when exploration was closely linked with strategic operations, waships were in general use. When, however, in the second half of the exploration the signer of scientific exploration began of the century the first voyages of scientific exploration began In the century the hist voyages of scientific exponentiation organization organization organization organization of the state of the state of the state of the science of the state of the science of the country colliers of three hundred tons or so, that Cook was able

to undertake the first hydrographic surveys in Antarctica. One other facet of exploration during the eighteenth century, in the polar as in other regions, and one too often disregarded, was the steady growth of public concern with exploration which tended to mould its course and direction. Following the publication of the pirate William Dampier's New Yorge around the World in 1677-a betsetline in its day-works about travel and exploration came second only to those on theology in public appulation came second only to those on meeology in public popularity, and this trend continued and became especially marked towards the end of the eighteenth century when with the voyages of Cook there opened the greatest age of geographical exploration since the Age of Discovery. In England it was fostered in a number of ways: through the foundation of private societies to promote travel and exploration, such as the Linnean Society and the African Association in 1788 for the support of botanical journeys and African travel; through the spread to the provinces of newspapers and lending libraries; and through the publication not only of those ornate but costly volumes with which the wealthy furnished the libraries of their country houses, but of inexpensive reprints or, as in the case of G. W. Anderson's edition of Cook's Voyager of 1784, of works in cheap periodical parts.

Included in this growing popular literature of exploration were

might rival) the scientists and technologists of the West It was not, however, until 1725, the year of his death, that the Imperial Academy of Sciences was founded, not conjt to promote studies in the physical and natural sciences but to promote the active exploration of the vast resources of Russia's new and expanding territories

In the remarkable advance of science which the eighteenth contury winnessed, an advance which was now for the first time to influence polar exploration, no branch (except chemistry) developed more rapidly than the study of magnetism Magnetic studies had been given a new and quite revolutionary aspect a century before when William Gibbert published in 1600 his great discovery that the earth itself was a globular magnet. This in turn led to the demand for the formulation of general laws or principles which could, it was apparent, only be deduced from an analysis of widespread, co-ordinated, and simultaneous observations of magnetic variation and magnetic day. These magnetic discoveries thore sailed in fits Majary's shap, the puck Paramore. Thus was led—disastrouily as it turned out—by a landaman, Edmund hours an the South Atlantic the first map of magnetic variation mand of the shup by the Admirally. It produced from observa Following this precedent the recording of magnetic variation prime the eighteenth and numeteenth centuries became a mand of magnetic and magnetic day of magnetic variation prime the eighteenth and mantecenth centuries became a mand of the shup by the Admirally. It produced from observa following this precedent the recording of magnetic observations prime to eighteenth and numeteenth centuries became a

The log exploring voyages to characteristic of the eighteenth contary could never have been achieved without considerable advances in hygicae, in margitation (of which magnetic studies were a vial part) and in the choice of shaps in hygiene, the most notable development since the introduction an 1601 of fruit juice as an anti scorbutic was the publication in 1753 of James Land's *Treatist of the Sarry* Innavgation, the invention of John Halley's reflecting quadrant (latter, the sextant) in 1751, the publication by Nevil Maklelyne in 1767 of the first natural alinance, and notably the testing in 1762 of John Harnon's chronometer, advances, each in rum constitutions to the gratest of all the between 1615 and 1617, the Danish expedition to Churchill River in 1619–20, and the expeditions ten years later of Captain Thomas James and Captain Luke Foxe, sponsored respectively by the merchants of Bristol and of London, have already been mentioned. Geographically perhaps they made no great advances, but they were important because they built up among English seamen a traditional skill in Arctic navigation. In the second half of the seventeenth century, to the motives behind these voyages -trade, strategy, discovery-there was added the new and growing concern with science, stimulated in Britain by the new Royal Society, whose Fellows had from the start shown an increasing concern with Arctic phenomena and observations and with the problems of Arctic navigation. During these and subsequent years, however, trade probably remained the most powerful motive. It was, it is true, often viewed by the colonists and the Company on one side and by the Government on the other in a very different light, the colonists and the Company being concerned with profit, the Government rather with trade as a weapon of strategic and commercial expansion. Nevertheless, to both sides it was of the highest importance, for the fur trade was to the northern colonists what the tobacco trade was to the colonists in the southern parts of the United States; it provided the means, the 'cash-crop', with which the manufactured goods of the mother country could be purchased.

The routes by which this trade should be conducted had an important bearing on the prospect of British voyages to seek a North-West Passge. Towards the end of the seventeenth century the Government and merchants of England were peruaded that trade in furs could best be carried not through the normal, and geographically more logical, route up the Stavernee River but by direct sea voyages from England by way of liukons Strait to fluidon Bay. To the colonists and trading tutions to the south of the Bay this, because it would be less furtile way sumpoular. But in London these new proposals, fint put forward, oddly enough, by two disgrantled French-Candian backwoodimen, gained much support. Voyages by this route would strike a blow at French trade and at the French trading areas in the south, while to the City of London such direct access would be more profitable. a number of collections of voyages and travels, not the specula tions or moralizings of geographers and philosophers, but per sonal stories of discovery and adventure like Dampier's Ner Voyage Two works of this kind, published in England and in France, did much, as indeed their authors intended, to focus the attention of neuron and compared the stations in the software of the attention of peoples and of governments on the problem of the existence of a fertile southern continent and thus to direct attention to Antarctic exploration in Findand, Dr John Camp bell's Complete Collection of Voyager and Tratels appeared in a second edition in 1745 It was addressed to the merchants of Britain for whom, the editor declared, a great new southern world, rich in prospects for trade, for colonies, and for the enhancement of British naval prestige, lay open In France, at the instigation of the naturalist Buffon, a foremost protogonist of the idea of a southern continent, M Charles De Brosses, president of the Parliament of Dijon, published in 1756 his Histoires des Navigations aux Terres Australes in both countriesand in France the territorial losses and the humiliations suffered under the Treaty of Paris of 1763 made the discovery of a southern continent all the more imperative-these works aroused great public enthusiasm and excitement, and concern that national expeditions should at once be sent out to probe the undiscovered Antaretic regions

Against this background of trends and influences, we must turn first of all to the Arctite. The eighteenth century was principally a century of Russian achievement in the Arctice, Britain being preoccupied with the great Pacific and Antarctic voyages of James Cook But British shops were also active in the Arctic, especially in the waters of Hudson Bay, and there a number of voyages in search of the entrance to a North West Passage took place, several towards the middle years of the century when Britain was engaged in a series of powerful maritime operations to oust the French and secure dominano over Canada

Since Hudson's last and tragic voyage there had been a number of attempts to discover a North West Passage leading out of Hudson Bay voyages made the more attractive to promoters in the City of London because of the prospect of a direct sear-oute to the fur bearing lands of the Canadian North which were to be harvested by the Hudson s Bay Company The English voyages this growing body of opinion was Arthur Dobbs, an Ulsterman and a Member of the Irish Parliament, one of those remarkable men who from time to time have emerged as insistent and

persevering champions of polar discovery. Dobbs, an enthusiast for northern exploration of all kinds, was keenly interested in the problem of a passage and he picked upon one of the Company's servants, a Captain James Middleton, a man sufficiently well versed in the current studies of magnetic variation to become in 1736 a Fellow of the Royal Society, as the ideal man to lead an expedition. No doubt because of the strategic significance of the voyage, Dobbs proposed that this time the expedition should be sponsored by the Admiralty. In June 1741, accordingly, Captain Middleton sailed from the Thames for the Article 1990 Arctic in His Majesty's bomb-carrier Furness, accompanied by the sloop Discovery. But once again the voyage was a failure. The crew was mutinous. Scurry broke out. And the officers of the ships proved for the most part to be as useless at sea as they were unqualified for such an arduous and complicated task of note unqualined for such an arduous and complicated task of navigation. Following Fore's route, Middleton's ships reached and penetrated Wager River, so called after the First Lord of the Admiralty. Indeed, they thrust even further north, as far as Repuise Bay on the Arctic Circle. But Middleton returned convinced that no passage of any kind lay along that shore of Hudeo P

Arthur Dobbs, convinced that Middleton had been bribed to contain Loobs, convinced that Mindleton has been determined to come to a conclusion so agreeable to the Company, refused to give up the struggle. In 1745, the year when the British capture of Vauban's great fortress of Louisburg demolished the French defences of their main artery, the St Lawrence, he persuaded particular that the struggle of the structure of the discovery Parliament to vote the sum of £20,000 to reward the discovery Parliament to vote the sum of £20,000 to reward the discovery of a North-West Passage by way of Hudson Bay; and two years later an expedition under Captain Moore set forth, at the public deeply into Wager's inlet but they discovered that it only dwindled into two micor waterways instead of expanding into the great seawy they had hoped for, leading to the distant Est. Middleton's findings being thus confirmed—as indeed they were Middleton's findings being thus confirmed—as indeed they were again to be by the British explorer, Parry, early in the nineteenth century—English interest in the Passage died away. The next moreover, of associating with trading voyages, expeditions for the purpose of Arctic discovery and secentific research and in part cular expeditions to seek a North West Passing: This continued to be a constant enthusiam, indeed an absorbing passion, of govern menus, merchants, scientasts, and the general public alike To counter this projected English offensive the French them

selves planned some voyages in search of a passage, aiming to exclude the British from the northern trade But the Treaty of Utrecht of 1713 put an end to such ambitions, for by it the French lost all their ports along the shores of the Bay However, even with the field thus open, new obstacles arose to the promotion of voyage into the north of Hadon Bay, for the Company showed themselves strongly averse to the new policy of expansion and prenetration They had, they declared, neither the resources nor the men to thrust forward and hold trading posts in the memory and the strong the unknown and hostile interior and preferred to consolidate rather than expand, leaving it to the Indians to bring their furs to the posts along the shores of the Bay In the second decade of the to voyages of exploration and expansion was temporarily over come under the influence of a former governor of the Company. Captain James Knight and in 1719 he led an expedition of three ships to the north of 64°, seeking not only to expand trade and discover a North West Passage but also to discover the gold and copper mines said to exist in these far northern regions Knight's expedition ended in disaster, and in the last stages of exhaustion he and his men, as a subsequent search expedition discovered, were massacred by Estimotes This was a turning point in the Company's interest in a North West Passage and it decided that it

would do nothing further to encourage such ambitious adventures in London, however, in the second half of the eighteenth entury a very different opusion developed. There were fears that the renewed and widespread expansion by French hunters and scouts northwards and round the Bay might scoon pin the English to their posts along its shores with the French holding the hinterhard, and these fears hed to a elamour for a more active, a more offensive, policy involving not the passive tenure of trading posts but voyages of discovery and penetration inland such as the search for a North West Passing would require The leader of shipman Thomas Floyd, established new standards in British Arctic exploration. The shipschosen, two 'bombs', so-called from their bomb-carrying mortars, had bows and bottoms strengthened against the ice. Great ice-saws and hatchets, ice-cables and anchors were carried, and a large quantity of bricks, sand and line in case of shipwreck on the Arctic coasts. Special clothing was issued by the Admiralty; jackets, waistcoats, and breeches offlanel, and mittens and stockings of lamb's wool. The surgeon on the expedition, Dr Irving, 'justly noted for his knowledge in Natural Philosophy', invented—the melting of ice for water not then being the practice—an ingenious machine for distilling fresh from sale water. He insisted, moreover, that batter and rice insteadof cheeseand oatmeal should be taken, the better to fortify the duly beed or tork dict of the crews.

Constantine Phipps sailed in 1773, and although he contributed little to the accurate mapping of Spitsbergen, he reached temarkably far north up the west coast and indeed exceeded Hudson's farthest north by several miles. His expedition had its hare of adventures. Both ships had a narrow escape from being beet, and Horatio Nelson, playing truant from his ship one night under cover of a fog, decided rashly to challenge a bear. Although his muket had habed in the pan, and his ammuniton had runout, be resolutely refused to return to his ship until, Commander Lurvidge having ordered the ship's guns to be fired, the bear was toared away.

These British voyages to Hudson Bay and the waters of Spithergen were, however, small affairs by comparison with the grat panoram of Arctic exploration which the eighteenth century witnessed in the East: the culmination of Russian colonial and trade expansion through the forests and across the great waterways and prairies of Siberia to the Bering Strait and the north Pacific Ocean. In grandeur of scale and range, these Russian expeditions were characteristic of the physical and Intellectual energy and ambition of their principal architect, Prieter the Great, a ruler who was determined to match and outstrip the West by 'the findings of a passage to China and India through the Arctic Sea', a North-East Passage leading into the Pacific Ocean.

The first problem confronting the Russian explorers, whether

exp-ditions to seek it came not from London but from Phil delpha, an 1753 ani 1754 Four years later, the fortress of Lounburg, which hal been returned to france under the pace of 1748 was retaken, and this was followed by the capture of Quebe an 1 Vontreal, the keys to French Canada With the Frinch threat thus removed, there were no longer any strategic reasons for promoting further attempts on the North Weit Paruge in England, nevertheless, there was a slight revisit of interest in the second half of the explateenth century, and in 1761 and 1762 Will leton, with Captain Norton, followed up a sugges toon mide by Captain Noore that they should explore Chetterfield link But there were the last important sogages of exploration in the eighteenth century into the northerm waters of Hudson By In 1763 the Peace of Paris brought the Seven Years' War to a close and the pressure in London for voyages of discovery to Counter french extraording concensure the Seven Years'

counter Franch the pressule in tomon for volge to careful Before turning to the great Buvian explorations in the Arctic, one other British Arctic expediation describes to be mentioned because it illows, in its concern with science and in its general equipment, the influrnce of the more specialized attutude towards exploration for which Cook, as we shall see, was so largely responsible

The moving spirit in this enterprise was the Honourable Dance Barrington, a lawyer and a keen naturalist and student of Aretic hintry who pertuided the Royal Society to submit through the First Lord of the Admirality, the Earl of Sandwich, a memoral to King George III urging the displatch of a scientific expedition to the North Fole by way of Spitobergen. 'The great French enterprise', the Chevaher de Bouganville, was known to be launching a similar expedition that same year and in adding to the two prospect wwo British ships, the Admirality had the attree expedition was commanded by Capitan the Honourable Constan the Philips in the Bocknew, while in the Cartors, under Commander Skeffington Latwidge, there was among the young genilemen of the quirter direck Midshipman Horato Nelson The Reechorse carried a civilian estronomer, Israel Lyon, and two ice, of which there is a lively account in the private journal of Mid Asia and America were joined by land or separated by sea, hadthough this was not known until the second quarter of the eighteenth century-already been solved three-quarters of a century earlier by a Siberan Cossack, Simon Dethney, one of a band of Cossacks fleeing to the east to escape serfdom In 1644, he reached the Kolyma river which flows into the East Sharing Costacks fleeing to the flows into the East Solvin Sc Four years later, m as it is bottomed bast, Dezhov set out spin, following the coast towards the east unit he reached East Cape (My Dezhorea) overhooling the Berng Strat Thu was the land of the warring Chukchi trates Only Deahner and the set of the warring Chukchi trates Only Dezhnev and his boat's crew escaped, and, rounding the Chukchi Pennsula (Chukoshiy Polusortov), they reached the mouthof the Anadyr rver Some reports, vague and unconfirmed, of this first ducovery of the Bering Stratt may have reached the Imperial Court across the vast wulderness which separated the Russian outposts in east Schern from the new capital, SF Petersburg, and, indeed, a map presented to Peter the Great by a Swedish prinoare of war in Shores word to be the the section of the section prinoare of war in Shores word to be the the section of the secti of war in Siberia is said to have recorded a Russian penetration of the Berng Strait and even Russian penetration as far south as the Kamchatka penunula it is possible that such rumours may have stimulated the grandiose project which Peter the Great was about to launch to launch

This first great Russian Arctic expedition was as different from earlier promering efforts as were the British expeditions of the eighteenth century from those of the Merchant Adventurers in planning and execution it was a national enterprise, combanny with national strategic motives, as in the West, objectures of geographical and scientific discovery It was natural, therefore, but the shape used and the leader appointed, Vitus Berngs 4 Dane, should belong to the new and progressive Imperial Russian Nay

Six months before has death m 1725, Peter the Great put the finishing touches to his great Arctice plans. To Vinus Berng and his men they must have presented a formitable prospect, for they entailed not only an muttal overland journey of 5000 miles across Europe and Ans to Othotsk on the Pacific coast, which meant the transport of men and supplies by rail over the swulnog waters of four of the mightest rivers in Russia, but at the end of it a sea vorue northwards round the Kanchatk pennisul, and



a landing on the American coast. By the summer of 1725, Bering and the twenty-five men of his expedition had reached the settlement of Yakutsk on a curving branch of the Lena river. Already it had been an immense and wearisome journey. But worse was to come. So far they had travelled mainly over steppe land, but between Yakutsk and Okhotsk lay seven hundred miles of country broken by rivers, mountains and swamps and sweept by the blizzards of an early winter. Of the two hundred horses in Bering's caravan many died of the cold, and cumbrous loads of equipment and provisions had to be hauled on sleds to the cosstal township of Okhotsk.

There Bering soon found himself tangled in the web of petty Oficialdom whose procrastination and corruption and secret manoeuvres were to prove throughout his explorations such as barler to progress. However, one of the ships for the northern voyage, the Forune, had been built and in the summer of 1727, two years after leaving St Petersburg, the sea route to Kamchatka was explored. In the following summer, the second ship, the St Gabriel, was finished after intolerable delays and in the summer of 1729 Bering was able to circumavigate the Kamchatka peninsula as far as the Guilf of Anadyr.

The Chukchi tribes, from whom Simon Dezhnev had so narrowly escaped, this time proved friendly, and their stories of journeys northwards across the peninsula to the Kolyma River, which, they said, flowed out into an ice-covered sea, encouraged Bering to persevere. Sailing out of the Gulf of Anadyr (Anadyr'skiy Zaliv), the St Gabriel passed St Lawrence Island, named by Bering after his patron saint, and entered the Bering Strait. To the west, Dezhnev's East Cape (Mys Dezhneva), the furthermost point of Asia, loomed above the sea. But to the east over the Alaskan coast fog hung heavily over the water and no sign of land could be seen. In part, Bering's mission had been accomplished, for a sea passage linking the Pacific with the Arctic Ocean had been found. But the passage had still to be navigated and the coast followed to the west for the discovery to be beyond all doubt. To go on, to turn back: it was no easy decision for Bering to take. Bering Strait was free of ice, but it was dangerously late in the season and winter and the ice might at any moment close in. In any event they faced a long and hazardous voyage to Okhotsk. Disaster, Bering well knew, would mean disgrace and worse He therefore turned back

The uncreatore turned back A fruides voyage cattwards the following summer completed Benng's five years of exploration and he returned in triumph to St Petersburg to report to the Trainia Ann But applause quickly turned to score as Bering told his story. The charting of the Kamchatka pennsula, the discovery of new islands, the revelation of a start separating Aua and America about which the geographers had speculated, all these achievements were submerged in the flood of public accusation at Bering's apparent turndity it was fortunate that there were men at court who still believed in him sufficiently to support his plas to be allowed to redeem his reputiton by flexing another expedition

simulary it was iorumate that there were men at court who still believed in him sufficiently to support his plea to be allowed to redeem his reputation by leading another expedition Bering's next expedition was on an even more majestil scale, and it exceeded in accide exploration. The whole Arretic coast from the Guil of Ob (Obskaya Guba) to the Anadyr River was to be systematically mapped. Bering was to search for land to the east of Kanchatka across the Bering Sea. South of Kanchatka Martin Spanberg, his Danish second in-command, was to clart the Kurile slunds and the sheads of Japan This was the plan But even the Admirally College, when it took over direction of the vast enterprises in 1733, thought this more than one man could possibly control, and Bering was left with the principal exploring expedition, from Kanchatka across the Bering Sea

When Bering arrived in Okhotsk liter in 1754, it was no longer the frontize retilement of his first visit It was now a township, thronged with the colonisty, the technicans, the unnumerable officials sent out by the Imperial Government Here he was immobilized for six years, bewildered and frustrated by the protersituation and the intrigues, by the multiplication of dossers, by the stream of enquires, of orders, and of counter orders dispatched across the visit expanses of Siberna by a central government determined to exercise remote control over every deail of his operations. Not until 1740, seven years after he had left St. Peterburg, were Bering's on the new explorations. The Sr Daul ready to tail eastwards on the new explorations. The Sr Daul ready to tail eastwards on the new explorations. Delisle, geographer to Louis XV, sailed with Chirikov, the Russian captain of the St Paul.

Bering's lastvoyage ended in both triumphand disaster. The broad beaches and dark forests of north-west America were reached and in the one day spent on shore, Steller the naturalist fromd time to make copious notes on fauna and flora and to gather specimens of Alaskan native arts and crafts for the imperial collections. But the plan to winter had to be abandoned, for Bering, among others, was weakening rapidly from scurvy. Both ships therefore, despite the threatening weather, put out to sea and made for home. But Bering's ship, the St Peter, sailing through fog and storms of torrential rain, was wrecked on the beach of Bering Island. And there the gratest Arctic explorer of the eighteenth century died.

Bering's discovery of the strait which bears his name, and of the islands south of it, his charting of the Kamchatka and Anadyr peninsulas, and his two landings on the American coast are among the great achievements of Aretic exploration. And to them must be added the immense and systematic work of charting the whole length of the northern Russian coast eastwards from the Ob which was carried out simultaneously and was continued after Bering's death by the Imperial Admiralty College, All these complicated and extensive operations, successfully completed despite the hindranees of a highly centralized and often incompetent administration, disposed once and for all of the fantastic ideas about the Arctie geography of north-east Asia and north-west America current in the first half of the eighteenth century. They were also more indirectly to affect the course of Arctic exploration. In the east as in the west (in Hudson Bay), exploration was followed by trade, and by the formation of trading companies. In the footsteps of the Russian explorers, a new brand of Russian imperialism at the instigation of Catherine the Great began to spread during the second half of the eighteenth century across the Bering Strait and down the North American coast. By the first quarter of the nineteenth century, Russia-in the form of the government sponsored Russian-American Company-was firmly established in Alaska. She thus became a strategic factor in the problem of a North-West Passage round the northern extremity of British Canada. The search for this was to preoccupy the British Navy for more than half the century which followed the Napoleonic Wars,

## Cook and the First Crossing of the Antarctic Circle

A sharetic vojsee early in the elphteenth century, mode time to be to discovering the true nature of Antarctic geography Bourch had persuaded the French East India Company to equip two whys to discover and annex the Southand and, reaching latitude 48700 S in the Athanic section of the Southern Ocean, he was able to deserable for the first time the great flat topped tabular teckergt, the scale and the pengums, iamiliar etements in the Antarctic scene. On hew Year's Day 1739, a movy land boomed out of the fog through which hit two ships, the *Majle* and the *Maric*, had been steering a tortoous courter. This was Boure thland Then a now it was ao difficult to appreach that Bouvet was forced to bear away to the south until he reached the edge of the pack. This great bele of ece, he surmused, girdled a dustant and inaccessible constrast to the rich hands promised by the geographeen in Britain and France

Not until after the Seven Years' War was exploration in the southern hemisphere renewed it was then that the Bruish Navy entered the field, with require which were before the end of the eighteenth century to transform the whole problem of a southern continent and in so doing to provide a true and rational basis for future Antarctic exploration

Charles Byron in 1764, Samuel Walls and Phulp Cartaret in 1766, each aliel with accert orders from the Admiralty to go 'in surch of the Land or Islands suppored to lie in that part of the Southern Hemsphere' Each carried precise instructions as to the making of surveys, the proper treatment of natives, and the annexation of newly discovered terratories to the British Crown Byron, great as was hav soyage, constrained little to the problem of a southern continent. But Wallis's discovery of Tahiti, with its sands and placid lagoons, its verdant slopes and graceful casuarinas, once again filled the minds of men like De Brosses and John Campbell with hopes no less extravagant than those aroused by the discovery of the Solomon Islands and other island groups in the eastern Pacific during the sixteenth and early sevententh century.

France now also joined in the search, eager to rival British naval achievements and, in compensation for the losses of the recent peace, to have some share in this new and rich colonial world. The leader chosen for the French expedition was the Chevalier de Bougainville, of noble birth and an intellectual turn of mind, and a fervent disciple of Charles De Brosses. Accompanied, as was now the fashion, by scientists, Commerson the botanist and Verron the astronomer, De Bougainville reached Tahiti in 1767 and explored numerous new islands in the flamboyant archipelago of which Tahiti was the central jewel. Follower of De Brosses though De Bougainville was, his views about the probable discovery of a great southern continent in these seas were not encouraging to the optimists at home. Tagree,' he declared, in an objective analysis reminiscent of Cook, "that it is difficult to conceive so great a number of low islands and, as it were, drowned pieces of land, without supposing a continent in their neighbourhood. But geography is a science of fact; no man in his study ventures on system-making except at the risk of the largest mistakes, which are subsequently corrected only at the expense of the practical sailor.<sup>4</sup> Tahiti might be La Nouvelle Cythère but that was no proof that a continent lay nearby. To seek that proof was to be the task of one who, among other and greater qualities, amounting in aggregate to genius, was just such a practical sailor as De Bougainville had in mind.

In England at this time one of the most ardent champions of the southern continent was Alexander Dalrymple, an obdurate, cantankerous Scot, of some ability, much self-conceit, and no sense of proportion. He had served for some years in the East India Company and on his return had devoted himself in a general way to a variety of studies, such as astronomy, cartography, the history of the Spanish voyages, and the formation of coral reefs, and had gained sufficient distinction in these diverse fields to win a Fellowship of the Royal Society His principal passion, however, was the history of exploration of the Southern Hemi sphere A friend and correspondent of De Brosses, he soon be-came convinced, like De Brosses, of the necessity of a Southern Controlled, use De proses, or the necessity of a Southern Continent to maintain a conformity in the two hemispheres -a concept peculiarly attractive to the formal eighteenth century mind-and took as his mission the task of persuading the people and government of Britain to hunch expeditions to discover, as he called it, the Southland

In 1766 an opportunity arose for Dalrymple to direct the search himself The Royal Society had sought the support of the Treasury and the Admiralty for an expedition to observe the transit of Venus across the sun, a rare astronomical phenomenon known to occur in 1769 For such observations, Tahiti was known to occur in 1/62 for such observations, same was regarded as the perfect base, and Dalymphe seized the oppor-tunity to plead that with these astronomical tasks there should be combined a thorough search for the Southland He drew up plans and, indeed, instructions for the voyage in 1/67 he pub-lished a memor on the Spanish voyages in the Pacific to draw attention to the problem And when the appointment of a leader of the expedition came to be considered, he applied for the post himself

Dalrymple was no inconsiderable astronomer. He was well Dalrymple was no inconsiderable astronomer. He was well known to the Royal Society, moreover, as a dulgent student of southern exploration and he scenned, therefore, the obvious man for the post The Admiralty, dabious at first, refused him out right when Dalrymple insisted that he had 'no thoughts of making this voyage as a passenger or in any other capacity than having the total management of the ship to be sent' True, only seventy years carlier the astronomer Halley had been given com mand of a naval ship, but in the Admiralty Halley sincompetence in naval matters had not been forgotten and the First Lord, hear og of Dalrymple's demand, roundly declared that he would lose his right hand rather than see one of Hin Majesty's ships com manded by one not a raval object Dalrymple was outraged But marked by one not a naval before Dalrympic was outraged But it was a wise, indeed historic, decision For instead, an officer then on level from it markes surveying mission off NewFoundand was relected a Master in the Royal Navy, james Cook it must to Tahy-Lavg sense:

only a warrant officer and nearing forty, should have been selected for so important a mission. But he was already well known, not only in the Navy but to the Royal Society as well. His charts of the St Lawrence which had played such a vital rus charts of the assult on Quebec, his marine surveys part in making possible the assult on Quebec, his marine surveys of Nova Scotia and Newfoundland, had already caused senior officers to speak of 'Mr Cook's genius and capacity'. And in 1766, the very year in which the Royal Society had approached the Admiralty with plans for the new astronomical expedition, Cook's achievement in accurately observing an eclipse of the sun and in calculating the longitude of Newfoundland had, the sun and in calculating the longuide of Newtoindiand had, when communicated to the Royal Society, established his reputa-tion as 'a good mathematician and very expert in his business'. So the tall, angular, enigmatic Yorkshiremun became Lieutenaut James Cook and in May 1768 assumed command. When on 25th August of that year he sailed out of Plymouth, he carried Jour August to that year he same but of 1 jimouth, it defined plans and instructions in scope infinitely greater than the Reoral Society had ever conceived. It was, as Dr Beaglehole, Cook's distinguished biographer, has said, 'the beginning not of one voyage but of three voyages that were going to change the face of geography and a number of other departments of human learning, as well as to affect the polluies and strategies of empires'.

In equipment, in attention to scientific needs and to the requirements of health and hygiene, the preparations and the planning for Cook's first voyage became the pattern for future voyages of polar exploration until the middle of the nineteenth eentury. There was first the choice of a ship. It must be one, Cook maintained, 'in which the officers may, with the least hazard, renture upon a strange coast.' She must be 'of a construction that will bear to take the ground; and of a size, which ... may be safely... half on shore". These were qualities, Cook reflected after his second voyage, 'not to be found in any ships of war of forty gum, not in frigsters, mor in East India Company's ships, nor indeed in any other but North-constry-built ships, or auch as are built for the coal-trade'. These were the ships, 'cat-built' colliest from Whithy used as transports and storeships by the Navy, in which Cook had served as a merchant seaman in the North Se. It was in one of them, the *Endergou*, a 'cat-built' barque of some 370 tons with a wide bluff bow, that Cook sailed

barque of some 370 tons with a wrde bluit bow, that Cook sailed on hus first great voyage Since the expedition was in impiration a scientific enterprise, a number of scientists, including Cook hinself (for narigation, eharting, astronomy) were numbered in the Endorour's comple-ment of ciphty five There was Mr Green, the astronomer, 'the ingenious Mr Green, 'whose observations of the transit of Venus were to be the main work of the expedition at King George III Island or Tahut There was the portly and garrulous Dr Solander, a pupil of Linnaeus and the ablest botanist in England, with another Swede, Hermann Sporing, as assistant naturalist And there was the young and clegant Mr Joseph Banky, one of those rich dilectantes who adorned the Royal Banky, one of those rich dilectantes who adorned the Royal Society of that time, 'a gendeman of large private fortune, well versed in Natural History who, preferring exploration to the routine diversions of the Grand Tour, had eased the problem of his acceptance by a contribution of £10,000 to the expedition's ins acceptance by a contribution of 10,000 to the expectition a funds. The inclusion of so fashionable a young main had its draw backs, for Banks insisted on bringing with him a small retinue of servants, including two Negross, Richmond and Doriton, for all of whom space had to be found in the cramped and dingy quarters of the East Coast collier. He also brought two members of the expedition essential before the days of photo supply These were the drawdpthmen, for botany the young and virtuous Sydney Parlinson, for 'landskip' Alexander Euchan whose delicate drawing have charmed successive generations of readers of Cook's travels

Natural History, a term in the eighteenth century almost synonymous with Science, was a principal prococupation of the expedition and a contemporary remarked No people ever went to sea better fitted out for the purpose of Natural History They have got a fine Library of Natural History, they have all sorts of machines for extending and preserving insects, all kinds of nets, trawks, drags and hooks for coral fishing, they even have a eurious contrivance of a telescope, by which, put into the water, you can see the bottom at a great depth, when it is clear

But these scientific studies, in astronomy, in natural history, though of primary concern to the Royal Society, were secondary
in the minds of the Admiralty. More important were Cook's own work of charting and survey, and the exact geographical descriptions which he was instructed to make, of mineral resources, of the Genius, Temper, Disposition and Number of the Natives, if there be any ...' In the long run, trade and colonization were the objects of this as of most exploratory voyages in the eighteenth century. Discovery and exploratory to the honour of this nation as a maritime power, as well as to the dignity of the Crown of Great Britain, and may tend directly to the advancement of the trade and navigation thereof'. As for colonization, 'You are also with the consent of the natives to take possession of convenient situations in the Country in the name of the King of Great Britain'.

There is no need here to retell the story of Cook's first great voyage of circumnavigation from Cape Horn to Tahiti, or to describe the charting and circumnavigation of New Zealand, the journey up the east coast of Australia, or the return journey by way of New Guinea and Java. From the point of view of polar emploration, what is important are Cook's views about the legendary southern continent (for which from Tahiti the had screte instructions to search) after this first voyage of 1768-71. That such a continent, if it existed at all, could only be found in a high latitude, Cook was now certain. With an eye on Dalrymple and De Brosses and their followers, this voyage, Cook declared, 'must be allowed to have set aside the most, if not all, the arguments and proofs that have been advanced by different authors to prove that there must be a Southern Continent—I mean to the northward of 40 degrees South, for what may lie to the southward of that haitude I know not. Certain It is that we saw no visible sign of land, according to my opinion, neither in our route to the morthward, southward or westward, until a few days before we made the coast of New Zealand . . . . .

The problem bad now at last been reduced to manageable proportions. But Gook was not content to leave it there. 'Thus,' he wrote in his journal for March 1770, 'I have given my opinion freely and without prejudice not with any view to discourage any future attempts being made towards discovering the Southern Continent; on the contrary, as this voyage will evidently make it appear that there is left but a little space to the northward of 40° where the Grand Object can lay, I think it would be a great pity that this thing which at time has been the object of many ages and nations should not now be wholy clear'd up, which might very easily be done in one voyage with out either much trouble or danger 'The direction in which auch a voyage must be made Cook explaned in his report to the First Lord of the Admirahty in 1772 'Therefore, to make new discoveries the Navigator must traverse or circumnavigate the globe in a higher parallel than has high-there been done 'The search, in other words, had now to be directed towards the hart of the Antarcit regions

None of these solver and logical reflections, however, reached the general public or Dr Dalrymple. On the contrary, sensa tional rumours flew around the town that the greatest of the discoveries from which Cook had just returned was nothing less than the continent itself, inhabited, so it was suid, by peopler 'hospitable, ingenious and civil' who were eagenly awaiting his return Dr Dalrymple was greatly encouraged in 1772, the year after the Endearour's return, he took up the cudgels again with his customary volence, using language which shows the full measure of his fantary Why, he asked angmly in his Collections of Forger to the South Sear, why should the Government bother with the contanent lay to hand, a land more spaceour than the whole civilized part of Asia, from Turkey to the eastern extremity of China' The scraps from this table', he declared, 'would be sufficient to maintain the power, dominion and sovereignty of Britan'

In France the followers of De Brosses were no less vocal nor were ther claums less absurd When, that same year, the Breton nobleman Yves Joseph de Kerguelen Tremarce returned from hs discovery of the sub Antarctic Kerguelen Island (on the franges of the Indian Ocean), he claumed, on the basis of one brief and hazardous landing, no less than the discovery of La France Australe 'The lands which i have had the happiness to discover', Kerguelen declared, 'appear to form the central mass of the Antarctic Continent' and the land which I have called South France is so suitated as to command the route to India, the Moluccas, China and the South Seas . . . South France can henceforth give new life to the lle de France and Bourbon, tripling their seat-trade, provisioning and enrichening them . . . the latitide in which it lies promises all the crops of the Mother Country . . no doubt, wood, minerals, diamonds will be found . . . if men of a different species are not discovered, at least there will be people in a state of nature living in their primitive manner, ignorant alike of offence and remores, knowing nothing of the artifices of civilized society. In short, France Australe will furnish marvellous physical and moral spectales.' At first glance, this Rousseuseque vision was exhibitating, and full of ptomise. The following year, however, Kerguelen returned for a more extensive exploration. He found his island cold and barren, with fog lyng heavily upon its mountains, and named it the 'Land of Decolation'.

In England, too, illusions were shattered (though not those of Dr Dahrymple) for, in 1773, the full story of Cook's voyage was published in two volumes. Here was the problem of the Southern Continent clearly set out, and the way to its solution pointed. It was inevitable that Cook should be asked to lead a second expedition so that the matter could, as he put it, 'now be wholy clear'd up'.

Dalrymple in his shortive plans had argued that 'a thourand motives recommend a single ship for discovery', but Cook this time knew better. In his single ship, the *Endewrow*, he had been perilously near dissater on the Great Barrier Reef. For this second voyage, therefore, two ships were taken, the *Realiano* of 462 tons and the *Adventure* of 336 tons; both, like the *Endearow*, of the sturdy, East Coast, collier type. The sole motive this time was exploration, the solution of the specific geographical problem which Cook himself in his sparse, laconic way, had so clearly defined. To take advantage of new discoveries scientists were squain invited, but they were different from those who had persisted with his astronomical observationt even when on the varge of shipwreek on the Great Barrier Reef, had died. 'He had been ill for some time,' the *Gorent Evening Four gored*, 'and was directed to keep himself warm, but in a fit of the phressy hi was the occasion of his death ' This time the astronomers were Mr William Wales, in the Resolution, and Mr William Bayley, in the Adventure

Joseph Banks had used all his considerable influence to join the josepn sants nat used at ins considerable innuence to join tue new expedition and had, with Dr Solander, planned to take an even larger party, twelve in all, including Zoffany the painter and Dr James Lind, Fellow of the Royal Society, a distinguished geologist and astronomer with an extensive 'knowledge of Natural Philosophy and Mechanics' It was large party to fit into a small Whitby collier like the Resolution and the alterations which had to be made caused her to be so unseaworthy-'so crank', in Cook's words-that she had to be restored to her original Cooks worth-unks was maken the new found the ship to be 'neither roomy enough nor convenient enough for the purpose, nor no ways proper for the voyage', and he wrote a tempestuous letter to the Earl of Sandwich, First Lord of the Admirally Istall I then, my Lord, he complained 'who have engaged to leave all that can make Life agreeable in my own Country and thrown on one side all the Pleasures to be reaped from three Years of the best of my Life be sent off at last in a doubtful ship with Accomodations rather worse than those which I at first absolutely refused and after spending £5000 of my own The absolutive interval and even spectrum absolution of the former fortune in the Equipment upon the Credit of those Accome dations which I saw actually built for me? The our Great Cablum which is sto small and that is in reality our Shop where we are all to work. To explore is my Wish but the Place to which I may be sent almost indifferent to me whether the Sources of the Nile or the South Pole are to be visited I am equally ready to embark in the Undertaking whenever the Public

equality reasy to constrain the concretency meters in reports The comments of the Navy Board were explosive, and Banks's criticisms and his proposal that Cook should find another shup provoked the bluntest of replies This acrimonious corres pondence left Cook unmoved But he did not entirely get the best of the matter for instead of Banks he had foisted upon him a gloomy and complianing pair of German naturalists, Mr Johann Reinhold Forster and his son A draughtsman completed the scientific team, the celebrated William Hodges, and the scientific equipment carred included not only a theodolite, level and chain but an ingenious oceanographical apparatus for obtaining the temperature of the sea at different depths. For navigation and survey, too, the new expedition was excellently equipped, better perhaps than any that had sailed on a voyage of exploration. All the new and handy instruments were carried, the reflecting sextant, the chronometer, the station pointer. Of these the chronometer, a copy made by Larkum Kendall of John Harrison's No. 4 chronometer, was of supreme importance for the solution of the vital problem of hongitude.

Early in December 1772, less than a month after the two colliers had set a southerly course from Cape Town, the first of Cook's famous lee Islands were seen, great flat-topped bergs, moving silently through the water, some with high colonnaded sides, perfect in their glittening symmetry, others of elaborate design with pinnacles and arches, caverns and grottoes, carved and hollowed by the ceaseless motion of the sea. Keeping as far south as the drifting ice allowed, the two ships held their course, their officers on the watch day and night for the new land which might at any moment be sighted. Only the Forsters were unstirred by the tension in the air. 'We were', they recorded gloomily in their journals, 'almost perpetually wrapped in thick logs, beaten with showers of rain, sleet, hall and snow, surrounded by innumerable islands of ice against which we daily ran the risk of being shipwrecked, and forced to live upon salt provisions which concurred with the cold and wet to inflect the rass of our blood.' Banks with all hir retinue must to Cook have seemed preferable to this dismal pair.

On 17th January 1773 the Anta-retie Circle was crossed by man for the first time. In his Voyage towards the South Pole and around the World, published in 1777, Cook describes this landmark in the history of polar exploration. It continued to stand to the south, we wrote, "and on the seventeenth, between eleven and twelve o'clock, we crossed the Antarctic Circle in the longitude of 66 degrees 36 minutes 30 seconds south. The wasther now was become tolerably clear, so that we could see several leagues around us: and yet we had seen only one falmd of ice since the sorting. The solut 4 pum, as we were steering to the south, we observed the whole sea in a manner covered with fice . . . in this space, thirty-right ice islands, great and small, we re seen, besides loose ice in abundance so that we were obliged to luff for one piece and bear up for another, and as we continued to advance to the south, it increased in such manner that we could proceed no farther, the ice being entirely closed to the south in the whole extent from east to west southwest, without the least appearance of any opening 'In these passings is the first complete picture of Anizertica, the whiles wallowing and blowing in the water holes, the darting petrels, brown and white and blue, the iron grey albatrosses swooping over the mainteads, while beyond the two ships, which lay dark and motionless at the edge of the pack, ice stretched as far as the eye could see.

'No trace having been discovered of a continent on this voyage, in December 1773, after a spell in New Zealand, the search was renewed and on the twenteth of the month the Resolution and the Adventure crossed the Antarctic Curcle for the second time Steering pait ice islands more than two hundred feet in height, they reached a latitude of 67° 31 5 , but still there was no sign of land In Jauary the following year the search was widehed This time, after a third crossing of the Circle, the Resolution (the Advenue having returned to England) reached the farthert south to be strained in the eighteenth century, 71° 105 in 106° 54 W But with no better success On this third attempt, the pack rec, of which the first signs had been seen in clouds to the south of an unusual anow white brightness, proved to have been rafted by thrust and pressure from after to mousental heights On the crew, meanwhile, the meessant foul weather, the monotony of the salt food, and the stram of a barrdous royage were beemaning to tell. For once Johann Rembold Forster was probably justified when be wrote, 'A gloomy melancholy air Joured on the brows of our submarks, and a drafful sincer ergined amongst us the hour of dinner was hatfell is 'Confronted by such physical and psychological obstackes, Gook decided to turn back

and psychological constances, wook decrated to turn back. The terms of this decision, as Cook's bographer has pointed out, are among the most revealing of the character of this great scanna (' will not say,' he confessed, 'that it was impossible anywhere to get in smong the Ice, but I will assert that the bare attempting of it would be a very dangerous enterprise and what I behave no man in my situation would have thought of I whose ambition leads me not only farther than any other man has been before me, but as far as I think it possible for man to go, was not sorry at meeting this interruption.... Since therefore we could not proceed one inch further south, no other reason need be assigned for our tacking and stretching back to the north....

Cook did not turn back without classifying in his own mind the problem which future explorers would have to face. 'It was, indeed, my opinion as well as the opinion of most on board', he wrote in a passage of remarkable perception, 'that this ice extended quite to the Fole, or perhaps pioned to some hand to which it had been faced from earliest time; and that it is herethat is, to the south of this parallel--where all the ice we find scattered up and down to the north is formed, and afterward broken off by gales of wind, or other causes, and brought to the north by the current, which we always found to set in that direction in high latitudes,' Cook's final conclusion dealt one last and fatal blow at the sanguine speculations of Dalrymple and De Brosses, for he declared himself 'now well-satified no continent was to be found in this ocean but must lie so far south as to be wholly increaselible on account of ice'.

However inaccessible the continent—if such it was—might be, Cook was sure that 'there remained . . . room for very large islands in places wholly unexamined; and many of those which were formerly discovered are but imperfectly explored, and their situations are imperfectly known'. The clusive snow-capped lands doubtfully sighted by wandering ships in the sixteenth, seventeenth and eighteenth centuries were now to be systematically tracked down.

In Kovember 1774 Cook sailed once again from New Zealand and discovered (or probably rediscovered) to the south-east of Tierra del Fuego, early in 1775, the first typical Antarctic land. This was the lale of Georgia, the island of South Georgia as it is now known; an island first sighted by a Spanish ship, the León, in 1756, and today a famous whaling base and port of call for Antarctic expeditions. Three landings were made, the flag was boisted and Cook 'took possession of the Isle of Georgia in His Majesty's name, under a discharge of small arms'. It was the first British claim to territory in the newly discovered region of Antarctica. A rapid chartung by Cook of its coastline soon proved that the isle of Georgia was no part of any continent, nor did the appearance of this "savage and thorrible" land give any promue of the riches expected by Dalrymple From the ree chills of the coast, masses of ice tumbled with a thunderous roar Lichen clung in patches to the inhospitable rocks and inland the only vegetation seen was a coarse long bladed grass "The wild rocks", Cook wrote, 'raued their lofty summits until they were lost in the clouds, and the valleys lay covered with everlasting anow Not a tree was to be seen, nor a shrub even big enough to make a tooth pick 'No doubt Cook expressed the feelings of every man and boy on board the *Resolution* when he declared 'the disappoint ment i now met with did not affect me much, for to judge of the balk by the sample it (i e the continent) would not be worth the discovery'

The Resolution sailed from the life of Georga without regress and Cook set course south estiwards and then north estiwards to escape much floating ice which lay about 60° S and 30° W Soon alterwards another desolate island emerged, one of the South Sandwich islands which was charted and named Sandwich Land after the then First Lord of the Admiralty After a fruitless search for Bouvet Island whose longitude Bouvet had evidently sadly muccleulated, the Resolution sailed for Cape Town, and thence for Spithead There at the end of two great voyages during which Cook had for the first time ercumanigated the 'continent' in high latitudes, the Resolution dropped anchor on a summer's day, in july 1775

Cook's conclusions were as convencing as they were discourag ing and put an end, as has been sud, to one of the great chapters of human speculation. Occan after occan had been systematically searched but of Dalrymple's continent there was no sign if it existed, then it lay unpregnable far to the south in the mdst of encircling battlements of are. If it were found, would it be worth the lives of men, the loss of shape which would be the price of its discovery? On this point Cook had no doubts 'Should anyone', he blundly declared, 'possess the resolution and the fortitude to elucidate this point by point may be done, is shall not envy hum the isance of hus done, is shall not envy hum the isance of hus discovery, but I make bold to declare that the world will derive no benefit from it 'As for the Antarctic lands discovered, what were these but 'countries condemned to everlasting rigidity by Nature, never to yield to the warmth of the sun,' countries for whose wild and desolate aspect Cook could find no words. The Antarctic seas certainly were rich in life and in promise of wealth. But the lands, to judge by these discoveries, were dead.

Cook's pioneer voyages across the Antarctic circle were not his last to the polar regions. In 1776, a year after his return, Parliament, as it had done in 1745, offered a reward for polar discovery, this time for the discovery of a North-West Passage by way, not of Hudson Strait, but north of the 52nd parallel of north latitude. A further reward was officed for a sea voyage as far as 89° north. Cook meanwhile had accepted a vacant captain's berth at Greenwich Hospital. Nevertheless, tirted as he was by so many years continuously and hazardously at sea, he accepted the Admiralty's invitation to lead a new expedition.

Sailing northwards across the Pacific, Cook came in 1778 within sight of the Bering Strait. His intention had been to sail through the Strait, then north-eastwards past Point Barrow into the Beaufort Sea, but towards Alaska the ice was thick and he therefore crossed over from the American side northwards and westwards towards Asia and Dezhnev's East Cape. Here again ice blocked the way. Bering, confronting an ice-free sea, had chosen to turn back. For Cook, there was no choice, The whole strait was frozen over, But Cook saw what Bering had never seen because of the fog which obscured the peaks and promontories of Alaska. In A Toyage to the Pacific Ocean, published in 1784, he wrote, 'At this time, the weather which had been hazy, clearing up a little we saw land extending from South to South East by East, about three or four miles distant. The Eastern extreme forms a point which was much encumbered with ice; for which reason it obtained the name Icy Cape. Its latitude is 70°29', and its longitude 198°20'. The other extreme of the land was lost in the horizon; so that there can be no doubt of its being a continuation of the American continent.' Meanwhile the main body of ice to windward was drawing down upon his ships and threatening to force them on to the shore so, with this sight of the two continents achieved, Cook withdrew

again towards the central Pacific and there met his death on a Hawaiian beach

On this last voyage the tracks of Russian and British, Arctic and Antarcuc, ships had crossed as if m preparation for one of the greatest ages of polar exploration This, in both Arctic and Antarcuc, opened in the second decade of the nineteenth century, after the Napoleonic Wars

## After the Napoleonic Wars

A string the years of the Pax Britamica which followed waterhoo, Because of the abandonment of mercantilism in favour of free trade—a revolution in British policy—the seas were for the first time free. In science, and in technology too, the period was one of extraordinary progress though it was not until well into the second half of the nineteenth century that the greatest advance in maritime technology, the transition from wood and suits to tion and steerm, was to benefit polar exploration.

In Britain, which took the lead in exploration after the Napoleonic Wars, the advance of science was an overwhelming influence in the general shaping of ideas and as education spread among the new literate classes which had emerged from the aftermath of the Industrial Revolution, the need for centres arose in which this popular enthusiam for science could be focused and where new knowledge could be accumulated and diffued. Just as the intellectual interests and desire for improvement of the new technical working class found a focus in the Mechanles Institutes which spread rapidly in the second quarter of the century, so the preoccupation with scientific knowledge of the broadening middle class became concentrated in a number of private societies which combined scientific aims with a popular, rather than a professional, membership.

These new popular enthusianow, concerned especially with science in relation to exploration, arose fundamentally from the broadening, in new social conditions, of a trend which had originated, as we have seen, in the late eighteenth century when Cock's startling revelation of a new and unknown world powerfully atimulated a general desire to promote geographical discovery. The foundation of the Linnes Nociety and of the African Association in (1788 was followed in 1804 by that of the Palestine Association for the exploration of Syria and the Holy Land In 1828 the Zoological Society was founded, and in 1830 and 1831 respectively, the Geographical Society of London and the British Association for the Advancement of Science These the Brutsh Association for the Advancement of Science These societies, supported by the private subscriptions of members who came for the most part from the professional and commer-cial classes, fulfilled two important requirements As science moved early in the nucleath century towards the modern pattern of specialized research, broad studies grouped in the eighteenth century under such general names as 'Geography' and 'Natural History' came to be discarded by the national academics of science in favour of more precisis and specialized investigations In this respect, the new societies filled a gap More important. however, was the resemblanced lawed areason More important, however, was the psychological need arising out of the ercumstances of the Revolutionary and Napoleonie Wars In so far as the new societies were concerned with the wars in so lat as the new solution and with the accumulation of knowledge about foreign or unknown lands, they provided a most welcome avenue of actual or vicarious escape after thirty years of national isolation

years on matchesi Bostavon Of these raw arisons societies, the geographical societies not only in Britam but in Europe are in many ways most characteristic of these new developments in contemporty tate. As eentres of influential and informed public opinion they became during the inneteenth century powerful somewhat reactionary protogonists of polar exploration, with a role initially complementary to, but so how a separation, while role moving complementary of the more specialized national academics of science. The first of the geographical societies was the Societe de Geographica of Paris, founded in 1821. This was followed in 1828 by the foundation of the Gesellschaft fur Erdkunde in Berlin and two years later by that of the Geographical Society of London A memorandum of 24th May 1830 proposing that a society should be founded in London for 'the promotion and diffusion of that most important Lonuou to the promotion and dimission of that most important and entertaining branch of howledge-geography illustrates in sympathetic language the point of view (making allowance for antional prepidice) of the founders of a nueteenth century geographical society. It was needed, its promoters declared, on the grounds 'that the interest excited by this department of science is universally felt, that its advantages are of the first importance to mankind in general, and paramount to the welfare of a maritime nation like Great Britain, with its numerous and extensive foreign possesions; that its decided utility in conferring just and distinct notions of the physical and political relations of our globe must be obvious to everyone, and is the more enhanced by this species of knowledge being obtained without much difficulty, while at the same time it alfords a copious source of rational anuscement. ... 'This blend of intellectual interest, national bias, and enlightened entertainment is fairly typical of the atmosphere in which the principal geographical societies were founded.

<sup>•</sup> Polar exploration during the first half of the nineteenth century was, in the tradition established by Cook, predominandy a naval affair and naval officers with experience of polar voyages were among the most active members of the new geographical societies. Through them a wealth of praetical knowledge was accumulated and just as the national academics of science continued to advise governments in matters of polar science, so the geographical societies became centres of advice on the organization and technique of polar exploration. The geographical societies also included a large proportion of the new and expanding commercial and industrial class, among them the owners of whaling and scaling ships. The remarkable contribution which these men and their carefully selected captains made to geographical knowledge is one of the most striking features of polar exploration during the first half of the nineteenth century.

One of them, William Scoresby, whose Enther William Scoresby of Whitby achieved a farthest north of 81° 31′ to the east of Splitbergen in 1806, may be said without exageration to have laid the foundations of modern Arctic geography by the publication in 1820 of his Account of the Arctic Regions with a Hintory and Description of the Northern Whole Future and the Journal of a Vogage to the Northern Whole Future and by his Journal of a Vogage to the Northern Whole Future and by Journal of a Vogage to the Northern Whole Future and the sploration were the Enderly brothers, one of whom, Charles Enderby, was a founder of the Geographical Society of London. Sacrificing the secrecy inevitable in a highly competitive industry, in which knowledge of new fishing bases and fishing grounds, of tides and currents and ice conditions, was pealously guarded from reads, these men not only made available the knowledge they or their captains had acquired, but also diverted thur ships for the purpose of geographical discovery, often at considerable financial loss. The discoveries made by asalers of the Enderby brothers, some of the most impressive discoveries of the anteteenth century, prepared the way for a great campaign of Antarctic exploration in which the navies of Russia, Bratian, the United States and France in turn participated

The broad Scientific interests, the zest for travel, for exploration and for geographical discovery which inspired men of different kinds and nationalities in this age of peace and of free dom of the seas, were not, however, untarnished by thoughts of national preticing or strategies advantage The advant of free trade and freedom of the seas brought with it no corresponding decline in nationalism, on the contrary, and in a period when polar exploration was predominantly sponsored by governments and cettred out by navres, it was ineviable that politics and strategy should creep in

The British Navy took the lead in the renval of polar exploration after the Napoleonic Wars and its ambition was the dis covery of a North West Passage It was a challenge inherited from past generations of British seamen and for this reason it had a traditional and a romantic appeal But this was no longer the North West Passage to Cathay It was now envisaged in terms of the Circlimnavigition and exploration of the Aretic coast of British Canada and of the discovery of any new lands which might be found to the north of the America continent, including (because Baffin's discovernes were no longer acknowledged) the tice covered mass of West Greenland

Such a project, so closely bound up with the exploration and extension of British territory, was one in which Britain, supreme in naval as in a concount can dimancial power but keenly alve to potential nvals, could not allow herself to be forestilled by any foreign nation. In fact, some apprehension of foreign activity along the borders of Canada in the first quarter of the numeteenth century was not unwarranted. The strategic power low works from reasoning British colonist were relatively few and widely scattered. Relations between British and the remaining French settlers were easily inflammable. To the south lay a youthful and ebullient United States which had already threatened the Canadian frontier during the war of 1812. To the west was apparently a greater danger: Russia, fervently nationalist and with imperial ambitions which had been greatly encouraged by the events of 1812-15. She was in total occupation of Alaska (overlooking one extremity of the North-West Passage) and had by 1820 spread her trading posts and settlements so far south along the American coast (as far indeed as San Francisco) that it almost seemed as if three nations not two might soon divide the North American Continent

British suspleion of Russian intentions and of the true nature of her recent exploratory operations in Arctic and Pacific waters was reported by the Austrian Archduke Ludwig after his visit to England in 1816.

A Power', he wrote, 'which is not in friendly esteem is Russia. The Englishman, calculating and jealous of his trade, knows that that Empire, which is so vast, provided with all resources, and touching all seas, might one day come forward as a Sea Power. England has been made attentive of late by repeated Russian sea voyages, which had for their purpose more than discovery; by the establishment of settlements on islands between Asia and America, and even on the North-west Coast of this continent [i.e. America], by the connection with Kamchatka, the Continent of Russia; by the mission to China, and by the conquests over Persia."

Similar suspicions were hinted a year later by John Burrow, Secretary to the Admiralty, a principal founder of the Geogra-phical Society and the father, as he came to be called, of British Arctic exploration in the nineteenth century. In an anonymous article in the Quarterly Review for October 1817 Barrow (who had access to the Litest intelligence about Russian movements) wrote, 'The Russians have for some time been strongly impressed with the idea of an open passage round America. . . . It would be somewhat mortifying if a naval power but of yesterday should complete a discovery in the nineteenth century, which was so happily commenced by Englishmen In the sixteenth.'

substantal rewards for the discovery of a North West Passage, or for a farthest north towards the Pole if no westward route to Beering Strait could be found Great as was the British anxiety to forward exploration and discovery it is difficult to avoid the supprion that the desure to forestall and counterate Russian operations in the Arctic, if not a major factor, was at least in the minds of the Board of Admirally when they agreed to make men and ships available for Arctic exploration

International rivalry was also much in evidence in Antarctic waters early in the ninetcenth century. There the first discoveries after the Napoleonic Wars were made by the sealers, American after the Napoleonic wars were made by the seafers, American and British working in ferce competition in their search for ports and bases and the most profitable fishing grounds. In polit cell terms, this invaly-among the sealers (who were surreptitionsly supported by their Governments) was a reflection, an extension, of the Anglo American economic and commercial war which had began with the first expansion of British trade in South America in the eighteenth century After the Napoleonic Wars, when Europe was impoverished and Canada still too scantily populated to provide profitable openings for British goods, this sharpened to a bitter conflict as Britain strove by every means to capture the South American trade The Monroe Doctrine of 1823 was directed at Britain rather than at France or Russia, and Canning for one was convinced that it was the American intention to supplant Britain in navigation throughout the world, but especially in all seas adjacent to America When rumours reached London in the thirties that the United States Navy was preparing to explore Antarctica, this news had accordingly a powerful effect in persuading the Bratish Admiralty to launch the first naval expedition to the Antarctic since the voyages of James Cook

At one stage in this Anglo American struggle Antarctic territory nearest to South America assumed for British merchants engaged in the South American strake as importance which had nothing to do with scaling. On the mainland their future was precarous for, quite apart from the hostility of American interests whose agents were active in all ports and cities, there were many doubts about the fate of the old Spanish colonies. They begin therefore to look about for adjacent standards from which they could, if need be, carry on the struggle. The Falkland Islands, the nearest, had been abandoned for reasons of economy in 1774 and were not reoccupied until 1833. When the South Shet-lands were discovered by Britain in 1819, more than one of these merchants saw in them a possible base to which they might retire and carry on British trade.

To conclude this preface to the story of the first polar explorations of the ninetcenth century, a word must be said-because the British Navy took the lead-about the special position and functions of the Navy in exploration at this time, and about the characteristic pattern of life on these first British naval expeditions

The doctrine of the freedom of the seas which Britain had proclaimed and of which her Navy, supreme on all seas, was the principal guardian, carried with it a special obligation. This was not only to ensure the protection of the seas but to provide for their safety by exploring and charting unknown coasts and waters for the benefit of the shipping of the world. Hydrographic survey had made great strides since the days of Cook. In 1811 a separate Hydrographic Branch was established. After the wars, charting and survey, with magnetic observations which assumed an importance greater even than during the eighteenth century, became the principal task of British naval expeditions and, indeed, so great was British technical advance in this field that London became the world's chief centre for the purchase of charts and hydrographic instruments, as it remains to this day.

The first British naval expeditions to the polar regions provided in their organization and their conduct the pattern for British polar exploration for many years to come. Officers and men, ambitiously or adventurously minded, volunteered for polar service not as 'explorers' in the twentieth-century idiom but as part of an ordinary naval career and they sailed for an unknown world of ice and snow full of the robust confidence of the Victorian age. Their uniforms, of standard naval pattern, were more appropriate to Portsmouth than to the Poles, and samples of the heavy Victorian plate with which their wardroom tables were laden have survived among the more curious and moving relies of the Arctic tragedies of the nineteenth century. On board, rollicking performances by the ships' company of

the latest London farce, magne lantern shows, and a heavily humorous weekly magazne, like Party's North Georgia Gazette ad Winter Chronicle, kept up morale during the months of winter darkness But discipline was stern, and the moral tone set by officers drawn from the new modile class was strictly Evangelical and Sabbatran Rehgnous education featured largely in the shup's routine on these expeditions and large additional stocks of bibles were hopefully carried for distribution to the Eskumoes But despite this stubborn adherence to traditional avail ways

But despite this stubborn adherence to traditional naval ways in most unsuitable conditions, despite their madequastic equipment, their ignorance of how best to live and how best to travel in the polar regions, the achievements of these expeditions, now to be described, are among the most remarkable in polar history At sea their supreme skill in the handling of cumbrous saling ality, turning and twisting through the pack at the mercy of the winds and the zee, was a miracle of navigation. On land, their hencio pourneys haulung, officers and Jack Tars alike, heavy sledge boats across the turnbled and subfung Arctic floes, were for generations the inspiration of Britsh polar explorers

# The Royal Navy takes the Lead

THROUGHOUT polar history there have been men-a John Barrow, a John Reynolds, a Henry Grinnell, a Clements Markham-who gave, like the Hakluyts in Elizabethan days, a new turn and thrust to polar exploration. The moving spirit in British Arctic exploration of the first half of the nimeteenth century was John Barrow. Industrious, highly capable, widely travelled in bis younger days, Barrow served as a decisive and influential Secretary to the Admiralty for forty years from 1804, and became moreover in later years President of the Geographical Society of London. He was born of humble Westmoriand stock. As a boy while working in a foundry at Liverpool the contrived to be the first in England to make an ascent with the famous Italian aeronaut Lunardi in his balloon. He followed this adventure by a summer cruise to the Arctic in a whaler and from that day be became an ardent enthusiast for polar exploration and a great student of its literature, especially of the Elizabethan age.

When Barrow, after many years in China and South Africa, joined the Admiralty in 1804, he found himself in an exceptionally strong position to influence polar affairs. The year 1817, as be describes in his autobiography, appeared ordalned by circumsstance to be the one in which the great traditions of British Arctic exploration might be revised. There was little demand on the Royal Navy at the time. The Arctic geography of North Apperica, the discovery of a North-Vest Passage (on which the Russians had their eyes), even the insularity of Greenland, were all problems yet unsolved. Indeed, how little was then known of Arctic geography despite the explorations of the last two hundred years can be scent from the map accompanying Barrow's own Chronological History of Vergage in the Arctic Regions, publibed in 1818. At the mouth of the Mackende River, at points northwards of Great Eser Lake, the sea lad been reached late in the eighteenth century by Alexander Mackenzie and Samuel Hearne, men of the Hudson's Bay Company But farther north, except for a vague and shadowy outline of Greenland's west coast, the Arctic map, despite William Baffur's discoveries, was blank

But there was another and more immediate reason for the temporary climatic fluctuation, were m 1817 quite exceptionally favourable and as Barrow recorded in his article in the Quarterly Review (lireday quoted), William Scoresby the younger, the whaling captam, had that very summer reported the extraordinary disappearance of an immense quantity of ice 'i observed, Scoresby had written to Sir Joseph Banks, 'on my last voyege (1817) about two thousand square leagues (15,000 aquare miled) of the surface of the Greenland sean, included between the parallels 74° and 80°, perfectly void of ice, all of which had disappeared within the last two years 'Ints was an opportunity not to be lost Farrow at once proposed to Lord Melville, First Lord of the Admiralty, a plan for two voyages 'for the advancement of geography, nivgeiron, and commerce and this, with strong support from the Royal Society on scientific grounds, was rapidly approved

Barrow's plans were on a grand and multiple scale. One naval squadron was to sail northwards between Spithergen and Greenland and then as close to the Pole as possible and on to the Berng Strait This was in the direction of Captain Constan time Physics expedition of 1773. The second and principal squadron was to search for an entrance to a North West Passage along the traditional avenue of Davis Strait while other ships waited off Berng Strait to welcome or rescue any survivors who might get through This was the plan for the first maritume operations. In addition, there was the ba land exploration of the almost unknown. Arctic coast of North America

In May 1818 the naval squadrons sailed Ciptain David Buchan, with orders for the northern journey, commanded two bomb built sailing ships, the Dorahes and the Trent His second in command was an officer whose name was toon to become a household word, Leutemant John Franklin This voyage, how ever, was a total failure Off the west coast of Spitsbergen a volent gale fell upon the ships, forcing them to make for land Venturing out again to the north, they were beset for days in heavy pack along the edge of the Arctic Sea, then escaped, and returned, battered by the ice, to Spitsbergen. A coastal map of north-west Spitsbergen, but nothing else, came out of this first atternet.

The voyage of the second squadron, under the stocky, redheaded Commander John Ross, who had a very remarkable young naval officer, Lieutenant Edward Parry, as his second-incommand, ended inexplicably. Ross's ships, the Alexander and the Isabella, sailing up Davis Strait, restored to the map the discoveries of the great Elizabethan scaman, Baffin: Baffin Bay, and Smith, Jones and Lancaster Sounds, which Baffin had named after his supporters in the City of London. But alter arriving on 30th August 1818 off Baffin's Lancaster Sound, the most likely of the three to lead to a North-West Passage, Ross sailed westwards for a day, then stopped. Ahead of him, he insisted, he 'distinctly saw land round the bottom of the bay forming a chain of mountains connected with those which extended along the north and south side'. Indeed, so convinced of their existence was he that he named them after a Secretary of the Admiralty, the 'Croker Mountains'. To Parry and his fellow officers, however, the 'Croker Mountains' seemed no more than a fantastic optical illusion. They could see nothing. The sea ahead was clear. They felt certain that they were on the very verge of a great discovery. When Ross, therefore, insisted on turning back, it seemed an incomprehensible, a lamentable, decision.

Amusing and malicious stories about Ross and his mythical 'Croker Mountains' were soon going the round of the drawingrooms of London. Some found it impossible to doubt the word of so capable and trustworthy an officer. But there were many who hinted slyit that the Croker Mountains were a hapty excuse to retreat to safer waters. So damaging was this gossip not only to Ross but to the Nary that the Administly decided to settle the matter by the dispatch of another expedition. The commander chosen was Ross's second-in-command, Lieutenant Edward Parry. The elegant and ambitous young commander of the North-West Pausage expedition was only 29 years of age. But his talents and achievements were already considerable. His knowledge of hydrography, nautical astronomy and magoetic research had won hum a Fellowship of the Royal Society and he had at the same time already won a name in the Navy for seamanship and navigation and for leadership of men

### THE FIRST ATTACK ON THE NORTH WEST PASSAGE

To follow in any detail the fortunes of Parry's first great Arctic expedition, or for that matter the manoeuvres of any of the many expeditions seeking a North West Passage during the one namy experiments according a troud when the according to the intrincite numeteenth century, some knowledge is necessary of the intrincite pattern of islands and icy channels which spreads across the map between the north western extremity of Greenland and the Arctic coast of the American continent Below the ice and around the rock masses, geologically related to those of the Yukon and Alarka, Atlantic waters mingle with those of the Beaufort Sea Beyond lies the Bering Strait through which warm currents stream from the Pacific into the Arctic Ocean On the map, the way to the west looks easy But to Parry, as he sailed, the region westwards of Baffin Bay was utterly unknown, a world of lands perhaps, or of sea, where navigation must be a matter of tedious and repeated probing where a day s sailing might end in bestment in the ice, or imprisonment in some land locked bay Parry's ships were the Hull built bomb *Heda* of 375 tons and a gun brig of 180 tons, the *Carper* both hings, to save men, being barque rigged, with bows, bottoms and keels strengthened against the ice, and with provisions for two years Parry had with him on the *Held* young Captain Sabine of the Royal Artillery who was to gain a reputation as 'the most persistent and the most successful magnetic observer of his day Lieutenant Liddon commanded the Graper It was a very young expedition, for apart from Parry and Sabine, no officer was more than 23 years of age The two ships sailed from the Thames on 11th May 1819 with

The two ships sailed from the Thames on 11th May 1819 with one question uppermost in the mands of those on board Did Ross's Croker Mountains exist or not? By the beginning of August, they were nearing the answer To the north lay the low, smooth coast of Devon Island, overhaug with clouds, to the south the mow-covered mountains of northernmost Baffin Island Ahead, free of ice and dark as the ocean, were the waters of Lancaster Sound The *Heads* was the faster ship. As she waited for

84

the Griper under easy soil, she pitched so heavily in the westerly swell that the sea was thrown up against her stern windows. To Parry this immediately was a hopeful sign, the sign of an open sea and not of the land-locked bay which Ross thought he had seen.

As they sailed towards the new waters there was much scientific work to be done: there were soundings to be made with the new deep-sea class invested by Captain Ross, there were sea and air temperatures to be noted, the movement of tides and currents, the angle of dip of the horizon, the effects of the Auron Borealis on the electrometer and magnetic needle, and many other phenomena to be observed. Magnetic observations were an important part of the scientific programme recommended by the Royal Society and Captain Sabine of the Royal Artillery, and various branches of knowledge' was fully occupied. Charting and Survey and drawing were asigned to Lieutenant Beechey and Lieutenant Hoppner, the Admirally having decreed that no professional civilian draughtsman should be carried on this purely navel expedition.

As the Heclo and the Griper sailed westwards into Lancaster Sound, two questions filled the minds of Parry and his men. Was this the North-West Passage? Or were they at any moment to be confronted by the barrier of Ross's Croker Mountains? In his Journal of a Vogage for the Discovery of a North-West Passage from the Atlantic to the Pacific, Parry describes the scene:

It is more easy to imagine than to describe the almost breathless anxiety which was now visible in every countenance while, a the brezer increased to a fresh gale, we ran quickly up the sound. The mastheads were crowded by the officers and men during the whole afternoon, and an unconcerned observer, if any could have been unconcerned on such an occasion, would have been amused by the eagemess with which the various reports from the crow's-mest were received all, however, hitherto favourable to our most sampine hopes."

Sounding after sounding revealed no bottom. Headland after headland came into view for the weather remained remarkably clear and the only ice they saw was a few large bergs, much washed by the sea. When they reached longitude 83° 12', Parry knew that he was beyond the point which Ross had reached But the shores of the sound were still some miles apart Croker Mountains had been proved a myth

Parry and his officers were now supremely confident They felt already that they were well on the way to the Berng Stratt and to Kamchatka where, their official instructions stated, they were to hand over their journals and maps to the Russian Governor for transmission to St Petersburg and Lindon But it was too soon for such high hopes. The easterly wind which had carried the Heds and the Graper up the sound suddenly died away and they were becalmed in thick and snowy weather for day, with lesure to examine the curtous horizoatal banding of the cliffs along both shores while the men amused themselves chasing the white whiles which swam around the ships in large numbers, emitting 'a shrull ranging sound, not unlike that of musical glasses badly played'.

The manoeuvres of the two shups, when the breeze sprang up again, give some idea of the techous process of trial and error by when exploration had to be carried out in such unknown and complicated waters. To the westward, their way was harred by a large compacted mass of ce flocs, bearten by a heavy surf. So they turned to the south through the haze which hung over the sea and found themselves in a large inter-Prince Regent inletflanked by ice along one shore. The ship's compasses, sluggah ever since they had entered Lancaster Sound, on this southward course soon became useless and were removed and placed un store. Somewhere near, as James Clark Ross was to prove, was the site of the magnetic pole

Parry's am, however, was not the North Magnetic Pole but the North West Passage Finding the unlet to run south and south east they turned back to Lancester Sound But in snowstorms and fog, it was perlous sailing, with land suddenly looming upleaving the ships with only a narrow space in which to wear round between land and ice it took them many days therefore to feel their way along the south shore of Decon Island and to find the coast trending northwards, with a wide channel (Welling ton Channel) and a large island (Cornwillis Island) to the west This northward turn of the coast of Decon Island was a great relief for Parry had feared that it might turo south natead of north, swinging across in a great arc to join the mainland of America. Even more encouraging was the sight of the sound (beyond the entrance to Wellington Channel) broadening out into a wide strait. This Parry called Barrow Strait after John Barrow, the promoter of the Arctic expeditions. The officers and men of the Hecla and the Griper were now in

The officers and men of the Heela and the Graper were now in high spirits; it was the end of August but they still had six weeks or so before the onset of winter; the ships had so far come through undamaged; provisions were ample; and they had found a broad and roomy seaway to the west, navigable between the large ice floes which broke up the surface of the open sea. Bearing to the north, then running again to the south to avoid the floes, they entered these broad and ice-strewn waters, calling them Melville Sound after the First Lord of the Admiraly. To the north, as the ships moved in and out of the Admiraly. To the north, as the ships moved in and out of the floes in the direction of the Beaufort Sea, they saw an extensive, inhospitable coast, and in the distance a low, dark headland narrowing their path ahead. There were Eskimose along this coast, the coast of Melville Island, and Ser a brief landing to make contact with them, to make survey and magnetic observations, and to hunt reindeer and shoot parry because of logs and calms and contrary winds, until on 4th September 1819 he was able to announce the news that they had that day crossed the meridian of 110 west from Greenwich, in latitude 74 degrees 44 minutes 20 seconds.

The officers and men of the Heda and the Griper by this achievement became entitled under the Act of Parlianent to a reward of £5,000. But their celebrations were short-lived. For aloft in the crow's next, Parry could see stretching from coast to coast across their path a solid, apparently impenetrable barrier of ice floes, with no sign of open sea beyond. The two ships anchored. There was after all still a hope that the ice, as often happened in September, might loosen and diminish. But as the days went by, the ice, iar from abating, moved in towards them, slowly, inexorably, as if in accordance with some malevolent plan to imprison the ships at their anchorage. Furthermore, with the lower autumn temperatures, young ice, Parry saw, was forming fast on the surface of the sea it was too late now to escape and at a small hay, Winter Harbour, slightly to the east of Cape Hearne, the *Hecla* and the *Gaper* put in for the winter Thus was the most westerly limit of Parry's first and most remarkable voyage

As late as 4th October, there was still sunlight enough for Parry to read and write in his cabin and from its stern windows morning and evening he watched in silent admiration the fluctuat ing hues, hlue, purple, scarlet, and deep red, of the Arctic sumrse and sunset On 4th November, however, the darkness of winter set in and lasted almost a hundred days Parry made sure there was no idle moment, no time in which the spirits of his men might flag during these dark hours From the moment, a urea mignt mag ourning these dark nours from the moment, a quarter to sax each morning, when all hands turned out to scruth the decks with warm stand and stones, there was plenty to do, musters morning and evening, inspections of clothing and bedding, continual fire precautions, and each aftermoon work on sils and ngging. When the weather was too bad for exercise on shore, he ordered the men to run round the covered and ingen with hards data. ouly heated decks, keeping step to a tune on the ship's organ, or to any song they cared to sing. For the officers, the afternoon walk on shore was the most dismal duty 'Not an object was to was on shore was the most dismal duty 'Not an object was be be seen on which the eye could long rest with pleasure, unless when directed to where the slups lay, and where our litle colony was planted 'There was plenty of entertainment to counteract this Arctice gloom and monotony, singing and dancing for the men, for the officers 'more rational amutements, reading, writing chess classes are the fact whether whether the short whether writing chession and monotony singing and dancing our use men, hor the olicers 'more rational amusements, results, writing, chess, playing on the flute and the volue', is to both the fortmightly theatrical performances, produced and stage managed by Lieutenant Beechey which opened uproarnously on the first winter's evening with a performance of 'Miss in her Teens' This, Parry dryly remarked, 'afforded to the men such a fund of amusement as fully to pustfy the expectations we had formed of the utility of theatrical entertainments' Captan Sabine's weekly netwoney. Morth General Generation and Winter Chendled, weekly newspaper, North Georgia Gazette and Winter Chronicle, was highly successful and the dark days passed with surprising rapidity At night, above the mcessant wind, they could hear the howing of the wolves on shore and the cracking of the ships' tumbers under pressure from the sce.

Early in February all hands set to work, sawing leads through the ice while Parry explored across Melville Island to its northern cost. After three months of imprisonment, it was a great relief to escape from the ships and to see, as the Arctic spring turned to summer, the moss, fresh and green, istuing from the melting snows and to rest the eyrs on dwarf willows, on pink and yellow saxifrage, after the implacable whiteness of the winter. There was hunting too, of reindeer, geese, and parmigan, and the shaggy and bewildered musk-ox, the most primitive of Arctic creatures, provided excellent sport for these Arctic explorers of the British Navy.

By August, the Hela and the Griper made one last attempt to break through the massive ice which still blocked all passage to the west. But the floes, Parry calculated, even now at the height of summer, were fifty feet thick; a hopeless task for ships powered only by the cold Arctic winds. Defeated by this one last barrier between his ships and the navigation of a North-West Passage, Parry sailed for England.

Not only in its discoveries but in its record of good health and high morale during the first wintering by naval ships in the Arctle, this was a remarkable expedition. The entrance to a North-West Passage had been discovered and navigated over a distance of some six hundred miles from Bafin Bay. Down Prince Regent Inlet, the way to the North Magnetic Pole had been found. These discoveries of new Arctic waters had, moreover, rich consequences for the British whaling industry. They had auffered setious losses recently because of the northward migration of whales, and the whales who carlies had followed John Ross's ships into Bafin Bay now moved westwards to even richer whaling grounds in Parry's Lancaster Sound.

Parry's failure, however, to get through the great concentration of ice which choked the narrows south and west of Melville Island had a profound effect on Arctic strategy. Henceforth, so massive and impregnable did this ice wall seem, the greatest efforts to discover a North-West Parsage were concentrated to the south of Lancaster. Sound in the hope that somewhere here a parallel seaway might be discovered, washing the continental cost. This was the region which Parry attacked on his next expedition in 821, approaching from Hudson Strati. His ships 9° were the Heela, repaired after her battering from the ice, and the Farry a duplicate ship 'precisely alike' so that any article belonging to either might be transferred from ship to ship, and at once applied to its proper use, without selection, itral, or alteration of any kind' it was a very practical device, char acteristic of Parry's alert and inventive mind

Party passed two successive winters in the Arctic on this second expedition. The east coast of Melville Peninsula, over looking Foxe Basin north of Hudson Bay, was explored and Parry and his officers, travelling on snow shoes and sledges with the Eskimoes, crossed to the northern end of the peninsula and came upon the narrow Fury and Heela Strait which leads westwards into the Gulf of Boothia On the analogy of Lancaster Sound this into the Unit of Boolia Ori the analog of Earliester bolie the was a highly promising discovery but once again a deep ice belt blocked a western exit With sourry spreading dangerously through both ships during their imprisonment over a second winter, there was no alternative, when summer came, but to turn back

Could Fury and Hecla Strait and Prince Regent Inlet be con nected, that was now the question? And if so, might there not be leading westwards a route parallel with Melville Sound? Only an approach down Prince Repeat Inley, outflanking the ice which blocked the Strati, could solve these problems, and this was what Parry decided to do But 1824 was a had year for Arctic exploration, with ice spreading as far south as Baffin Bay A hard winter off the eastern shores of the lalet was followed by a summer of thick fogs and heavy gales The Fury was wrecked upon the beach of Somerset Island In the end, both ships' companies returned aboard the *Hecla* to England It was Parry's third and last attempt to find a North West Passage

by geographers since mediaeval times, of an inner but ice-free Arctic Sea. For Parry, there was also the chance to try out, as in his first wintering of naval slips in the Arctic, new and revolutionary techniques in Arctic exploration. All previous attempts to reach a high northern latitude—those of Hudson, of Constantine Phipps, of Buchan—had been wholly shipborne and all had been stopped by the dense pack which stretched away to the north of Spitsbergen. Parry, following the traditional English route, proposed instead to establish a Spitsbergen base as far north as possible by sea, and then (preferring this to the use of reinder advocated by William Scoresby) to advance on foot hauling ships' boats, fitted with iron runners, over the pack.

Party sailed in the Hecla, the heroine of his North-West Passage expeditions, in 1827 and on June 21 from a base far up the coast of West Spitulergen started for the Pole with the two ships' boats, the Enterprise and the Endersour, four light sledges made from snowshoes, and provisions for seventy-one days. As far as Walden Island, discovered by Captain Constantine Phipps, It was easy going. The ship's cutter under Lieurenant Crozier (the first mention of a famous polar name) relieved them of much weight and they passed easily enough through loose ice linto a calim and sunit see, disturbed only by an occasional bellowing walrus which floundered ponderously off the fee-floes as they passed.

When they reached the compacted, solid, ice, Parry put his plan of travel into action. To take advantage of the harder snow wirface and to avoid any risk of snow-bildness from the intense reflected glare of the sun, he decided (as the American Robert E. Peary decided later in the century) to travel only by njaht and to sleep during the warmer hours of the day; though as far as light was concerned, day and night were indistinguishable during the Articia summer. On this basis, a routine of travel was established. Each day's journey over the ice, hauling the boats over the tumbled and jagged floes, then hanching them in intervening pools of water, was as thoughtfully, as methodically, organized as the wintering had been on Melville Island. After evening prayers, officers and men changed fur sleeping clother, of camlet lined with raccon skin, for uniforms of strong blue box cloth; then breaklast of cocca and biscuit, a journey of fire hours, an were the Hecls, repaired after her battering from the ice, and the Fury, a duplicate ship 'precisely alke' so that any article belonging to either might be transferred from ship to ship, and at once applied to its proper use, without selection, trail, or alteration of any kind' It was a very practical device, char acteristic of Parry's alert and inventive mind

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#### PARRY'S ATTEMPT ON THE POLE

In 1821, Parliament offered handsome rewards for an attempt on the Pole, and this was Edward Parry's next Arctic adventure This attempt to do what Barrow had hoped Buchan might do had great attractions Success might mean the opening up of a northern passage by way of the Pole from the Atlantic to the Pacific Ocean New light might be thrown on the existence, supposed mentioned in any other well-authenticated record.' But his men were now forced to pause for breath after almost every haul. 'I could not', Parry admitted, 'but consider it as incurring useless fatigue to the officers and men, and unnecessary wear and tear for the boats, to persevere any longer in the attempt.' So he turned back, having achieved by these new and extraordinary methods an advance towards the Pole which was not bettered for forty-eight years.

Thus ended the active career of a great Arctic explorer, a man who in his first and extensive explorations of the Canadian Arctic archipelago came closer than any until the days of Franklin to solving the principal Arctic problem of the first half of the nineteenth century, the discovery of a North-West Passage.

#### THE DISCOVERY OF THE NORTH MAGNETIC POLE

One more ship-borne expedition, and the land explorations to be carried out as Barrow had plazared by the Navy and the men of the Hudson's Bay Company, fall within this period of splendid advance by the Arctic explorers of the British Navy. The ship-borne expedition, led by John Ross of 'Croker Moun-tains' fame, was in two respects unusual. The object, once again, was the North-West Passage, to be sought by the route of Party's last attempt, south down Prince Regent Inlet. But the British Government had by this time lost all enthusiasm for Arctic exploration (partly perhaps because of an evident decline in the maritime ambitions of Russia) and in 1828 the Act of Parliament offering rewards for Arctic discovery was repealed. The new expedition therefore had to be promoted privately, by Mr Felix Booth, Sheriff of the City of London. For the nineteenth century, this was a new departure. Another was use of, or rather the attempt to use, the new power of steam. This was an audacious experiment and to the Navy which by 1828 had promited ground there for most steam to be stored in the permitted no more than a few small steam tugs to appear in the Navy List it would have been unthinkable. Felix Booth, the enterprising Sheriff of London, had however no such regrets for the passing days of sail and when the Victory, a paddle steamer which had made the Dover to Calais run, headed for the Arctic, she moved uncertainly and convulsively under steam and under

hour for dinner, and another five or six hours' journey before they hauled the boats up onto the ice and spread the sails as awnings. Then prayers again and seven hours' aleep until reveille on the bugle roused the party for another night of travel For officers and men alike, this was exhausting work. Wading,

For officers and men alike, this was exhausting work Visiong hauling, stumbuling, cutting boots and feet on the razor sharp points of ice, Parry did not realize for weeks how futule were their efforts because of the southward drift of the pack with the Arctic current. There was after all no landmark to guide them in this desolate whate waste land which stretched so unendingly ahead The eye', wrote Parry in his Narrative of an Attempt to reach the North Pole in boars Fitted for the Purpose, and attached to His Mojesy'r Ship Hede, an the year MDCCXXIII, 'the eye weared itself in vant to find any object but ice and sky to rest upon, and eren the latter was often hidden from our wew by the dense and diamal fogy which so often prevaled 'A passing guill, some strange shaping of the ice, brought uniant pleasure to men dejected by the unchanging vist of so vast and so monotonous a desert

For those unacquainted with the range of Arctic climate the summer weather that year was bewildering in its variety On 15th July, Parry wrote, 'It rained so hard and so incessnity that it would have been impossible to move without a complete dreach ing I had never before seen rain in the polar regions to be com pared with this, which continued without intermission, for twenty one hours, sometimes falling with great violence and large drops' On other days, the warmth was no less astonshing and the sum so bot that the tar rain out of the seams of the boats

On 20th July Parry calculated their latitude at noom to be less than five miles to the north of their latitude three days earlier, though they had travelled twelve miles since then A few day dater they lost more than they gaused. Only by produgous and desperate efforts could they counteract the norshile southward movement of the ice and reach, as they did on 26th July 1827, arthest north of 82° 45°, only 413 mules shour of the Pole. 'Our ensigns and pendants', Parry wrote, 'were displayed during the day and annecrly as we regretted not having been able to host the Brittsh flag in the highest latitude to which we had apired, we shall pethaps be excused in having felt some little pride in being the bearers of it to a parallel considerably boyond that Lancaster Sound. There, they were picked up by Ross's old ship, the Hull whaler Isobella, in August 1833. Ross (and it was compensation for his earlier misfortunes) was knighted on his return to England and although the Act of Parliament granting rewards had been repealed, he and his men were awarded five thousand pounds for their discoveries and for their courage and endurance in surviving without loss four consecutive winters in the Arctite.

#### LAND EXPLORATIONS OF THE CANADIAN ARCTIC COAST

The role of the land parties in John Barrow's plan was not only to explore and map eastwards and westwards from the estuaries of the Mackenzie and Coppermine Rivers but to search for an open sea-way, an east-west passage, along this coast. They were to be ready also to assite any sea-borne expedition which might be moving south down Prince Regent Inlet, from Lancaster Sound. These land parties, led for the most part by naval officers, were strongly reinforced by men of the Hudson's Eay Company who carried out many of the greatest land journeys in the Arctic during the Inheteenth century. These men, explorers of the calibre of Chief Factor Peter Warren Dease who travelled with Lieutenant John Franklin, or the youthful and remarkable Thomas Simpson, contributed far more than is often acknowledged to Aretic geography, generally in the face of some opposition from within the Company from men who, as far a a North-West Passage was concerned, did not share the endusians or anxieties of the British Government. They feared on the contrary that an open sea-way round Canad's Arctic coast would soon bring ports and cities. In other words, it would transform a hunter's into a settle's land.

The first of the land expeditions was timed to coincide with Parry's first attempt on the North-West Parays and when it set out from Hudson Bay in 1819 it carried orders to explore estwards from the mouth of the Coppermine River. The leader was young Licutenant Franklin who had sailed with Buchan the previous year and with him went Midshipman Buck, who had also been with Buchan, and a scientist, Dr John Richardson, who was concerned with problems of natural history and observations of the Aurora Borealis, It was an oddly assorted party which the command of an officer to whom steam power was as dustate ful as it was to the Board of Admiralty His second in command was his nephew, Commander James Clark Ross, a specialist in the study of magnetism a very talented sailor who had served with how to get a party on previous Arctic voyages

both Ross and Parry on previous Arctic voyages This first polar experiment with steam was singularly unhappy The mammoth engue occupied most of the tonnage of the ship, the boilers, though liberally plastered with potatoes and dung, never ceased to leak, and the maximum speed was three miles an hour It was not long therefore before the *bistory* ceased to be regarded 'as aught but a suhng ship' and it was as such that shie made her way to Fury Beach on the east coast of Somerset Island where the wireck of Parry s ship, the Fury, lay

Parry shope, it will be remembered, had been to find a channel or sound leading westwards out of Prince Regent Inlet But Sir John Ross was an unfortunate man In sailing past Bellot Strait, he failed to see that this was just such an opening-he called it Brentford Bay-and oblivious of this lost opportunity to make for the west, salled on and made landfall on the east coast of Boothia Peninsula naming it Boothia Felix after his patron In Felix Harbour for two winters the Vactory was beset James Clark Ross, the second in command made excellent use of those years He studied the dress and the building techniques of the Eskimoes who had settled in their snow houses (igloos) near the hetery, and made many long sledging journeys with them to the west and south of the peninsula and across the sea ice to King William Island Parry had been certain that somewhere in this direction lay the North Magnetic Pole and on one of these jour neys, on 31st May, 1831, the discovery was made For James Clark Ross, the student of magnetism, this was a proud moment and he erected a cairn on the barren western coast where 'Nature had erected no monument to denote the spot which she had chosen as the centre of one of her great and dark powers'

The discovery of the North Magnetic Pole and—though John Ross never seems to have realized u—the first landfill to be made from the north on the American Continent were momentous events in Arctic exploration. The Retery was beset for three winters in the Arctic and in the end Ross and his men were forced to abandon shap and make there way by the boat to estuary prevented him from exploring along the coast to the west.

Of these Arctic and sub-Arctic mainland explorations of the first half of the nineteenth century, none were more remarkable than the journeys of Dease and Simpson of the Hudson's Bay Company. Between 1837 and 1839 they linked up and greatly extended the explorations of Franklin, Back and Richardson, moving westwards as far as Point Barrow in Russian-held Alaska and eastwards from the estuary of the Coppermine as far as Queen Maud Gulf. Nearing the Gulf, they saw across the coastal waters to the north the dark mass of Victoria Land (Victoria Island). 'Our present discoveries', wrote Simpson in his journal, 'were in themselves not unimportant, but their value was much enhanced by the disclosure of an open sea to the eastward, and the suggestion of a new route—along the southern coast of Victoria Land—by which that open sea might be attained while the shores of the continent were yet environed by an impenetrable barrier of ice, as they were this season.' The sight of the open sea to the east was tantalizing. Might it not, they thought, link up with Parry's Fury and Hecla Strait and thus be accessible from Hudson Bay?

The following year, 1839, Dear and Simpion, like Back, reached the estuary of the Great Fish River, (the Back River). To the north lay King William Land (King William Island) partly explored by James Clark Ross, in the course of this great fourney of over fourteen humdred geographical miles, they crossed over to both Victoria Island and King William Island and mapped their southern shores. But one problem, which Sir John Ross might have solved, remained undecided. 'We had determined', wrote Simpson, 'the northern limits of America to the wearward of the Great Fish River; it still remained a question whether Boohia Felix might not be united to the Continent on the other side of the estuary.'

The discoveries of these two remarkable Canadian pioneers conclude this broad survey of Arctic exploration after the Napoleonic Wars. In grandeur of strategic design, in its closely integrated planning, in its methodical exploration of the complex geography of Arctic Canada, this British campaign gainst the Arctic (if lone excepts the differently intended marched westwards from Hudson Bay There were the Brinsh sailors There were Induan guides and interpreters And there were the voyageurs from the Hudson's Bay Company and the old North Vest Company (based on the St Lawrence River) All were equipped with bark canoes for the descent of the river, with sledges and with dog teams, and with snow shoes on which the Britsh sailors clambered heavily and painfully over the deep water enough of the Barest Comparison. winter snows of the Barren Grounds

On this and on a subsequent expedition four years later when he was accompanied by Chief Factor Dease, Franklin and his men explored and mapped a great stretch of unknown coast, estwards from the Coppernme as far as Point Turnagain, west wards from the Mackenzie for four hundred miles in the direction of Bering Strait, and between the Coppermine and Mackenzie A series of the adventures and evolution of the Royal Ravers The adventures and gallantry of these men of the Royal Navy in such an unusual and romantic setting deeply stirred the British people Their damag descents in frail cances over form ing rapid and swiring whirlpools, their nearness to death in the Barren Lands, the lourd stories of treachery, of murder, seen of complete the stories of treachery, of murder, it these even of cannibalism among the Indians and guides, all there moving episodes contributed to a national legend about the her-oism of John Franklin. As an Oxford Prize Poem said of Brian at the tune

> 'In the proud memorials of her fame, Stands linked with deathless glory, Franklin's name '

These naval land explorations, however, like those at sea, were stopped after 1828 when Parliament repealed the Act offering rewards for Arctic discovery This ended for the time being government sponsorship of Arctic exploration and when Back, now commander, was sent out in 1833 to search, by way of the Great Einh Rurer, for sent out in 1833 to sent a, y of the Great Einh Rurer, for the long overdue expedition led by Sir John Ross, his mussion was sponsored by a public annous to learn the faite of Ross. It received only muon assistance from official funds. Back was at the headwaters of the Great Fish Rure (the Back River) the following year when he heard the news of Ross's rescue, but be carried on nevertheless, explored the whole five hundred miles of the river with its eighty three falls, cascades, and rapids, and stopped only when marshes at its
## VШ

## The First Sightings of the Antarctic Continent

While the few ships which could be spared from Britain's much reduced peacetime Nary were thus occupied in Article waters, sealers, American as well as British, were making the first discoveries of Antarctic land since Cook. These salers, the majority of them American, drawn south by Cook's reports of the rich fauna of the Southern Ocean, had been working the seas and coats of Cook's lake of Georgia and Sandwich land since the Revolutionary War and by the second decade of the inneteenth century, more than two hundred vessels, small brigs, schoorers and cutters from Britain or from the trim resports of Massachusetts and Connecticut, were fashing in these waters. With such a great number of sealers at work the slaughter of seals soon became a massacre, indiscriminate and uncontrolled. Old fashing grounds were exhausted, new fisheries had to be found, and this led the sealers to vorgees of exploration.

No comprehensive study of the voyages of these scalers has been mude. If is were, if more of the log books and journals which they guarded so jealously were searched for and scrutinized, no doubt new and unsuppected Antarctic discoveries would be revealed. Meanwhile, of the earliest voyages there are only the vaguest records. In 1800 Captain Edmund Fanning sailed in the armed corvette Appair on a sealing and exploring voyage but there is nothing known of the discoveries he mude. In the course of the next decade or two there may well have been other voyages by American sealers. But until there is more research into this important phase of Antarctic exploration, none of these voyages and discoveries can be confirmed. All that can be said with certainty is that a British scaling captain was Franklin Search operations) is unique in the nimeteenth century Indeed, not until the mid twentieth century, when fleets of the United States Navy explored the coasts of Antarctica, were there naval operations comparable in polar history

Nevertheless, despite these achievements of a quarter of a century, John Barrow, their principal organizer, was left unsatusfied When in the tharities the Entith Navy turned from Arctice to Antarctic exploration, Barrow held aloof He was alceady fully occupied with new plans to achieve what none of these land or sea expeditions had yet achieved despite these costly endeavour the discovery of a North West Passage ashore, the Jack was planted and the new land was claimed for the Crown, being given the name 'New South Britain'. It was a desolate place, yet another land 'condemned to everlasting rigidity by Nature', no less barren, no more agreeable than Cook's Isle of Georgia. But like Cook's new lands it had for Smith one very redeeming feature. Along the shores were rich colonies of seals.

John Miers was elated by the news of Smith's landing. There was not only a prospect of riches for British sealers. Might not New South Britain, or New South Shetland as Miers persuaded Smith to call it, provide a refuge and a trading base for British merchants if they were forced out of South America? It might even become an entrep&t for the Indian and Chinese trade. It offered, moreover, exciting possibilities for discoveries in geography and natural history, in which Miers, like many others of his kind, was much interested.

Together with other British merchants Miers thereupon resolved to charter the brig Williams for a fresh voyage of exploration. But by this time, Captain Shirreff, Captain of H.M.S. Aadromache then in port at Valparaiso—'an excellent officer', said Miers, 'ever alive as well to British interests as to the pursuit of objects of science and utility'—had heard of Smith's discovery, Persuading Miers to relinquish the brig. Shirreff placed his matter Edward Bransfield in command, with William Smith as master and pilot, and ordered Bransfield to survey the coasts and harbours of New South Shetland and 'to observe, collect, and preserve every object of natural science'. The brig, in case she was trapped in the ice, was stocked for a long voyage and provisions for tweive months were carried. And on 20th December 1819 she weighed, stood off, and sailed out of Valparaiso harbour.

News of William Snith's discovery of New South Shetland had meanwhile reacbed London and the *Literary Gazette and Journal* of *Belles Lettres*, to the great excitement of its readers, had published a brief but dramatic story of his exploit. Quickly the news travelled, Maps allegedly of New South Shetland attracted crowds to the windows of the London bookshops. And on all sides the question was being asked, was this the undiscovered responsible in February 1819 for the first known discovery of Antarctic land since Cook

The story of the discovery made by William Smith of Blyth in Northumberland, a pilot who had learnt his ice navgetion in the Greenland whale fisheries, was published in 1820 in the Edinburgh Philosophical Journal, one of those journals like the Questelly Renew and the Literary Garetie and Journal of Beller Litters much read at that time by educated persons with a sate for geographical and scientific matters Smith's brig the William had, it appears, been hired by John Meres, an English engineer living at the time in Valparasso, to carry a cargo of muning machinery from Valparaso to the River Piate Off Cape Hom, Smith was forced by heavy crested seas to sail far to the south and on 18th February 1819 in these new waters he magned that he saw land He hauled off during the night because of snow showers and a hard gale. But next day, a day of clear skees and sparkling yunshine, he had no doubt of his discovery and marked it down in latitude 62° 40 South and longitude 60° West on his charts

Back in Valparaiso, neither Miers nor any of the British merchants there believed Smith's story. He therefore determined when he sailed aguin an june for the River Plate to confirm hu discovery by a landing. But he had no luck because of the lose pack and he stood off on his course and made for Montevideo in Montevideo Smith was tracked down by a group of American merchants who proved a good deal less sceptical of his discovery than John Miers and the British merchants in Valparaio and Smith gives an entertaining picture of his meeting with them an report he sent to the British Admirally of Jist December 1821 'The Americans at that port', he wrote, 'offered your Memorialis targe sums of money to make known unto them the Discovery he had made, but your Memorialist haring the Good of his Country at heart (d'any should be derived from such a Discovery) and as he had not taken possession of the land in the mean of his Sovereign Lord the King result all the differs from the suid Americans, determined again to revisit the new

Sailing from Valparasso in October 1819, William Smith this time was successful The first mate of the Williams was sent publishes from Midshipman Bone's Journal. The story starts with the happenings of 28th January 1820 when new land was sighted for the first time since leaving New South Shetland.

'From the bay [George's Bay] in which our countrymen first hauled up, and took possession of New Shetland, or, as they christened it, "New South Britain" in the name of his Majesty, the Brig Williams sailed on the 27th of January. Their course was W.S.W. On the 28th, several whales and shoals of seals were seen; and the whole day they were surrounded by penguins, snow-birds, pintadoes, and albatrosses. The land, wherever seen, appeared to be immense mountains, rude crags, and barren ridges covered with snow, close to the water's edge, presenting a most dreary and dismal aspect. Thick fogs occurred now and throughout the voyage so often as to render observation uncertain and navigation difficult. On the 29th, a glimpse was caught of a very high mountain due north; and on the 30th, a small group of islands, extending S.E. to E. by S. was discovered, part of a range stretching E, by N. to S.W. "The winds at this time," we quote the Journal, "were strong, and the horizon very hazy, which opened and shut occasionally, offering to our view an unknown coast, evidently abounding with rocks and small islands. At noon, our latitude by meridian altitude was 63°16, and longitude by chronometer, 60°28 W." They now, in consequence of the weather, steered southward, and seemed to be running from the land; but at three o'clock in the afternoon, after having their attention attracted by three large icebergs, the haze clearing, they very unexpectedly saw land to the S.W.; and at four o'clock were encompassed by islands, spreading from N.E. to E. The whole of these formed a prospect the most gloomy that can be imagined, and the only cheer the sight alforded was in the idea that this might be the long-sought Southern Continent, as land was undoubtedly seen in latitude 64°, and trending to the eastward. In this bay or gulph there was a multitude of whales, and a quantity of sea-weed, apparently fresh from the rocks. A round island was called Tower Island, latitude 63°29, longitude 60°34, and the land Trinity Land, in compliment to the Trinity Board.'

'About this period sheet-ice abounded a-head, and not fewer than 31 icebergs were counted at once. The weather was very stormy, and the fatigue of officers and men excessive. Land and Southland, the long sought Southern Continent? When it was heard that Smith had sailed with Bransfield on yet another voyage, public interest was so metnese that the Literary Gazette thought it worthwhile to publish in its issue of 3rd November 1821 a very full account based on information provided, pre sumably with the tacit approval of the Admiralty, by Midshipman Thomas Man Bone, one of three midshipmen on board Bone was a surveyor and a skilled draughtsman and his sketches were a most valuable addition to Bransfield's general chart of his discoveries when these came to be published by the Admiralty on 30th November 1822

No polar discovernes have been more acrimoniously disputed by American and British polar historians than those made by Branfield and Smith on this voyage. On the basis of the account in the *Literary Gartite* and of other sources they deserve therefore to be considered in some detail

On the way south from Valparano, as the Literary Genture reported, a storm hit the brag, splitting her sails and springing a boom But otherwise the voyage south way uncerntful and in the middle of january the first seals indicated that land must be near For two months Bransfield and Smith explored and charted the coasts of New South Shetland and, opposed only by mdignant perguns in the throes of their breeding season, landed for the first time The Jack was planted personally by Bransfield, como of the realm were bured, and sovereignity over the slands was claimed in the name of His Mayesty King George IV. They were thus, said the editor of the Literary Gazette, "attached to the British Empire" But impressive as these ceremones were, Midshipman Bone thought little of the new possessions The islands, he worte, were composed of black rock and above the reach of the watter, patches of snow made but a dismal apeet The main entrely capped which gave us but very faith they for ever being able to speak well of its firstiny." As the brig headed wets south west on 27th January 1820 'prodegious masses were continually falling with a nose like thunder' from the high snow cliffs round George s Bay

For an account of the important events of the next three days we must turn to the *Literary Gazette and Journal of Belles Leitre* for 24th November 1821 and to the allegedly verbatim extracts it continent larger than Europe, twice as large as the continent of Australia, may seem in relation to the great sea voyages of Cook, of Bellingshausen, of James Clark Ross, or to the land explorations of Scott, Shackleton and Mawson a fact of only moderate importance. Of recent years, however, Antarctica has been brought more closely into the realm of international politics. American historians and Russian historians have in turn put forward rival claimants to this first continental discovery. Out of the archives of the Library of Congress of the United States an American sealer Nathaniel Palmer, of Stonnington, Connecticut, has emerged as the alleged first discoverer of the mainland and in commemoration of this legendary achievement (which Nathaniel Palmer himself never claimed) the whole of the Graham Land peninsula is named Palmer Peninsula on American maps. Soviet historians and gcographers, furthermore, supported by the Soviet Government, have since the last war claimed similar priority for Captain Baron Fabian Gottlieb von Bellings-hausen of the Imperial Russian Navy. The claims with which Bellingshausen has been credited will be discussed in a later chapter. Here we are only concerned with the voyage of Nathaniel Palmer.

In 1820, the year of Bransfield and Smith's discovery, Palmer, then mate of the sloop Hero, sailed from the New England port of Stonnington. His log preserved in the Library of Congress is, from the available facsimiles, a laconic and restrained document compared with the Literary Gazette's graphic account Gocument compared with the Literary Gaztie's graphic account of the British voyage. From the slopes of a mountain on Decep-tion Island, one of the SouthShetlands group, Palmer—it records— caught glimpses of Trinity Island and possibly also of the main-land beyond. Having thereupon decided to follow up his discovery, he approached close to the Trinity Peninsula but because of ice thought it prudent not to attempt to land. 'Laid on and off until morning', his log records, 'at 4 a.m. made sail in shore and discovered—a strait—trending SSW and NNE—it was literally filled with ice and the shore inaccessible—we thought it not prudent to versume in ice \_\_\_\_\_\_ he bindle of the strait was prudent to venture in ice . . . the latitude of the strait was 63° 45' S.' These events took place on 16th November 1820, ten Months after Bransfield's discovery. A more picturesque account of Palmer's voyage is contained

silands were observed to latitude 61°30, and longitude 56°34 This land was of moderate height, and chaefly covered with snow On the 4th February they hauled up, 6 or 7 miles off the centre of an immensely high mountain. The master here went on shore, and planted in a small cover, at the foot of a most tremendous precipice, a board with an inscription similar to that which was left on the coast of George a Bay The above mentioned precipice, a lutitude 61°19 S, longitude 54°16 W, was named Cape Bowles, it seemed to be an abrupt termination of the land none was seen till the brig was in the longitude of nearly 50° In presenting to the public such a detailed record, the *Littery Genetic* did a considerable service to history There end

be no doubt about the identity of Branifeld's discovernes. His Tower Island, for example, is Tranty Island Tranty Land is the northern extremity of the Graham Land pennsula which pro jets from the mainland of the Antarctic Continent northwards towards South America If any doubts exist, then they can be resolved by reference to Bransfield's signed, manuscript chart in the possession of the Admiralty and to the later official chart based on this, published in November 1822 The South Chart owscu on this, pupointed in November 1822 inc Solution Shedhaldiands, Trainty Fennanual projecting from the Continent, Clarence Island and a kirge unnamed shand, probably Elephant Island, are on these clearly shown To the north of Elephant Island ize Seal hiland where a handing party collected 'nnetty fine fur skins', as well as some pieces of 'canl coal' Between the South Shetlands and the pennanuk he the waters now known as Bransfield Strait On yet another chart, drawn by William Henry Goddard, an officer of the brig, and presented by William Smith to the Admiralty not later than December 1821, Trinity Peninsula, Elephant Island and Clarence Island are all shown exactly as they were shown by Bransfield Inset, in a water colour sketch, the brig Williams is seen nearing the north coast of New South Shetland

Were these two Englishmen, then, Edward Bransfeld and William Smuth, the discoverers of the Antarctic Conument? That in retrospect they were, that in this first sighting of the muniland costs of the Graham Land pennsula they were the first men to approach within landing distance the perimeter of a in the veteran American sealing captain Edmund Fanning's Voyager Around the World, published in New York in 1833 From this it appears that while the sloop Hero, one of a fleet of five sealing vessels under the command of Captain Benjamin Pendle ton, hay at anchor in Yankee Harbourt, Deception Island, in 1820-21, Palmer saw from the top of a mountain on a very clear day a range of mountains far to the south, one of which was an active volcano in the Hero, a ship of less than 40 tons, Nathand Palmer was then sent out to explore He found scording to Fanning 'an extensive mountain country, more sterile and more dismal if possible, and more heavily laden with tee and mow than the South Shetland's there were sea leopards on its shore but no fur seals. The main part of its coast was ice bound, although it was midsummer in this hemisphere, and a

The rest of Fanning's story is worth repeating not only because it reveals that Palmer, though an enterprising seler, knew nothing of Bransfield subcovery but because it introduces one of the most remarkable of Antarctic explorers, the Russian Ogatum Bellungshussen. The sloop *Hera*, the story continues, while on her way back to the South Shetlands, became enveloped in thick fog and when it cleared Palmer was astronshed to see, towering on either side of this small sealer, a frigzte and a sloop of war hoisting the Russian colours These two slops, com manded by Captain von Bellingshausen, had been sent, Palmer ducovered, by the Emperor Alexander I of Russia on a voyage of circummavigation Palmer was immediately invited on board and was able to tell the Russian that the islands they could just see ahead of them were the newly discovered islands of New

According to Faming Bellingshausen was astounded by this news "Previous to our being enveloped in fog", Fanning reports the Russian commodore as saying, 'we had sight of those slands and concluded that we had made a discovery, but behold, when the fog lifts, to my great surprise, here is an American vessel apparently in as fine an order as if it were but ystereday she had left the United States, not only this but her master is ready to pilot my vessels into port. We must surrender the pilin to you Americans' This anecdote is more picturesque than accurate most liberal-minded of all the rulers of pre-Soviet Russia. The rewards expected however from this Antarctic project, the first of its kind undertaken by Russia, were by no means wholly intellectual.

For some years the problem of nourishing the remote Pacific settlements, not only those on the Kamchatka peninsula and on the shores of the Sea of Okhotsk but since the foundation of the Russian-American Company in 1798 those in North-West America and in the Aleutian Islands as well, had been the source of much anxiety in St Petersburg. Inadequate and costly communications lay at the root of the problem; communications which until early in the nineteenth century were virtually restricted to the land route across Siberia. It was not only that the distance to be travelled was immense. The cost of maintenance and of the transport needed, more than four thousand horses every year, was prohibitive. Furs exported westwards from Siberia, merchandise and equipment of every kind sent from Europe to the Pacific coast, even cables and anchors for the shipyard at Okhotsk, had to be carried, picce by picce, by waggon and pack-horse, through the forests, across mighty rivers, over plains and over prairies by this trans.Siberian route, at a cost so exorbitant as to threaten the whole economic future of these Russian colonial settlements.

But what were the alternatives? The northern sea route, infested with ice, was dangerous and unpredictable. The long sca route down the Adantic and across the Indian Ocean was exceedingly costly because goods had to be carried in foreign ships. Only if Russian seamen in Russian ables could explore this route, only if they themselves could learn the secrets of trade and navigation in these waters, could this economic problem be solved. It was for this reason that a young Russian nobleman, A. J. Kruzenstern, who in his four years with the British Navy during the War of the Resolution had made several voyages in British ships to the Far East, persuaded Alexander 1 in 1802 to give him command of a three-year expedition, the first from Russia to circumnavigate the World.

After the Napoleonic Wars these Russian reconnaissances were continued by the famous Otto von Kotzebue and others. On such long ocean voyages, however, the Russians, unlike the

## Russia Enters the Antarctic

"
INPEROR Alexander Pavlovich of glorious memory, desimp dupatch of two expeditions, each consisting of two vestels, for the exploration of the higher latitudes of the Artic and Antarctic Oceans' With these words the President of the Scientific Committee of the Imperial Naval Suff introduced the first Rusum edition of the 'Noyage of Captain Relingshauen whose ships were lat seen towards the end of this voyage apparing out of the fog off the South Sheilande on either side on Nathandel Palmer's select

The Russian Arctic expedition consisting of a corrette and a transport under Commander Vaillev was onlered to rearch for the North West Fanzye by way of the Aliskan coast 11 was a project which (as the British had suppected) the Russians had for some time had in mind and to the Tara it might well have seened the more ungent of the two for reports of Ross's abortive voyage had already reached St Petersburg and rumours were now coming in of Parry's imminent departure, and of British sea and land operations in the Western Arctie on an unprecedented scale. Little is known, however, about this Russian North-West Passage expedition evcept that it failed 11 returned to Russia in 1822, a year later than the Antarctic expedition under Capital Borro von Bellingbuasen

In the work of the Tzzr, "the great object' of the Antarctic expedition 'was exploration in the closest vicinity to the South Pole'; or as Bellinghausen explained more precisely, 'to explore those parts of the Antarctic Sca into which as yet navigators had not penetrated, and to survery, in regions which were already known, such thands as had not personally been which were already known, such thands as had not personally been which were promote higher education, the Tzar Alezander I was perhaps the The ships of Bellingshausen's Antarctic expedition were an oddly assorted pair. The Vestok (East) in which Bellingshausen siled was an armed sloop of uneszoned pinewood, sheathed in copper underwater against the ice, very similar to the sloop Kaeshaike in which Captain Golowin had siled round the world. The second ship, the Ladaga, renamed the Mirrayi (Peaceful), was commanded by Mikhail Lazarev. She was a transport of 230 tons, a duggith ship very much slower than the Fostok, and Bellingshausen was constantly delayed throughout his voyage waiting for the Mirray to eatch up.

The Fortok's company of one hundred and seventeen included an astronomer, Professor Ivan Simanov of Kazan University, and Paul Mikhailov, Academician of the Imperial Academy of Fine Arts. The Minyl carried a ship's company of seventy-two. Each ship was to carry a naturalist and the Tzar on the advice of the Academy of Sciences had nominated two German naturalists, acatemy of Sciences had nominated two German haturains, Dr Mertens of Halle and Dr Kontze of Leipzig. At the last moment, however, both refused to join. Bellingshausen's com-ment on the excuses they gave was characteristically blunt. They had reduced, 'he wrote, 'on the ground that too little time had been given them to complete preparation for the voyage. Perhaps they were right; but 1, as a naval officer, cannot help thinking that all that a scientist need bring with him is his clentific translations. selentific knowledge; books were to be found at Copenhagen of every kind in quantities, and even if some had been found unobtainable all the bookshops in London would have been at their service. . . .' Bellingshausen proposed instead that two Russian scientists should be invited. But his request was flatly rejected. This incident is an interesting commentary on the state of Russian science at the time. Founded by the Germanized Russian Peter the Great, the Academy of Science had been for many years exclusively German in membership and though a few Russians were later reluctantly admitted, German influence was still predominant in Bellingshausen's day. Faced by the Academy of Science's refusal to appoint any but 'unknown foreigners' as Bellingshausen called them, the expedition sailed without a naturalist to the great disadvantage of its scientific work and to Bellingshausen's lasting regret.

It is not easy to draw out from the laconic and official prose of

British and French, suffered one serious disadvantige, the lack of Russian owned harbours, ports and bases, along the route in the Indan Ocean, in the South and Central Pacific, France and Britain were already in possession But further south, along the perimeter of the Antarcite seas, there might still be territories undiscovered or unclaimed and in Bellingshausen's instructions from the Imperial Admiralty Department great stress is lud accordingly on the unportance of harbours and on 'the possibilities of establishing future sea communications or places for the repair of ships'

This first Russian Antarctic expedition sailed from Kronshtadi (an island off Lenngrad) on 26th July 1819 There had been little enough time for preparation, for only an April had the Tzar's orders (issued on 25th March 1819) reached the Marquis de Traversy, has Minister for Nasal Affairs During these three months a volume of instructions, repetitive, verbose and some times misleading, poured in on Captain Bellinghausen There were the instructions from the Marquis de Traversy on bahf of His Imperial Migesty. There were instructions from the Imperial Aminely Council, others from the Limperial Adminily Department A special memorandum of advice was provided for inder and the special memorandum of advice was provided for was filled by a second series of instructions from the Minister of Nava Affairs The array of scientific studies to which attention was drawn, geodery, astronomy, gravity observations, observa toons on winds, tides and weather, auroral observations, observations on winds, the selling sum and population of the series of the studies, geology, mineralogy, anthropology, mut

In the political sphere the accent was on peece and a great and curious variety of gife—hussar pickets and tambournes, hints men's horns, knuting needles, kaleudoscopes, and silver and bronze medals with the Emperor's effigy for important person ages—was to be carried to placate the people of foreign or newly discovered lands There was also a multitary side to the instructions Detailed intelligence was to be collected about other travellers, and about the war strength, the harbours, forts and armament of foreign countnes vasied harbour the Russians were able to salute the gilded yacht of the Prince Regent 'accompanied by warships and a great number of spectators in gally decorated boats of all sorts'. 'Only in England', Bellingshausen wrote in bis journal that night, 'is it possible to see such a picture of animation.'

In England, however, the Russians had to wait nearly a month for the instruments and charts which the Imperial Admirally Department had instructed them to buy; sextants from Mr Troughton, chronometers from Arnold and Barraud, telescopes from Mr Bolland, and charts from Mr Arrowsmith, one of the founders of the Royal Geographical Society. But the days passed quickly, They called on the aged Sir Joseph Banks at the Royal Society in the vain hope that he could find them a naturalist. They toured the City, saw the Tower, visited Westminster Abbey, Yauxhall Gardens, and the thattres. And early in Septemher they sailed for the South Atlantic on a day so hot that fresh meat sufficient only for three weeks could be brought on board.

From Teneriffe and Rio de Janeiro, the two ships had a straight run down the South Atlantic and towards the end of December 1819 Cook's Isle of Georgia came in sight, the peaks of its mountains obscured by dark and heavy clouds, their slopes white with snow. As the ships approached, whales spouted, hlue and white and small black petrels flew about or rested upon the water, and numerous crested penguins, with cries of alarm, jumped off the floating ice into the sea. In Port Mary (Undine Harbour or Queen Maud Bay), two British whalers, the laderpensable (sic) and the Mary-Ann, commanded by Captains Brown and Short, lay at anchor. They had been there for four months extracting blubber from seals and Bellingshausen cross-examined them closely on their technique, helped in interpretation by one of their sailors who proved to be a deserter from a Russian ship. Bellingshausen then turned to his principal task, a survey of the island. In two days he completed a survey of the south coast, linking up with Cook's survey of the northern coast done fortyfour years before. It was an admirable piece of work later included in British Admiralty charts and unrivalled until recent years.

The Fostok and the Minyni then set course south-east by east for

Bellingshausen's journals any very clear picture of Bellingshausen or of his second in command, Mikhail Lazarey Born in 1779 in Estonia, of a family as aristocratic as that of Cook was humble, Bellingshausen first appears in the context of exploration in the pages of Kruzenstern's narrative of his voyages 'The choice of Baron Bellingshausen, my fifth lieutenant, wrote Kruzenstem, 'I made without being personally acquainted with him His reputation as a skilful and well informed officer in the different branches of navigation, which I found to be perfectly just, induced me to propose to him to sail with me ' Bellingshausen was then twenty four In April 1819 when he was summoned by Alexander I to St Petersburg he was engaged in a survey of the Black Sea as commander of a frigate under Vice Admiral Sir Alexis Samuilovich Greig whose father, Sir Samuel Greig, born in Fifeshire, had been one of the many Scots who distinguished themselves in the service of the Imperial Russian Navy Little about Bellingshausen s character and personality can be gauged from the carefully impersonal prose, from the clipped phrases customary with serving officers, which mark his journal His admiration for Cook- the great explorer, Captan Cook-hu admiration for learning and for its patrons like Sir Joseph Banks, his professional pride, high competence and passion for accuracy are evident It is evident too, from his reference to the works of Alexander von Humboldt for example, that he had some acquain tance with the scientific literature of his day His portrait, done about the time of the expedition, may be a little more revealing Here he is seen, sharp eyed, a little arrogant perhaps, evidently a somewhat forbidding man and something of a martinet, a contrast to his genual, bluff and sociable second in command Mikhail Lazarev who had like Kruzenstern served four years in the British Navy

Copenhagen and Portsmouth were the expedition's first ports of call and it was in Copenhagen that Bellingshausen heard the news that the German naturalists refued to jon hum The visit to England was more profitable, though Bellingshausen was no more successful there than in Copenhagen in finding replace ments for the missing naturalists First, there was the welcome sight of Golovinn's shap, the Kamchates, Jying in Spithead Road, homeward bound from North America: Then in Portmouth Bellingshausen was again within sight of the ice cliffs of the Continent and wrote, 'As we surveyed the extent of the icefield around us to the east, south and west, we were unable to see its limits; it was precisely an extension of that which we had seen in thick weather on the 16th (i.e. 28th January, new style), but had been unable to examine properly on account of the mist and snow'. They were now in clear weather. Nevertheless, Bellingshausen from his narrative seems to have been quite unaware of the true nature of his discovery. In his journal for 5th and 6th February (17th and 18th, new style), when the two ships still in clear weather were in latitude 69° S., longitude 16° E., Bellingshausen once again gives a very recognizable description of the ice cliffs of the mainland and of the ice slopes beyond, gently rising towards the polar plateau; the cliff edge, he says, 'was perpendicular and formed into little coves, whilst the surface sloped upwards towards the south to a distance so far that its end was out of sight even from the masthead'. These coves, he thought, marked places from which the ice-bergs floating round the ships had broken away. On the following day, Bellingshausen, then off the coast of Prinsesse Ragnhild Kyst which was discovered by the Norwegian Riiser-Larsen in 1931, saw in the farther distance 'ice-covered mountains'. But he makes no claim even then to any discovery of the Antarctic Continent.

Bellingshausen's Antarctic expedition because of its bearing on Russi's historic right to a say in the future of Antarctica has recently been the object of much research in the Soviet Union and new documents have been uncarthed and published. These include a lecture delivered by Professor Simanov, the astronomer, in 1822 at Kaznu University; a letter from Mikhail Lazarev, captain of the Altmpi; the diary of Yegor Kiselev, aseaman on the Yonob; and a book, not published until 1833, which was probably the work of P. M. Novosil'skiy, a midshipman on the Altmpi. One might expect such private documents to be less guarded and cutious in expression than Bellingshusen in his official narrative. But none contains any claims to continental discovery. Norse there any assertions of Russian sovereignty over these parts of Antarctica; a remarkable omission on the part of Bellingshausen and his men in a century when national claims were made with such alacrity. the northern extremity of Cook's Sandwich Land, now known as the South Sandwich klands Cook had thought Sandwich Land to be 'either group of silands or else the point of a continent' But Bellingshausen settled the matter He discovered Sandwich Land to consist of two groups of islands and named the northern group the 'Marques de Traversay Islands' after the Minister of Naval Affairs The Islands were carefully surveyed, sketchea, precise and clegant, were made of coastal profiles by Paul Mikhailov, the Academician, and these have continued to decorate the Brutsh Admiralty's 'Antarctice Pilot' down to the present day

There were lesser tasks still to be completed, no less method cally, before Bellingshausen embarked on the first stage of his great voyage of areumanyagiton. The position of the Candlemar group of islands was firmly fixed. Sumders Island, Cook's Cape Montague, was proved to be an Island These and other Island, including Cook's Cape Bristol, were mapped and their insularity proved.

On 27th January 1820 the leased and the Mirnyi, the first shaps to do so since Cook, crossed the Antarctic Circle, an achievement not even mentioned in Bellingshausen's pournal Then followed a sequence of discoveries, exaggerated of recent years far beyond the hmits of Bellingshausen's moders claims, which brought the Russians, though they never realized to at the time, within sight of the Antarctic Continent On 28th January (16th January by the Russian calendar), the two ships in a heavy well were in latitude 692 21t's and longuide 27 14t' w, when Bellingshausen saw through the falling snow 'a solid stretch of the running from east through south to west', a vertable 'icefield attewn with hummocks' But the weather was rapidly worsening and Bellingshausen turned north west by west in reach of the open iese, leasing behind hum—for discovery more than a century later—the kee chiffs of Kr Prinesse Martha Kyst, part of the Norwegian Antarctie territory of Dronmer Mund Land Only two days later, away to the west, Edward Bransfield and Williams Smith in the brig Williams became the first to recognize this same Antarctic mainland in the form of the Tirnuy Peninsula

Sailing east and south, by 21st January (2nd February, newstyle)

Bellingshausen was again within sight of the ice cliffs of the Continent and wrote, 'As we surveyed the extent of the icefield around us to the east, south and west, we were unable to see its limits; it was precisely an extension of that which we had seen in thick weather on the 16th (i.e. 28th January, new style), but had been unable to examine properly on account of the mist and snow'. They were now in clear weather. Nevertheless, Bellingshausen from his narrative seems to have been quite unaware of the true nature of his discovery. In his journal for 5th and 6th February (17th and 18th, new style), when the two ships still in clear weather were in latitude 69° S., longitude 16° E., Bellingshausen once again gives a very recognizable description of the ice cliffs of the mainland and of the ice slopes beyond, gently rising towards the polar plateau; the cliff edge, he says, 'was perpendicular and formed into little coves, whilst the surface sloped upwards towards the south to a distance so far that its end was out of sight even from the masthead'. These coves, he thought, marked places from which the ice-bergs floating round the ships had broken away. On the following day, Bellingshausen, then off the coast of Prinsesse Ragnhild Kyst which was discovered by the Norwegian Rilser-Larsen in 1931, saw in the farther distance 'ice-covered mountains'. But he makes no claim even then to any discovery of the Antarctic Continent.

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Continuing castwords and clockwise round the Continent, Rellingshaven penetrated further south than any previous explorer in these waters and after crossing and recrousing the Antarctic carcle reached almost to Enderly Land, tody part of Auttralia Antarctic Territary The two whips then made for Auttralia and skitted New Zealand, Tahkit and the Central Pacific before returning the MA Antarctic regions.

Early in November 1820, with mein rested and ships refitted, Bellingshauen emlurked on his second phase of discovery in the Antarctic, approaching by way of the sub-Antarctic Macquire Island, south of the Taxman Sea, where he found British sealers from Sydney were very active He then sailed weitwards through the Southern Ocean and approached the Continent the first signs of land were seen, heralded by a diariling white light, the first bluek familiar to Antarctic explorers, lighting the sky to the much

The following day, a dark shape seen through the hare to the north-sat was transformed as the sun broke through the clauds into a land of black rock and snow, the first recognizable land they lad seen within the Antaretic circle. This small bland, as it proved to be, protected by an encircling lock of ice, Bellinghauen called Oxtrow Peter i after 'the great name of the foundor of the fleet of the Russian Impire'. In 1929 Norwegians, within whose territory the island now falls, made the first Lanling there. But it retains its Russian name, Peter 1 (by, today

Towards the end of the month, heading for the east, the fonts and the *Winnyi* silled close to a great and mountinous heading! I called this discovery fland", wrote Bellinghuuren, becaue its southern extent disuppeared beyond the range of our vision', he named it Brerg Aleksandra i (Alexander I Coaut); its now known as Alexander Land. This, the most extensive Antercit discovery made by the Rousians, is not part of the mainland, as Rellinghausen thought, but an island separated from the mainland by a surrow, ice-coaverd sound

Bellinghausen had now almost completed his circumnarigation of the Antarctic Continent and he turned to his last mission, the survey of New Shetland, the South Shetland hinds, 'to ascertain whether this recently discovered land belongs to the supposed Southern Continent'. Bellingshausen, unlikely as it may have seemed to Captain Edmund Fanning, already knew all about William Smith's discovery through a message he had received while in Australia from the Russian Minister in Rio de Janeiro. He had also heard the news from the captain of an East India merchantman he.met in Sydney Harbour. As usual no time was wasted. In six days he surveyed with his customary aceuracy all the islands of the group and thus disposed of the continental theory. Bellingshausen had now proved beyond doubt that neither the South Sandwich Islands nor the South Sheland Islands belonged to a Southern Continent.

It was in the course of this survey, early in February 1821, that Bellinghausen met Captain Nathaniel Palmer and it is worth while comparing his version of this encounter with the picturesque version perpetuisted by Captain Edmund Fanning, Bellingshausen, as he approached Deception Island, met one of the several American scalers lying off the coast. 'I lay to', he writes, 'despatched a boat, and waited for the Captain of the American boat. . . . Soon after Mr Palmer arrived in our boat and informed us that he had been here for four months' sealing in partnership with three American ships. They were engaged in killing and skinning seals, whose numbers were perceptibly diminishing. There were as many as eighteen vessels about at various points, and not infrequently differences arose amongst the sealers, but so far it had not yet come to a fight. Mr Palmer told me that the above-mentioned Captain Smith, the discoverer of New Shetland, was on the brig Williams and that he had succeeded in killing as many as 60,000 seals, whilst the whole fleet of sealers had killed 80,000. As other sealers also were competing in the destruction of the seals there could be no doubt that round the South Shetland Islands just as at South Georgia and Macquarie Islands the number of these sea animals will rapidly decrease." After some further talk about sealing and about the dangers to ships in these waters 'Mr Palmer soon returned to his ship'. There is no word, in this Russian version of the episode, of Palmer Land, or of Palmer's discovery of a continent.

This survey of the South Shetland Islands completed, Bellings-This survey of the South Shetland Islands completed, Bellingsbausen turned for home. It was the end of a great voyage of circumnavigation and of Antarctic discovery. In the east, he had been the first, though he had not realized it, to set eyes on the continental coast in the Norwegan sector of Antarctica In the west, he had discovered Peter I Dy and the great and moun tamous expanse of Alexander Land, an sland barely separated from the maniland In the west, too, in his surveys of South Georga, of the South Shethands, and of the South Sandwich Islands, Bellingshausen completed, extended and perfected the work begun by Cook It is undeed with Cook whose example he so closely followed, whose achievements he so much admired, that Bellingshausen can most fittingly be compared in his leader ship and conduct of this first Russian Antarctic expedition

It is remarkable that Bellingshausen's great contributions to Antarctue discovery should, on las return to Russia in 1821, have been so tardly recognized in 1824 when he presented to the imperial Admirally his report and the maps of his two year voyage, the Emperor refused to sanction the cost of its public tion. Three years later the work was somewhat reluctantly taken in hand out of fear that 'the scientific discoveries of Captain Bellingshausen, if not now made known, may be claimed by others as their own, and that the honour of them will go to foreigo and not to Russian navigators' in 1831, the report and maps were published. But it was not until 1836 that Bellings hausen's charts were available outside Russia to guide the course of future exploration

Wanng maritime ambitious, a diversion of strategie and cononuic interest from the Far to the Near East, these no doubt were factors in Russay's failure to profit in the numeternh century from the brilliant lead in Antarctic discovery which Bellingshausen gave Indeed, whaling apart, Russian Antarctic exploration was not renewed until after the Second World War when the Soviet Linkow of the International Geophysical Year Bellingshausen, meanwhile, Lingely because of the great significance of his voyages in connection with Russay's claims to the status of an Antarctic power, has at last been restored to his singhtful place in the history of polar exploration. The names of his ships, *Kotok* and Maron, have been given to Soviet Antarctic statuous set up for the Geophysical Year. And Soviet plans are already (1935) in hand for a sciencific journey accoust he Antarctic

119

Continent towards the waters which Bellingshausen was the first to explore, the waters of the Bellingshausen Sea.

Along the line of this trans-continental journey, in Dronning Maud Land and on the shores of this sea, two Russian scientific bases are to be established and named, in the words of the Soviet Press, 'in honour of the famous Russian sailors who discovered Antarctica—Thaddeus Bellingshausen and Mikhail Lazarev.'

## A British Sealer Circumnavigates the Continent

A risk this magnificent Russun InterJude we can return to the explorations of the Intuits scalars who continued to of such owners as the Endethy brothers. Their long toyges in the twenties and thartes of the century, in brigg and cutter manned often enough by no more than a dozen men, were hi dintance covered no less extensive, in discovery often at finitful as those of many of the heasily manned assal ships which took part in the tubequent revisal of national Antercic exploration towards the end of this period. The names of Powell, Weldbli, John Bittee, John Kenp and John Billeng are three which stand forth among the British scalers at work in the Antaretic between 1822 and 1839.

In 1822, the year after Belling hausen's return, James Weddell in the 160 ton brig Jane and the 65 ton cutter Beaufoy penetrated deeply into the Weddell Sea, normally one of the most dangerous of Antarctic seas because of the tremendous pressure of the circulating ice within it, and reached the latitude of 74° 15' 5 . two hundred and fourteen nautical miles nearer the Pole than Cook Weddell, a retired Master from the Royal Navy, was In his devotion to science typical of these sealing captains of the first three decades of the nineteenth century Despite the lack of proper instruments and the disgruntlement of his sailors at so apparently profitless an occupation, he did what he could, testing the strength and direction of currents, taking temperatures of the sea until his thermometers were smashed in a gale, puzzling over differences in magnetic variation, scrupulously observing even In moments of immediate danger the nature, form and movement of the ice To persevere with such tasks in vessels cruelly exposed to the violence of Antarctic weather required a singular

devotion. The experiences, however, of Weddell's ships on this lengthy pioneering voyage were not unusual. A whale boat overboard; a rudder frozen into immobility; bulwarks, decks and rigging so heavily encruted with ice that the ship could scarcely rise to the sea-such experiences were common in the brigs and cutters of the Antarctic scalers in the early years of the nineteenth century.

Eight years later, John Biscoe, who is the best known of the Enderly scalers, circumnavigated the Antarctic Continent and the log of his voyage of 1830-32 was presented by Charles Enderby to the newly founded Gographical Society of London. Biscoe's mission was to search for land in the Southern Ocean east of the meridian of Greenwich where it was thought the great icebergs originated which had recently been seen, to the alarm of shipping in the South Atlantic Ocean, as far north as 35° 50' S. By 22nd January 1831 Biscoe's brig the Tula, with the cutter Lirely, had crossed the Antarctic Circle. The edge of the pack must have receded considerably since Bellingshausen's voyage through these same waters ten years earlier, for Biscoe was able to sail well south of Bellingshausen's track of which, of course, he had no knowledge. East of the Greenwich Meridian, Biscoe's ships were pounded hercely against the pack. Only, as he calmly recorded, 'by the careful management of the sails' were they able to escape disaster. On 25th February 1831, the first doubtful land was seen, 'an appearance of land . . . nearly similar to the North Foreland'. 'I should think', Biscoe wrote, 'that the cliffs of it, which bore the marks of icebergs having been broken off from it, and which was exactly similar to their sides in every respect, were as high, or nearly so, as the North Foreland; it then tan away to the southward with a gradual ascent, and with a perfectly smooth surface, and I could trace it in extent to at least

point-uj smooul surate, and route tate a metalante from thirty to forty miles with a good releasope; it was then lost in the general glow of the atmosphere.' Biscoce is clearly describing, just as Bellingshausen had described, the ice cliffs of the continent and the ascending slope of the ice beyond, rising towards the polar plateau. But on this first view he was very doubtful of his discovery. He had unorthodox views on the origins of Antarctic ice and imagined that it was all engendered from the sea. Antarctica he prophesied would prove to be not an ice girt, ice-covered land mass, but a solid mass of sca ice, though silands might be found embedded in it in accordance with this hypothesis to which he obstinately adhered, Biscoe concluded that the great ice wall be had seen, which reminded him so much of the white cliffs of the North Foreland, was 'nothing more than a solid body of ice'

But on 3rd March 1831, undenuable land appeared which Bisco identified from the foretop as the dum black shapes of mountan summits As the Tole and the Leefy edged dangerouily through the pack, this new discovery was heralded by an Aurora Australis is brilliant that it emblacomed the whole night sky, and of such a marrellous variety of pattern and colour that Biscoc and his sulors, secure these Southern Lights for the first time, had no eyes for the ice hazards in the sea below "Nearly the whole night". John Biscoe wrote in his log, 'the Aurora Australis showed the most brilliant appearance, at times rolling itself over our heads in beautiful columns, then as suddenly forming itself or the form of a serpent, and at times appearing not many parts to the form of a serpent, and at times appearing not many jards above is 'Under this canopy of colour the brig and the cutter moved cautiously towards a prominent and sombre headland which Biscoe named Cape Ann Suddenly the sublimity of the iteme was shattered A south easterly gale arose, boats were swept away, bulwarks were stove in, and before a wind which had turned tee cold, the burg trapped an the whirting pack wa swept a hundred miles out to sea Of the cutter no vesting could be seen

When the storm subsided, Biscore returned to this coast which he named after his owners, Enderby Land It lies in the north east of Australian Antarctic Territory Butit twas then mud March, the new ice forming on the sca marked the approach of winter, and scury had broken out among the exhausted crew of the brg Biscore in his log for this stage of the voyage gives a picture of the hardhaps endured by the men who manned these small scalers, 'the land maccessable, heavy gales frequent every day, some of the people getting stek, the carpenter for some time in the same condition, and two or three more under medicane for the same condition, and two or three more under medicane for the same condition, and two or three more under medicane for weather and ships a great deal of water, and is now on her outside, both hull and ropes, where the spray can reach, one mass of ice. By April so weakened were they by scurry and the incessant rolling and pitching of the brig in the south-easterly gales that only three men on board could work, but nevertheless Biscoe managed to bring her into port, at Hobart, on 10th May 1831. By some miracle, the cutter *Lirely* too survived and her effective crew, reduced to the captain, one seaman and a cabin boy whose hand had been crushed by a falling bost, brought her into Port Philip, near the modern Melbourne.

Leaving Tasmania in October 1831, Biscoe on the second stage of his voyage of circumarization entered the region of Belling-husen's discoveries. Knowing nothing of these, Biscoe sailed wetwards and, approaching the contant from north of the Bellingshusen Sea, wrongly claimed that his first new discovery Adelaide Island, an island 'of a most imposing and beautiful appearance, with one very high peak running up into the clouds' was 'the farthest known land to the southwards'. To the north, beyond this island named after William the Fourth's Queen, he could see other islands fringing a mountainous mainland coast, and on 21st February 1832 he made his first landing on Antarctic territory. It is difficult to be certain precisely where Biscoe landed but it was probably on Anvers Island off the central stretch of the coast of the Graham Land peninsula south of Bransfield's 'Trinity Land' and 'Palmer's Land'; the latter, a name to which Biscoe himself refers though he seems to have been vague about its position. On his return to England, this central stretch of coast was given the name of Graham Land after Sir James R. G. Graham, then First Lord of the Admiralty, and with slight justification considering the prior discoveries of Bransfield and Smith and Palmer himself, the name was later applied to the

whole of this northward projecting Antarctic peninsul. The brig *Tula* anchored in the Thames on 30th January 1833. Biscoc, despite the great extent of his voyage, had been singularly unuccessful as a scaler. But as an explorer he had won fame and he received, in company with no less a traveller than Richard Lander, the explorer of the Niger, one of the two gold medals of the Geographical Society. His owner Charles Enderby meanwhile, despite heavy financial loss, was so encouraged by Biscoc's achievements that he forthwith planned further voyages of Antarctic exploration One by Biscoe himself is unrecorded But another, a no less costly and hazardous venture by a Britin sealer, John Kemp, resulted in the discovery of Kemp Land, adjounng Enderby Land (and also part of Australian Antarctic Territory) Yet another Enderby expedition sailed in 1838 In his, seven other London merchants pound with Enderby in sharing the cost Enderby captain this time was John Balleny He sailed due south from New Zealand to duecover in 1839 the Balleny Islands-five large and two small islands to which the names of Enderby's partners were given-and subsequently, though less certainly, discovered the stretch of cost called, after Balleny's cutter, Sabrina Land It is shown on modern maps in the western part of Australian Antarette Territory

The historian of Antaretica, the late High Robert Mill, has aptly summed up the remarkable contributions of these Bnuth sealers in the second quarter of the nunctenth century 'Balleny's eruse', he wrote, 'proved for the first inme the existence of land within the Antaretic Crele south of New Zealand, and by mean of it the firm of Enderby forged still more links in the strong chan of evidence that either the edge of an extensive continent or a long series of islands lay to the south of the Indian Ocean just within or on the Antaretic Circle, portions of which appeared in the Billeny Islands on the east, Enderby Land on the west, and at Kemp Land and possibly Sabrina Land between the two'

A more eloquent and no less justifiable tribute to the dama terested devotion to exploration of the Enderby brothers was paid after Charles Enderby had retold Billery's story to the Fellows of the Royal Geographical Society 'It would be im possible', declared the speaker, 'to cloate the simple but apparently faithful narrative of this woyage without adverting to the progress made in discovery in the Southern Seas through the spinted exertions of Mr Charles Enderby, and other Binuth merchants, so honourable to the commercial enterprise of our country Graham Land, Enderby Land, Keng Land, and now the Billeny blies, are all discoveries made by the ships belonging to his disnaterested and praseworthy owner. The results of this voyage', he continued, "must tend to keep alive the supposition BRITISH SEALER CIRCUMNAVIGATES THE CONTINENT 125

of the existence of either a great southern land or a vast mass of islands, whose northern limits would seem to range between the 67th and the 69th parallels, a part of which we trust, ere long, to see laid down in our charts, and not improbably rendered subservient to the interests of science, if not to the prosperity of our fisheries.<sup>1</sup> bear on the Government to promote American exploration both in the Pacific and in Antarctica. The most remarkable, and certainly the most indomitable, of these was John R. Reynolds of Ohio, the first active promoter of American polar to replocation less judicious, less successful, but no less worthy of the name than his British contemporary, John Barrow. From the start he had been the great protagonist of President Adams's project and his one ambition was to see an American expedition to the Antarctic suil, with himself as historiographer. He was, however, less concerned with forwarding American commercial interests or competing with the British than with the advancement of American discovery and research. When the Senate under President Jackson's new Democratic administration refused in 1828 to ratify such an exploratory project, Reynolds sailed with a Government sponsored expedition (the first to the Anarctic) under the sealing captains, Palmer and Pendleton, and on his return in 1831 alter a cruise round the South Shetlands he was more than ever convinced of the urgency not only of promoting American exploration but of making known to the world American achievements through a pational expedition not bound by the commercial secrecy which surrounded sealing operations,

For the next six years Reynolds, convinced of the rightness of For the next six years Reynolds, convinced of the rightness of lis cause, embarked with immense energy on a stormy public camping to whip up support for a large scientific expedition to explore the Antarctic. The Stomington sealing community were among his most enthusiastic backers and in 1833 the veteran memorial to Congress 'praying' that a national discovery and exploring expedition be sent to the South Seas'. Reynolds himself addressed Congress in support of the motion. He solicited supporting testimony from scientific organizations and commecial bodies. And he engged in a spate of newspace publicity. But his campaign made slow progress. Outside a few intellectual centres like Philadelphia imbued with the split of Benjamin Franklin, his impassioned speeches in the cause of science made little impression. Nor beyond the sealing towns did the Antarctic strouse much enthusiam. To the public and to the politiciton, the Pacific with its known promise of oew whaling grounds and trade routes to the lucrative markets of China, was a far more attractive proposition

In 1836 Reynolds was again permitted to address Congress In 1836 Reynolds was again permitted to address Congress eloquent passage he urged attention to 'the extensive group of stands lying north of the coasts of Palmer's Land, the extent of which neither we nor any subsequent navigators have as yet ascertained 'A Bruth vesel, he added in an acid reference to John Biscoe's landing on Anvers Island off Graham Land, 'touched at a single spot in 1832, taking from it the American and giving it a Bruth name'

At last, Reynolds' unflagging campaign aroused a sufficient pressure of public opinion and this, reinforced by rumours reaching Washington that the British Nasy was shortly to launch a national Antarctic expedition sturred Congress into action. On 14th May 1836 an Act of Congress authorizing a United State Exploring Expedition was pused For Reprodids, however, it was the beginning as well as the end of a battle. For on that day there was horn an expedition which, however important its achieve ments, was the most ill prepared, the most controversial and probably the unhappest expedition which ever sailed the Antarctic seas

At the start, all went well Captain Thomas ap Cateby Jones was appointed by the Nary Department to command Scientific societies and organizations throughout the country were called upon to advise on equipment, to draw up programmes of research, and to recommend scientistic for the expediuon A squadron of shaps was earmarked And a member of the expedition a Leutenant Charles Wilker, of the Department of Charts and Instruments, was sent to London to purchase (as Belling bausen had purchased) charts and scientific equipment. Then followed two years of charges and counter charges, of personal feuds and political intrgues. The shaps selected were unsuble additional funds, they refused on the grounds that they had been insufficiently consulted by the Nary Accusations of corruption and fraud, some of which Liter proved quite justifibile, were long from sule to side The principal battle, however, was between Reynolds and the Department of the Navy. In his ejes the expedition was to be a scientific expedition and societies like the Philosophical Society of Philadelphia had on his invitation composed lengthy memoranda of advice on scientific research. But the Navy Department in so far as they were interested at all in such matters considered that science was a matter for the Navy and viewed with the greatest of mistrust Reynolds's proposal to include a contingent of civilian scientists in a purely naval expedition. In Reynold's mind, moreover, the object of the expedition had been discovery as far south as possible. Now even this was changed, the emphasis being placed on Pacific and not on Antarctic exploration. Embittered by these successive defasts, Reynolds vented his grievances in a stream of pamphlets and newspaper articles and ended by accusing Mahlon Dickerson, Sceretary of the Navy, of a deliberate intention to wreck the expedition.

of the Navy, of a deliberate intention to wreck the expedition. This indeed very nearly happened and Nile' National Register for 28th October 1837 declared with some truth that "Success alone can efficate the recollection of the bickerings and the heartburnings, and delays and blunders, which have marked the progress of this expedition from its inception to the present time. Officer after officer resigned, including the commander, Captain Jones. The men recruited, being idle all this time, became increasingly disgranted. The public, exasperated by the quirrels and the vacillations of all concerned, proclaimed the expedition a failure before it started.

In March 1388, command of the expedition was offered to in March 1388, command of the expedition vectors Charles Wilkes, a comparatively junior lieutenant who had already resigned from the expedition because he had been offered a scientific and not an executive role. Wilkes's appointment produced another storm. He was accused of intriguing to obtain the post. His seniors in the service complained that they had been passed over. Many of the officers previously selected now refused to serve. Nevertheless, it was a justifiable appointment. Wilkes, a descendant of John Wilkes, the champion of the people, the frabrand English politician who had battled on behalf of the American colonists in the reign of George III, was—as his subsequent career made all too plain—impetuous and dominating. But his scientific attaitiments were far above those of the average nand, offeret driving power. Wilkes's orders were to reorganize the whole expedition, and in particular to reduce the number of vessels and the number of scientists, twenty five, selected The choice of ships wai unfortunate Three were warships, the linemas and the Peacok, sloops of 700 tons, and the Parpose, a gun brig of some 200 tons None were fortified agunst the see and in heavy weather their large squire gun ports Lay wale open to the usinge of the sea Of the Peacok, her captain was later to say, she 'has been fitted (as far as the Navy yard are concerned) with less regard to safety and convenience than any vessel 1 have ever had to do with beat serving as a tender, a comous vessel to take on an Antarctic cruse, the tender Flying Fah of 100 tons, and a store ship, the Relif, so slow that she was sent home early on the voyed. Its not turprising that only two of Wilkes ships survived the expedition. Their expecting was no less madequate than their design or equipment. Provisions for twelve months, and fuel for seven that years' amplies of the British and Russian expeditions. "The reduction in the number of scientist was easier than

The reduction in the number of scientize was easier than Wilkes anterpated for, sickened by the endless feuds, seveni had already thrown up their posts Of those remaining the first to be dumissed was john R Reynolds, for the sake of harmony', the Nay Department not unjusticably said An applicant for his post was the American novelist, Nathanied Hawthorne One of the dumissed sciencistic was a Wn Johnson who had reigned his professorship at the Franklin Institute un order to join were probably typical of the attitude of his scientific collegues to the Nay's reorganization 'The dignity and efficiency of the scientific corps, in particular J, Johnson declared, 'was or much curtailed that it was with disappointed hopes and lowered expectitions that those who were retained, embarked on the voyage, and it was with substation rather than regret, that Mr Johnson finally received notice from the Secretary of the Nay' that his scruces would not be required'

Although, in the words of the Secretary of the Navy, 'the important interests of our commerce embarked in the whale fisheries' were to be the chief objectives of the expedition, science was not entirely excluded. 'All occasions will be taken', Wilkes's instructions read, 'not incompatible with the great purpose of the undertaking, to extend the bounds of science, and to promote the acquisition of knowledge. For the more successful attainment of these, several scientific gentlemen will accompany the expedition, for the departments of philology, zoology, conchology, geology, mineralogy, and botany, with suitable artists, and a horticulturalist,' Professor Johnson had originally been placed in charge of magnetism, electricity, and satronomy. Now, however, 'astronomy, hydrography, geography, terrestrial magnetism, meteorology and physics' were entrusted to the Navy. Furthermore, the reduced scientific staff which was finally permitted to sail with the expedition was itself bound by an impossible regulation. For the Navy Department had ordered Wilkes to forbid 'all communications except to this Department, from any person attached to the Expedition, referring to discoveries, or any circumstances connected with the progress of your enterprise'. It is not surprising, therefore, that the eivilian scientists, suspect from the start, were allowed no part in the Antarctic cruises of the expedition on which alone new geographical discoveries were likely to be made.

In the Antarctic programme of the United States Exploring Expedition, the effect of the discoveries of the British sealers, Weddell, Biscoe, and Balleny is very evident. Broadly, it envisaged two summer voyages. The first, from Tierra del Fuego to the south of Powell's Group (the South Orkney Islands) and between the latter and Cock's Sandwich Land, was directed towards the greatest possible penetration of the Weddell Sea, 'following the track of Weddell as closely as practicable'. The second royng was to be southwards from Australia or Tasmania to the Balleny Islands and thence westwards as far as John Biscoe's Enderby Land. The United States Exploring Expedition was, however, no longer primarily concerved, as Reynolds had hoped, with Antarctic exploration. The Antarctic voyages, herefore, were no more than interludes in a series of Pacific voyages ranging from Valparaiso to Fiji and Sydney; from the Sandwich Islands to the north-west of America; and thence to Japan, Singapore and back to the Cape of Good Hope. On 18th August 1838 Wilkes's squadron sailed from Hampton

Roads For Wilkes it was a gloomy moment 'lt required', he confided to the pages of his private pournal, 'all the hope I could muster to outweigh 4 c intense feeling of responsibility that hung over me I may compare it to that of one doomed to destruction Six months later the ships were assembled at Orange Harbour, Nasau Bay, in the extreme south of Tierra del Fueço, the starting point for the first Antarctic voyage Almost at once Wilkes in the Porpoint and Leutennin Johnson in the old New York plot boat set off for James Weddell's sea. They sighted the northern islands of the South Shetland group early an March 1839 and three days later fixed the 'esstern extremity of Palmer's Land or Mount Hope'—at the tip of the Graham Land pennsula—in 63° 25' S and 57° 55' W. They did not know that only a year before a French national expedition, the first of the nincteenth century, had under Captain Dumont d Urville explored these waters and marced Mount d Urville ext that very spot

The ships then swung round towards the Weddell Sea But any hopes they had of beating Weddell's furthest south were rapidly dissipated. The extent of the ace cover in the Weddell Sea has fluctuated strangely from year to year In Weddell's time, only a decade or so earlier, the sea must have been extraordinarily free of ice to have enabled him to achieve such a high latitude Wilkes found conditions very different Along the north east coast of Graham Land, the weather was so thick, the ice pressed against the coast by the westerly drift so massive, that he soon despaired of penetrating further, or of landing The men were in great discomfort The brig, her gun ports wide open to the heavy south westerly gales, every rope, every inch of deck thickly encrusted with ice, was too small to accommodate so large a crew even in moderate conditions The clothing issued to the men moreover, was absurdly inadequate for a polar journey 'Although purchased', Wilkes wrote later, 'by the Government at great expense, it was found to be entirely unworthy of service, and inferior in every way to the samples exhibited This was the case with all the articles of this description that were provided for the expedition 'An outbreak of scurvy among the crew of the Porpoise was decisive After a hasty visit to Deception Island both ships, in some distress, headed for Orange Harbour

An attempt, meanwhile, by the Peacock and the Flying Fish to

exceed Cook's Ne Plus Ultra, in longitude 105° W., was astonishingly almost successful. The Paacack, the sloop of war of which her commander Lieutenant Hudson had so bitterly complained, managed somehow to struggle through the ice made the more dangerous by dense fog, as far as 68° S, 95° 44' W. when there emerged the outlines of the 96-ton tender, the Flying Fish, with the triumphant news that by riding above the ice and slipping through narrow leads the had only just failed to reach 71° 10° S., Cook's most southerly point. To have voyaged so far west and south, almost to within sight of the inaccessible coast of Marie Byrd Land (as it is now called) was a remarkable achievement in such ill-found vessels. But the Antarctic season was now over. When the squadron was assembled again off the South Shetlands, they returned to Valparaiso, and in May 1839, to Wilke's relief, silled for the warm waters of the Pacific.

In December 1839 the United States Exploring Expedition lay in harbour at Sydney, after seven months of Pacific exploration, preparing for their principal Antarctic voyage southwards towards the Balleny Islands and thence westwards round the continent towards Enderby Land. This was a voyage from which the civilian scientists were excluded. Wilkes did what he could to prepare his ships for the test. Tarred canvas and sheet lead was used to patch rotten bulwarks and keep cabins and quarters dy. Patching and restoring went on right and day. Wilkes, meanwhile, in his anxiety gained no comfort from the comments of the inhabitants of Sydney. They had a leased heard rummurs of the new, elaborate and ingenious equipment soon to be used by Sir James Clark Ross in a great British Antarctic venture and they expressed open astonishment at Wilkes's make-shift fleet. 'They enquired', Wilkes ruefully admitted, 'whether we had compartments in our ships to prevent us sinking? How we intended to keep ourselves warm? What kind of anti-scorbutic we were to use? And where were our great ice-saws? To all of these questions I was obliged to answer, to their great apparent surprise, that we had none, to agree with them that we were unwise to attempt such a service in ordinary cruising vessels; but we had This want of preparation certainly did not add to the character for wisdom of our government, with this community . . . and, altogether, as a gentleman told me, most of our visitors considered us doomed to be frozen to death

Depressed but resolute, Wilkes's squadron left Sydney on 26th December 1839 and the first Antarctic land was seen on 15th January 1840, a small said of the group discovered by John Balleny, of which Wilkes seems to have had no knowledge. The next few days suling on a westerly course they met the full impact of the Antarctic weather, with heavy gales and huge seas succeeded, omnously, by smooth water strewn with scarcely moving pack to the Tar are still and a dense fog hung over the sea, and Wilkes, bestet in the Vincense, the sloop of war serving as the flig ship, spent many hours listening annuously 'to the low and distant rustling of the see

However, the pack shifted and they made sail and on 19th January land was seen stretching far to the south south east and south west, visible above the ice islands which lay ahead of the ships it had, Wilkes noted, 'the appearance of being 300 feet in height, forming a sort of amphuheatre, looking grey and dark, and divided into two distinct ridges or elevations throughout its entire extent, the whole being covered in snow' This new coast, possibly the coast of Oates Land adjoining the Ross Dependency, was their first sight of the Antarctie continent The Peacock and the Fincennes then steered westwards along the edge of a belt of close pack ice, weaving a way between great tabular icebergs and Wilkes wrote in his journal of these with a true touch of neo Gothic fantasy. Some of the bergs were of magnificent dimensions, one third of a mile in length, and from 150 to 200 feet in height, with sides perfectly smooth as if hey had been chiselled Others, again, exhibited lofty arches of many coloured tints, leading into deep caverns, open to the swell of the sea, which, rushing in, produced loud and distant thunderings The flights of birds passing in and out of these caverns recalled the recollections of ruined abbeys, castles and caves, while here and there a bold, projecting bluff, crowned with pinnacles and turrets, resembled some Gothic keep A little farther onwards could be seen a vast fissure, as if some powerful force had rent in twain these mighty masses Every noise on board, even our own voices, reverberated from the massive and pure white walls if an immense city of runed alabaster palaces can be imagined,

134
of every variety of shape and tint, and composed of huge piles of buildings grouped together, with long lanes or streets winding irregularly through them, some idea may be formed of the grandeur and beauty of the spectracle.

Wilkes was still in the midst of this reverie when the *Peacock*, attempting to free herself from the ice closing in on her bows, drove backwards into the pack. But her rudder was smashed in this manoeuvre and she became so unmangeable that all sails were furled and ice-anchors were used to make her fast to a floe. Then a sudden squall tore her away. Her port quarter was smashed. A boom and davit were carried off. Her stern boat was crushed. And she lay, rotten and helplaces, the pack surging round her at the whim of the sea. Wilkes, however, had no hesitation in leaving her to her faste. The one thought in his mind was to advance westwards as far as Enderby Land and in the flag-ship, the *Vincenaex*, with the gun-brig, the *Parpoisz*, he carried on, clariting the lee-islands as he went, thinking that they would change their position so little that he would be able to return the same way.

Wilkes was convinced that if he could penetrate the ice belt which hy unbroken to the south of the ships, he would—as he hadlready done farther east-metch land. On 30th january 1840, in bright sunlight, still advancing westwards through a 'sea so mooth that a yawl could have passed over in safety', he saw his chance. Under full sail, the ships threaded their way through a glutening forest of bergs and ite-islands towards a bay, enclosed by rocks and ice, with land rising towards the south and stretching from east to west for sixty miles. 'I make this bay', wrote Wilket in his log, 'in longitude 140° 30° E., latitude 66° 45' S.; and, now that all were convinced of its existence, I gave the land the name of the Antarctic Continent.' The bay, named Piner's Bay after Wilkes' signal-quartermaster, must have been in the 'vicinity of Terer Addlie.

This first confident announcement of the existence of an Anarctic continent was followed by a crisis in the fortunes of the United States Exploition. The hardships of the 7935, the unbearable conditions on board, the remorseless ducipline of Wilkes himself, a martinet of the old sea-going school, had reduced the crew of the linements to a state so wretched that two of the three surgeons in the ship (the third Wilkes had personally suspended from duty) were forced to certify in writing that illness would soon so reduce their numbers as to hazard the safety of the ship and lates of those on board The men pleaded that they should return Only fear of their formitable commander prevented mutity But Wilkes was meriless and admant 'It was my duty', he wrote in his journal, to proceed and not to give up the cruise until the ship was toully disabled, or it should be evident to all that it was impossible to persist any longer.

Throughout February 1840 the Incenses, now alone, with the Popping far hehmd, advanced slowly westwards within sight of the costs, glumpung from time to time high land stretching south wards beyond the ice chiffs. One landing was made, on an slond, to make magnetic observations and collect geological specimens, but no linking could be male on the cost Wilkes had pasted west of Balleny's Subrias Land to longitude 1067 40° E in the venuity of knox Costs But even Wilkes had now to gue up hope of resching Enderby Land and of linking up there with Bisco's estiward longer. White was approaching, and he coult not risk his ships with work still to do an the Paeine, work if more important from the Paus Department's point of rew So he dedided to turn north. I have seldom seen, 'he wrote, 'bo many happy faces or such replacing as the announcement of my intention to return produced.' By 11th Narch Wilker was back. In Sydney Harbour, at the end of a surbulent but remarking horging at all events, fifteen hundred miles of Antarctu cost

The remaining ships of Wilkes's squadron added hitle to these discoveries The *Praceks* struggled back to safety Bet the *Porpies* was involved in an Incident which is worth recalling because it introduces for the second time in this narrative France's first Antarctic expeditions under Captan Dumont d'Urville Towards the end of January 1840 the gan brig *Porpies* was cruining off the present King Groupe V Land when her captain, Licutemant Ringgold, saw two ships sheed, standing to northward Secing that they were strangers, he housed his colours and attempted to cut them off 11e thought that hey

Ill judged though his conduct no doubt often was, one cannot In page in organise consistent and does on the construction of the expedition is scientific work on condition that American scholars only contributed, without European help But a limited publication was not at all what Wilkes had in mind He had all along been obsersed by the idea that the Whig administra-tion which had been in office ance his return was determined to minimize his achievements and he was all the more inclined to minimum in achievements and he was all the more include uo consider this a dersory and humihating proposal. For thirty years, indeed until after the Civil War, he clamoured for funds to publish new and more sumptuous solutions until the Senate, which had sufficiently unhappy memories of the Expedition's early day, became exsperated under this incessant bombard ment "Incow it into the Potomac, that is the best thing," sud Senator Toombs of Georgia in the course of one debate But perhaps Banator Simon Cameron a comment during the appro pration debate of 1861 best summed up official feeling about the United States Exploring Expedition '1 am tired', he declared, 'of all this thing called Science here'

or ail this thing called Science here ' Nevertheless Wilkes, by a tenacity no less than he had displayed on his Antarctic woyage, got his way I am, my dear Sir', he wrote to a correspondent soon afterwards, 'beginning to feel very' proud of our work we shall now produce a work that every American will be proud of, and which will show those across the Atlantic that we can compete with them in many more ways than they have a yet given us credit for, and that too under every disadvantage

misaryanage -Bitter memories of the feads surrounding the United States Exploring Expedition dissuaded the United States Government from involvement in polar exploration for more than a quarter of a century To generations of the people of the United States, however, Charles Wilkes was a national hero, another Columbus, the discoverer of a strange, new world His books were read and re read, especially by the young And Mark Twain relates in his autobiography that when he was a boy on the Mussissipp Wilkes was then as famous as Theodore Roosevelt in later years

# Europe Revives Antarctic Exploration

While John R. Reynolds of Ohio was demanding that the people and Government of the United States should haunch an exploring expedition, a powerful morement developed in Britain which urged the resumption of Antarctic exploration on a national scale comparable with the great Arctic interprises of the British Navy promoted by John Barrow. The object was to be not only geographical discovery but also, and as many thought even move important, the advancement of magnetic reserch.

From a navigational as well as from a theoretical point of view, the study of magnetism was one of the most pressing scientific problems of the first half of the nineteenth century because this was the beginning of a new maritime era, an era of iron and steam, of speed and naval expansion. In these new conditions accurate compass navigation involving a better understanding of magnetic phenomena was all the more essential. In England, by the eighteen thirties, considerable advances had been made in this branch of science, chiefly during voyages of exploration in the Arctic. In 1823 Captain Sabine of the Royal Artillery, the magnetic specialist on Parry's Arctic expeditions, had been the first to demonstrate the correlation of magnetic variations on a chart. In the Arctic too Ross had discovered the location on Boothia Peninsula of the Magnetic Pole. In the Antarctic, however, little had been done. Here a new and exceedingly valuable scientific motive for further exploration was provided by the German mathematical physicist Johann Karl Friedrich Gauss who discovered a formula whereby he claimed to be able to deduce at any given time the magnetic elements for any part of the earth's surface. On this basis Gauss predicted (with remarkable accuracy) that a South Magnetic Pole would be discovered in the Antarctic in the neighbourhood of latitude 66° S and longitude 146° E. The discovery of the South Magnetic Pole accordingly became the principal object of the British Antarctuc expedition which was about to be proposed, the first since the days of Cook

The first public appeal to the British Government to sponsor a national Antarctic expedition for the discovery of a South Magnetic Fole came at a meeting at Dublin in 1835 of the newly fieldged British Association At this meeting Captain Sabine was a dominating figure The following year reinforcement, ieloquent and powerful, came from another and at first a mysterious source in the form of an anonymous pamphlet composed, it became known, by Captain Washington, R N, the Secretary of the Royal Geographical Society and addressed to his President and Council, though from its contents it was evidentify also intended for a much wider and even more influential audience. This namothet, which and enaled to not the British Government to

Intendent for a much where and even more minorate enumerate This pamphilet, which appealed to the British Government to revive Antarctic exploration was prompted, the author said, by the news that at that very moment the United States of America was preparing to launch a great national Antarctic exploring expedition namely the expedition led by Charles Wilker Was England, Washington demanded, to study passively by and allow a 'foreign and in some points a rival nation. to step in and bear a foreign and in some points a rival nation to step in and deal away the plan of glory which Cook, Weddell and Bissoe had by their achievements so magnificently won? Washington mar-nalled a formidable array of arguments in support of his case the traditions of the Navy, the great example of the Russian Bellinghausen, the urgent need for magnetic investigation and finally, and in the last resort, the commercial benefits to be derived, the profits to be made, from a renewal of Antarctic exploration As to magnetic research, the author of the pamphlet maintained, 'the safety of our ships the value of our commerce, the lives of our fellow creatures are all risked by the unknown agency of this mysterous power which seems to ball investi-gaton' And as for commerce and industry, 'the expense of the outfit of an expedition to search for a new spot for British enter press and capital to exert itself would be covered five times over by the discovery of new scaling grounds and new and lucrative coverse of experiment. sources of sea elephant oil

## EUROPE REVIVES ANTARCTIC EXPLORATION 141

On his own Society, Washington's letter had no effect what-socver. Its President was now Sir John Barrow, the Secretary to the Admiralty, who was as deeply as ever immersed in the history of the Elizabethan adventurers and was in the throes of planning yet another naval voyage to discover the North-West Passage. Barrow had no intention of allowing the Society to be diverted to Antarctic exploration. But strong support came from the British Association. At meetings in 1837 and in 1838, first Sabine and then Washington (in a paper to the newly established Geographi-cal Section) urged the dispatch of an Antarctic expedition and in veiled terms proposed, as Washington in his pamphlet had quite obviously hinted, that the leader should be James Clark Ross, discoverer of the North Magnetic Pole. Progress was now rapid. In May 1838 the Royal Society, which had been granted rapid, in may 1635 the Royal Society, which has been granted large funds by the Government to purchase magnetic instruments, set up a committee to consider the whole matter of magnetic stations and of a South Polar voyage. In this they were greatly influenced by a letter (said to have been prompted by Captain Sabine) which the great German geographer Baron Alexander von Humboldt had addressed to their President, the Duke of Sussex. This proposed the establishment of a chain of such stations with the hope of enabling the philosophers to approxi-mate to some of the general laws by which this extraordinary phenomenon is regulated'.

Washington's pamphlet had a more immediate effect in France than in England. There, one of the founders of the Paris Geographical Society, the naval officer, Jules Schattien César Dumont d'Urville, an explorer, linguist and ethnologist who in the course of a varied career had rescued for posterity the Venus de Milo, was preparing an ethnological expedition to his favourite Pacific islands. His plans had been approved by the French Admiralty but when they were submitted to Louis Philippe he proposed that Dumont d'Urville should undertake a preliminary expedition in the Antarctice, simed at surpassing (as Wilkes had tried to do) James Weddell's farthest south in the Weddell Sea.

King Louis Phillippe was a shrewd assessor of public opinion. Possibly he calculated that such an adventurous exploit would have a tonic effect on a jaded and dispirited people. Possibly the ubiquitous Baron von Humboldt, a geographer of international fame and a frequent varior to the French court, may have had a hand in it as he had had in the Antarctic discussions in Britain in any event, Dumont d'Uruille was at first very dubious about this royal proposal, though he admitted 'it must at least give occasion for interesting observations' Meanwhile. Captain Washington's pampliet had been sent to the Paris Geographical Society On reading this, Dumont d'Uruille was convinced, as indeed the whole Society was comvinced, that France too must play her part in Antarctic exploration and in the advancement of magnetic research

magnetic research For Dumont d Urville, as for James Clark Ross, magnetic studies were the main objective 'An important discovery remained to be made, he wrote of the voyage of his two ships, the Astroides and the Zele, the position of the magnetic pole, the knowledge of which is so important for the great problem res peeting the laws of terrestrial magnetism. From the outset I had always wuhed to shape my course with this end in view 'His enthunaum for such scientific discovery however can have found no response in the French Covernment for when the French shaps sailed from Toulon early in January 1838 they carried only orders, the orders of Louis Philippe, to penetrate as far south as possible in the Weddell Sea, to the greater glory of France in this attempt Dumont d Urville (whose two warships were a unsuitable for Antarctic service as those of Wilkes) was wholly

In this attempt Dumont d Urslife (whose two warships were as unsuitable for Antarctic service as those of Wilkes) was wholly unsuccessful Islands and channels previously discovered by sealers were rediscovered, accurately mapped and renamed Louis Philippe Land, Orleans Channel, the Secur de Jourille's Island A mountain was named in tribute to the discoveres of Leutenant Edward Bransfield But the Weddell Sea proved, as Wilkes had found, *unpenetrable* with the pack extending far to the north. For two months or more the two ships hovered about the ice edge Observations on the formation and movement of the ice were made in accordance with the institutions of the Academy of Sciences in Pairs Young M Goupil, the artist, who was destined to die on a vorge to which 'his passion for art and travel' had committed him, made deheaste drawings of the shipe's of passing bergs. Then the Astroldea and the Zeler erterated

After more than a year of ethnology in the Pacific, Dumont d'Urville returned to the Antarctic early in 1840 to attempt, entirely on his own initiative, the discovery of the South Magnetic Pole. His plan was to sail as far south as possible between 120° and 160° E., in accordance with the predictions of Johann Gauss. On 19th January land was sighted. It was a scene very similar to that described by Bellingshausen, Biscoe and Wilkes, a panorama of ice and snow fronted by towering ice-cliffs which formed a columned facade stretching far to east and west, broken here and there by deep recesses where the icebergs which littered the sea had fallen away. To this desolate landscape, scoured by winds of unimoginable power, Dumond 'Urville gave the name 'Terre Adélie' after 'the devoted companion who has three times consented to a painful separation in order to allow me to accomplish my plans for distant exploration'.

The land, so called, was unapproachable because of the tumbled masses of ice which littered the coast. But there were numerous rocky snow-covered islets accessible and on one of these Dumont d'Urville landed with a boat's crew from the *Attolabe*. The landing was made with Gallic verve and gaiety. With load cries, the sallors, armed with pick axes and hammers, leapt ashore, hurling resentful penguins from their path. Then the Tricolor was unfurted. Following the ancient custom, faithfully kept up by the English', Dumont d'Urville relates, 'we took possession of it (the island) in the name of France, as well as of the adjacent coast. . Our enthusian and joy were such that it seemed to us that we had just added a province to French territory, by this wholy prefic conguest. . . We regarded ourselves, therefore, at once as being on French soil. . . .

The Airolabe and the Zelee then moved east towards, as their compasses showed, the South Magnetic Pole. They were in about 65° S. and 13°S. E. when suddenly out of the log in which they hay they saw running towards them before the wind, a strange ship, by her lines and perunat an American mano-fwar. This was the Popoie of Wilkes's squadron. She was moving fast through the water and fearing that she might past them the French ships too made sail. We can now compare Dumont d'Urville's version of this international Antaretic incident with that of Charles Wilkes. According to Dumont d'Urville, the American ship immediately bore off to the south and disappeared. 'We had no object', Dumont d'Urville afterwards declared, 'in keeping secret the results of our operations, and the discoveries for which we had nearly paid so heavily Besides, these are no longer the days when marginors, impelled by the interests of commerce, think themselves obliged to hide carefully their route and their discoveries in order to avoid the concurrence of rival nations '

Dumont d'Urville, abandonng hus eastward course, turned south westwards It was an unvarying and monotonous scene, and there seemed no end to the wall of see chiffs which stood here, as in Terre Adelie, a hundred feet or more above the level of the sea To this stretch of coast he gave the name of Coirce Clarre after the wife of Captun Jacquinot, captain of the Zeler That it existence has since been confirmed is a tribute to the high accuracy of this great French explorer's charting and observations

The exact nature of this ice bound coast was the subject of much exacted discussion on board the two French shups Some like John Biscoe held that it 'was a miss of compact ice indepen dent of all land' Others, including Dumont d'Urville humself, argued more justifiably 'that this formidable belt was at least an envelope, a erust covering a solid base, either of rock, or even of scattered shoals round a yast land'

In England, meanwhile, the discussions about the renewal of Antaretic exploration came to a head at a meeting of the British Association at Newcastle in the summer of 1838 A formal resolution calling upon the British Government to dispatch a naval expedition to the Antaretie, for magnetic investigations between the meridians of New Holland (Australia) and Cape Horn, was enthuisatically approved The Prime Minister, Lord Melbourne was sympathetic The Royal Society, a strong supporter from the start, was wholly favourable Parliament voted the funds And the joint exertions of Captain Sabine and of Captain Washington, the Secretary of the Geographical Society, ensured (as, Horoghout, hey had intended) that the leader appointed was james Clark Ross, the discoverer of the North Magnetic Pole

In its exclusive concentration on Antarctica, in the long polar experience of its leader, in the excellence of its ships and equip ment, the British expedition engoyed all the advantages which the French and American expeditions had so unhappily lacked Ross, a determined and an ambitious Scot, was better suited than any officer in the Navy to supervise all the different aspects, naval and scientific, of the expedition's work. The ships, H.M.S. *Erebus* and H.M.S. *Terror*, were three-matted barque-rigged bombs, without engines, 'of strong build and with a capacious hold', of a type whose value for ice navigation had already been well tested in the Arctic. Each had a double deck and a double coppered hull. Each was fitted with watertight bulkheads and strengthened internally with massive timber beams. The *Erebus* of 370 tons was commanded by Ross himself. Captain Francis Molra Crozier, a shipmate of Ross on his Arctic voyages and earlier of Parry on his North Pole expedition, commanded the 340-ton Teror.

This was to be a purely naval expedition and ostensibly no civilian scientists were taken. The surgeons, however-McCormick, Robertson, Lyall and Joseph Hocker, son of the eminent botanist, Sir W, J. Hocker-were in reality civilians in naval guise who had volunteered for the expedition, for work in zoology, geology, and natural history, because of the great opportunities for scientific discovery and research.

The instructions issued to Ross by the Admiralty in September 1839 were framed in the broadest terms. To ensure the maximum co-ordination of simultaneous magnetic observations, stations and observations were first of all to be set up at points as far apart as St Helena, the Cape of Good Hope, Hobart and Sydney, And provided that all this could be completed by February, Ross was then to proceed as far as the ice permitted to the south 'to examine those places where indications of land have been noticed, and to make the requisite observations of any outlying islands...,' The principal Antarctic explorations were to start the following summer. Their object would be the discovery and attainment of the South Magnetic Pole. This, said the Admiralty, would be 'one of the remarkable and creditable results of the expedition'.

That was the plan for the Antarctic summer of 1841. The programme for the Antarctic summer of 1842 allowed even wider scope to the experienced commander and was on an even more considerable scale. 'On the breaking up of the succeeding winter', Ross was told, 'you will resume the examination of the Antarctic seas in the highest latitude you can reach, and proceeding to the eastward from the point at which you had left off the preceding year, you will seek for freish places on which to plant your observatory in all directions from the Pole 'Through out, the prominent features of new coast were to be charted The positions of Graham Land and (the officials of the Admirally apparently having little regard to distance) of Enderby Land were to be checked, and a variety of scientific tasks were to be carried out, in meteorology, geodesy, oceanography, astronomy, geology and betany in accordance with the great weight of advice which Ross received from the busy committees of the Royal Society

In September 1839, eighteen months after Dumont d Urville had left Toulon for the Antarctic, the Erebus and Terror sailed from Margate Roads on the greatest Antarctic expedition of the nuneteenth century Hobart, Tasmana, was reached in August 1840, after numerous magnetic stations had been established on the way and deep sea soundings had been made with new equipment in the South Atlantic The Governor of Van Diemen's Land (Tasmana) was the Arctic veteran, Sir John Franklin and Ross' ships were greeted with the greatest enthusiant Malls and dimners, special meetings of the Tasmanan Natural History Society, pictures from which the fragile Dir Hooker natched such moments as he could to pursue has studies in natural history, were organized with indelaugable energy by the Governor's lady, who was herself to achieve independent but tragie fame in the course of polar history Despite them sultitude of social diversions, science, the principal theme of the expedition, was not allowed to flag. The magnetic observatory was completed in the Governor, Sir John Franklin, a keen follower of the recent advances in terrestrial magnetism, found 'infinite relaxation'

For Ross, however, the smooth parsage of life in Tammaluwas marred by some disturbing news, news that both the French man Dumont id Urville and the American Wilker had been exploring where according to Gauss the South Magnetic Pole was most likely to be found Ross had heard critications of the secrecy surrounding the activities of the United States Exploring Expedition Wilkes, however, was remarkably generous with his information, more generous than Ross was later to give him credit for, and went so far as to enclose, with much other valuable material, a tracing of his chart. This served to confirm Ross's forebodings.

Ross's reaction to these developments was unhesitating and full of the pride of the Navy which since the War had been supreme on the seas. 'That the commanders of each of these great national undertaking should have selected the very place for penetrating to the southward, for the exploration of which they were very well aware at the time that the expedition under my command They had, however, the unquestionable right to select any point they had, however, the unquestionable right to select any point they had, however, the unquestionable right to select any point they thought proper, at which to direct their efforts, without considering the embarrassing situation in which their conduct might have placed me. Fortunately, in my instructions, much had been left to my judgement under unforeseen circumstances; and inservice the select of the select the select the select of the and, impressed with the feeling that England had ever led the way of discovery in the southern as well as in the northern regions, I considered it would have been inconsistent with the preeminence she has ever maintained if we were to follow in the footsteps of the expedition of any other nation. I therefore resolved at once to avoid all interference with their discoveries and selected a much more easterly meridian (170° E.) on which to endeavour to penetrate to the southward, and if possible reach the magnetic pole.' it was a momentous and far-reaching decision for it was to lead to discoveries, more remarkable and more impressive than any that had yet been made in Antarctica, and in consequence to the first land explorations of the continent by Scott, Shackleton and Amundsen early in the twentieth century.

The Erebus and Terror sailed from Hobart on 12th November 1840, and on 30th December, then in64°S. and 10°E., they crossed Bellingshausen's track. So far they had met only loose ice, easily brushed away by the blunt bows of the ships. But the great test of Ross's specially strengthened ships was yet to come in the form of the main pack, the encircling ice belt which had kept so many ships at bay. This now stretched out before them, white, motionless and menacing, for over a hundred miles. Ross had an auxious time, waiting for the most favourable conditions of wind and weather He had, however, full confidence in the heavy sheathing and guant timbers with which *Erebus* and *Terrer* had been reinforced and he determined to try his luck At first, as fin solernn warning, he was held off by a heavy swell, by fog and by thek anow showers which fell like a curtain across the ships Then on the morning of 5th January, side by side, under full sail, *Erebus* and *Terror* went into the attack Looking astern, they watched the open water north of them gradually disappear On all side there was only use

To their great surprise, the pack proved nothing like as impenetrable as had been prophesiced. An occusional collision with massive floes sent a violent shudder through the ships. But for the most part they made a slow and stately progress through the narrow leads in the ice which opened up under pressure from the bows in a few days they saw that the sky ahead of them was darkening a sure sign of open water. Momentarily the pack grew denser and their progress unbearably slow. But in another four days they were through

This conquest of the notorious ice belt---a feat which he was sure neather Wilkes nor Dunont d Urville could ever have achieved--was a triumph for Ross and the British shippards Meanwhile the increasing dup of the magnetic needles showed that they were all the time nearing the main objective of the expedition, the South Magnetic Pole Then astonishing news came from the officer of the wastch A strong hand blink, he reported, could be seen on the horizon, much paler than Ross or any of his shipmates of the North West Passage expeditions had ever seen in the Arctice and on 100 h january 1844 wholly unexpected land was distinctly seen, rising in lofty, snow covered packs, possibly a hundred miles away

This discovery of new Lind was not only unexpected but disconcertup. Ross when he so flatly reduced to follow foreign tracks and chose instead a course further to the east, along the 170th parallel of longitude, must have known that such a course would carry him well to the east of the region where Gauss had predicted the South Magnetic Pole would be found Had he decided in a moment of exasperation, to scientific science to the interests of national prestige? Or had be hoped ultimately to turn west again, through seas which ballength had found free fic cand of land, towards his original objective? Whatever he may have hoped, the situation now looked like forcing his hand. He was not only east but also south of Gauss's region. There was land appearing on his port bow. Only if these new lands proved to be islands, around which he might later make his way towards the west, could he expect to return towards the predicted region of the Magnetic Pole.

If these were islands which Erbur and Terror were approaching, then they were hewn on a scale far nobler and more majestic than any yet scen in the Antarctic, Their great mountains, deep valleys and sweeping rivers of ice were of an austere and inviolate beauty. To the men on board the two ships the slow revelation of this silent landscape, never before seen by man, seemed like erossing the threshold of a new and undiscovered world.

'It was a beautifully clear evening', wrote Ross, 'and we had a most enchanting view of the magnificent ranges of mountains, whose lofty peaks, perfectly covered with eternal snow, rose to elevations varying from seven to ten thousand feet above the level of the ocean. The glaciers that filled their intervening valleys, and which descended from near the mountains' summits, projected in many places several miles into the sea, and terminated In lofty perpendicular cliffs. In a few places the rocks broke through their icy covering, by which alone we could be assured that land formed the nucleus of this, to appearance, enormous ice-berg.' Ross named the most prominent features as they came into view; a high mountain after Lieutenant-Colonel Sabine; the northernmost cape, high and dark, after Viscount Adare, M.P. for Glamorganshire; another more southerly, at Commander Crozier's special request, 'after his kind and lamented friend, the late estimable Marquis [of Downshire].' Yet another was named after Sir John Barrow, Bart., 'the father of modern Arctic discovery, by whose energy, zeal and talent our geographical knowledge of those regions has been so greatly increased; we may hope he may live to see the great object of his heart, the discovery of a North-West Passage through the Barrow Strait into the Pacific Ocean, accomplished'.

Off Cape Adare, Ross had to make a decision of the greatest importance for the future of Antarctic discovery. The South Magnetic Pole, he calculated, Jay about 500 miles to the southwest, in latitude 76° 5 145° 20′ É Should he now follow the new coast to the south in the hope that a channel might be found leading westwards towards the Magnetic Pole? Or should he turn westwards at once towards the see cliff discovered by Wilkes and Dumont d'Urville, namely along the northern coast of Victoria Land and westwards? A channel might then be discovered cutting through them to the south which would enable him to reach the Magnetic Pole from this direction Ross's picture of the choice conforming him shows how little he was thinking in terms of the continuous land mass of a continent All his previous polar experience had been in the Arctic, among the mountainous islands and ubiquitous channels of the North West Passage Here too he was thinking in terms of julands, of channels, of a passage, a passage which sooner or later would probably be found, leading southwards or westwards to Gauss's Magnetic Pole

Of the two, the prospects towards the west, towards the region of the American and French discoveries, wat the less hopeful The ize cliffs in that direction sighted by Wilkes, Dumont d Urville and Balleny might extend for a great distance, they were moreover exceedingly difficult to approach through the outer grdle of ice. Ross therefore decided to follow the new coast towards the south. This was, he suid, "preferred as being more likely to extend our researches into higher latitudes, and as affording a better chance of alterwards attaining one of the principal objects of our voyage." Although, he added, "we could not but feel disappointed in our expectation of shortly reaching the magnetic pole, yet these monitans being in our way restored to England the honour of the discovery of the southermost known land, which had been nobly won by the intrepid Bellingshausen, and for more than twenty years retained by Russa'.

Slowly, with men crowding decks and rigging, H M S Erebur and H M S Terror moved south As they moved, new mountains, new and glustening glacer streams curving majestically and terminating in guant toogues projecting far into the sea, succes sively appeared No sound came from this sold and lifeles land, only the persistent surge and beat of a heavy surf could be heard as it broke on the fallen ice blocks which barricaded the beach. There was life, however, in the sea and the sight of whales—the 'right' or Greenland whale, he thought—reminded Ross of the wealth awaiting the enterprising merchants of Britain. From the deepest waters, moreover, the biologists brought up many minute marine creatures in their new dredge, several very similar to those they had found in the deep waters of the Arctic.

Ross continued to name the new features of the landscape, the peaks and promontories and glaciers, after those closely associated with the expedition. Two ranges were named after the members of the committees of the Royal Society and of the British Association. Mount Melbourne was named after the Prime Minister upon whom 'the representations of the great philosophers of the day had their due influence'. A headland to the south of Cape Melbourne Ross called after Captain Washington, R.N., 'the able Secretary of the Royal Geographical Society,'

In order that these new lands might be properly claimed for the British Crown, a landing had to be made. The coast of the mainland was quite inaccessible for no ship's boat could have penetrated lis heavy lee defences. A landing was made, therefore, on a rocky lalet named Possession Island, against a strong tide which swept a mass of loose ice through the channel separating It from the shore. There, on this isolated outpost of a new world, on 12th January 1841, 'the ceremony of taking possession of these newly discovered lands, in the name of our Most Grachous Sovereign, Queen Victoria, was immediately proceeded with'. Victoria Land, and with it the British Ross Sea Dependency over which New Zealand was later to claim sovereignty, thus came into being. Ross in his Journal describes the celebrations which followed, the hearty checers of officers and men, the toasts to the Queen and to Prince Albert. For the young Queen, declared Dr Hooker, this great but wholly unexpected discovery was 'surely the whitest if not the brightest jewel in her crown'.

By 22nd january 1841 the two ships were in hittude 74° 20°S., further south than James Weddell had reached on the other side of the continent, and another landing was made on an islet which Ross called after Sir John Franklin. Soon afterwards, on a day of clear cold air and sparkling brightness, Mount Erebus and Mount Terror were seen far away to the south. Dr Hooker, in a letter to his father, describes his first sight of these Antarctic mountains, such familiar and impressive landmarks for many exploring expeditions travelling in this region from the time of Borchgre vink and Scott to that of the recent Commonwealth Trans Antarctic Expedition Mount Erebus was then an active volcano emitting dense smoke and spurts of flame "The water and the sky , Hooker wrote, 'were both as blue, or rather more intensely blue, than I have ever seen them in the tropics, and all the coast one mass of dazzlingly beautiful peaks of snow which, when the sun approached the horizon, reflected the most brilliant tints of golden yellow and scarlet, and then to see the dark cloud of goinen yetiow and scarter, and then to see the dark cloud of smoke, inged with flame, rising from the volcano in a perfectly unbroken column, one sude jet black, the other guing back the coluent of the sun, sometimes turning off at a right angle by some current of wind and stretching many miles to leeward. This was a sight so surpassing everything that can be invigened, and so heightmed by the consciousness that we had penetrated into regions far beyond what was ever deemed practicable, that it really caused a feeling of awe to steal over us at the consideration of our own comparative insignificance and helplessness, and at the same time, an indescribable feeling of the greatness of the Creator in the works of His hand ' It was indeed a most impressive sight On occasions the column of smoke from Mount Erebus seemed to reach lifteen hundred, possibly two thousand feet above the rim of the crater Then it would fall back and condense into mist or snow and gradually disperse, leaving the crater rim clearly visible, a sharp black irregular line against the scarlet flames

But even as Ross watched he was planning his next more towards, if possible, the South Magnetic Pole which lay on the map more than two hundred and fifty miles away His hope was to sail south of the island on which the mountains stood—High Island, now called Ross Island—then westwards and north, through what no doubt he imagemed to be an archipelago on the Arctic pattern, towards the vicinity of the Magnetic Pole isself

But once agun he was frustrated As his ships moved south under all studding sails, Ross saw attentioning eastwards from High Island, as far as the eye could see, a long, low, white hie it presented', he says, an extraordinary appearance, gradually increasing in height as we got nearer to it, and proving at length to be a perpendicular cliff of ice, between one hundred and fifty and two hundred feet above the level of the sca, perfectly flat and level at the top, and without any fissures or promontories on its even seaward face.' What lay immediately to the south of this gigantic barrier of Rotaring ice, which 'crushes the undultions of the waves and disregards their violence', Ross could not say for its top lay far above the mastheads of the ships. But in the remote distance they could see—or, as Scott later discovered, imagined they could see—or, as Scott later discovered, imagined they could see—or, as for mountain peaks, and that was all, that and the unending line of the Barrier; the Victoria Barrier as Ross named it, the Ross Ice Shelf as tis called today. As to finding a way through, in pursuit of his plan, 'we might', said Ross, 'with equal chance of success try to sail through the cliffs of Dover, as to penetrate such a mass'. There was no hope of wintering for there was no harbour safe for salling ships. Nor was there any hope of landing and travelling, as Ross though they might easily have travelled, overland to 'the brilliant burning mountain' and on penhaps to the Mignette Pole. Instead, all the could do was to bow 'to the will of Him who had so defined the boundary of our researches'. He decided to follow the Barrier eastwards in the hope that some hidden channel or passage might ultimately appear.

For day after day H.M.S. Errors and H.M.S. Terror salled eastwards close to the groined and hollowed cliffs of ice. By Sch February they reached their furthest point, in longitude  $10^{59}$  W., and a few days later, fearful now because of the denser ice and the lateness of the season, they turned back to the coast of Vietoria Land, making for McMurdo Sound. Ross at first had some hope that there or between there and Cape Adare, he might find a winter harbours of that he could renew his explorations as early as possible the following spring. But none was found. And by 6th April 1841, he and his men were back in the Derwent River, Tasmania, his ships unceathed, every man aboard them as fin, after one hundred and forty-five days in the Antarctic, as on the day on which they had sailed.

The soft green of the hills, the colours, the scents of garden flowers, the comforts and hospitality of colonial Tamania, were intensely pleasurable after so many months of ice and snow, of guant mountains and bitter winds. To the people of Hobart Ross and his men were the heroes of the hour There were dinners and receptions There wasa grand ball on the *Erebus* But the highlight of these celebrations was an ew matured aframa given at the Royal Victoria Theatre Act III presented 'a splendid view of the Volcame Mountain', Act III 'A grand allegorical tableau, of Science crowing the distinguished navigators Captain Ross and Crozier at the command of Britanna, and Fame proclaiming their success to the World

The second Antarctic cruise of HMS Erebus and HMS Terror began in November 1841 after six months of refitting which gave the surgeon scientists excellent opportunities for which gave the surgeon scientists excented opportunities and magnetic observations and botancel surveys in Australia and New Zealand The aim of this second voyage was the solution of 'The Great Barrier Mystery and Ross accordingly struck this time towards the east, along the meridian of 146° W , hoping that he would hit the eastern extremity of the Barrier (the Ross lee Shelf) and thereby continue, as his instructions ordered, his explorations of the previous season But conditions were very different from those of 1840 with thick fog blanketing the Ross Sea, rendering the ships invisible to each other In mid December, See, rentering use simps invisible to each other in find December sailing together within halling distance, E-cheu and Terore interval the pack and steered south west where the ice appeared more open it was tedous going, forty four days moving from water hole to water hole, enlivened only by the sudden surfacing of whales to breathe For safety, the shap were moored on either side of a large flor. This made an admirable ports ground and it is do to the safety of the sudden surfacing of the sudden surfacing of the safety of the subscription of the subscription of the subscription when the safety of the subscription of the subscription of the subscription of the safety of the safety of the safety of the safety of the subscription of the safety of was the scene on New Year's Day 1842 of 'a grand fancy ball, of a novel and original character, the centre pice of which was 'The Antarctic Hotel' finked by an array of allegorical figures repre-senting Bacchus and Britanna, 'The Pigurus of the Occan' and 'The Pioneers of Science' No display could have better symbo

The induces all science we apply could not obtain the outer spinliced the spin of mid Victorian polar exploration Towards the middle of January, the monotony of the voyage was suddenly and most disagreeably broken when a strong westerly swell snapped havser after havser and the two ships were driven by high winds deep mit the beavy pack, high winds which rose soon afterwards to the fall violence of an Antarctu storm 'Soon after midinght', wrote Ross, 'our ships were involved in an ocean of rolling fragments of ice, bard as floating

154

rocks of granite, which were dashed against them with so much violence that their masts quivered as if they would fall at each successive blow; and the destruction of the ships scened inevitable from the tremendous shocks they received. The rudder of the *Ercbus* was put out of action, that of the *Tercos* was wrenched away from the stern-post by the battering of ice blocks flung about by the tremendous seas. As he listened through the wind to the straining and working of decks and timbers, to the crashing of the ships against the floes, Ross-calanness itself—found time to admire 'the coolness, steady obelience and uniting exertions' of his seamen. But he thought 'there seemed to be but little probability of our ships holding together . . . so frequent and violent were the shocks they sustained'.

The storm as suddenly subsided and on 19th February, after a voyage of eight hundred miles through the ice, the Barrier was seen. The cold was intense, the decks and rigging of the *Erbua* and *Terror* were heavy with frozen spray, and already young ice, the first portent of winter, could be seen forming gelatinously between the older floces. The Barrier as they approached seemed to trend north-eastwards and to merge at its eastern can dwith a range of now-covered mountains. These were the mountains of Seout's King Edward VII Land. But Ross had no time, with winter or near, for extended exploration. After a brief survey, he ordered his squadron to sail for the Falkland Islands. There they artived in April 1842.

In November 1842 Ross received permission from the Admirality to spend a third and final year of exploration. His ambition this time was to combine a survey of the east coast of Graham Land with an attempt to achieve what both Wilkes and Dumont d'Urville had failed to achieve, a new record for a farthest south in James Weddell's Sea. Not a man on board the *terbus* or Terror had the slightest doub that they would succeed. Had they not already made discoveries of Antaretic land greater than the world had east search Had they not in the Boss Sea reached a latitude attained by man? By comparison withouch highest southern latitude attained by man? By comparison withouch the statianment of the South Magnetic Pole, the Weddell Sea presented on great challenge; 'a bonne bouche', Dr Hooker called it.

they had not reckoned with the unaccountable vagaries of Antarctic ice and weather. The pack extended almost as far north as Wilkes or Dumont d'Urville had found it and of all their three seasons in the Antarctic, the weather that season was the worst It was a year, old Dr Hooker used to recall, 'of constant gales, fogs and snow storms Officers and men slept with their ears open, historing for the look-out man's cry of Berg ahead' followed by All hands on deck The officers of the Terror told me that their commander (Commander Crozier) never slept a night in his cot throughout that season in the ice, and that he passed it either on deck or in a chair in his cabin They were mights of grog and hot collee, for the orders to splice the mainbrace were many and imperative if the crew were to be kept up to the strain on their nerves and muscles. Of discovery there was nothing, but the fact that Weddell's route was effec-tively closed James Weddell in his unprotected scalar had urely closed james wedden in nis unprotector scaler has reached 75°S in 1823 A hittle beyond 70°S was all that could be achieved by Ross's sturdy, copper sheathed bombs which had thruat a way so caily through the Ross Sca pack. Turning back with better grace than Dumont d'Urnille in the face of such hopeless odds, Ross (after making several important discoveries in North Graham Land) reached England in September 1843

To his contemporaries in England, indeed throughout the world, the Antarctic ducoveries of James Clark Ross were the greatest geographical discoveries of modern times, discoveries, in the words of the President of the Royal Geographical Society, which had secured to the name of Ross a distinguished place amongst the most successful to earners of Science, and the brightest ornaments of the British Navy Seen in the perspective of history, they have an even greater significance From the moment Ross returned to England, the Aretic became the focus of the polar world Bat when Antarctic exploration us as resumed, after a lapse of fifty years, in a great remassance in which British to the lead, it was to the Ross Sea sector, scene of former trumphs of the British Navy, that the British effort was directed There the first inland explorations of the continent were launched. There also because in this region by the most accessible and the shortest route to the heart of the continent, the tragic race for the South Geographical Pole began.

## XIII

# The Arctic Cruise of *Erebus* and *Terror*: The Mystery of Sir John Franklin

O sooner had he returned than Ross, now Sir James Clark Ross, was offered the command of another great naval expedition, destined this time for the Arctic. It is surprising that the Admiralty, which had so recently diverted ships to the Antarctic, should have been prepared to equip yet another costly project of polar exploration. From the Admiralty's point of view, however, the moment was in one respect opportune, for the Navy was about to embark on an exciting and critical experiment, the introduction of the screw propeller. For years the greatest obstacle to the use of steam had been the huge paddle boxes which, installed amidships, deprived the British of their favourite weapon, their beloved broadside. The new screw propeller now allowed both mobility and fire-power and what better testing ground could there be for it than the Arctic with all its intricate problems of navigation amidst the ice? The Arctic veteran, Sir Edward Parry, who had become Comptroller of Steam Machinery, was full of optimism and he and another Arctic enthusiast, Captain Beechey, were convinced that the new invention would revolutionize polar exploration.

What form was the new expediation to take? Captain Beechey, who had just returned in H.M.S. Blosson from a voyage along the American cost assivard of Bering Strait, urged an attempt on the North Pole, an attempt to reach along the line of a northern passage a record high latitude comparable with Ros's Antarctic achievement, But Sir John Barrow had other and quite definite ideas, formed thirty or more years ago. His sole concern was with the North-West Passage. During the past thirty years the search had little by little been narrowed into two mam directions, westwards and southwards from Barrow Strait Westwards, the outlook was least inviting. Parry, the Admiralty's principal technical adviser in polar matters, having never forgotten the massive barrier of ice against which his sating ahips had battled so resolutely but so vanly south-west of the rugged promontory of Cape Dundas, on Melville Island But south and west of Barrow Strait and Lancaster Sound the prospects were more hopeful Here, across seventythousand square miles still unexplored there lay the shortest stretch of lind or sea between the extremites of the lands which had been discovered This was the direction, Barrow and Parry decided, in which the new expedition must go

In December 1844 Barrow laid his plans before Lord Haddington, First Lord of the Admiralty As of old, his reasons were cogent, his arguments skilfully adapted to the mood and suscepti-bilities of a Board with whose members he had been on terms of personal friendship for many years. He appealed in moving terms to the illustrious precedents of history, to the brilliant lead given by the great Elizabethan seaman William Baffin, the discoverer oy one great Litabethan seaman william isahan, the discovered of the gateway to the North West Passing, Lancaster Sound He pleaded the cause of science, pointing to the high importance of magnetic observations in these latitudes and to the great geographical and hydrographical discoveries which might be made, discoveries he urged 'well deserving the attention of a power like England' Finally there were the political arguments less potent now, but no less attractive to the Admirally in terms of hatmand presider. To be the first avaitant to link the Atlantic ress portent now, our no test attractive to the Admiratly in terms of national prestings. To be the first nation to link the Atlantic with the Pacific by way of this Arctic route would be a feat which 'if left to be performed by some other power, England by her neglect of it, having opened the East and West doors, would be laughed at by all the world for having hesitated to cross the threshold' The American fleet way young, progressive, adventurous Russia, which since the death in 1825 of Bellingshausen's sponsor, the liberal Alexander I, had been subject to a succession of barbaric and ruthless despots, had an active and ambitious fleet 'It should not be overlooked', Barrow therefore reminded Their Lordships, 'that there are in the Pacific at the moment two fleets of the only two naval powers likely to undertake the enterprise in question, and it is extremely probable that some of their ships will make trial of this nearest passage home when they leave the Pacific station." But most appealing to a Board who viewed with gloom the passing of the old days of sail were the advantages of Arctic training to the Nav. 'It is admitted', Barrow declared, 'that the Arctic expeditions have produced a finer set of Officers and Seamen perhaps than in any other branch of the Service... we have much need of increasing such men, now that Steamers are supplanting our best Seamen,'

Barrow's plans, on the insistence of the Prime Minister, Sir Robert Peel, were most carefully scrutinized, twice by the Royal Society, and by a host of Arctie experts including Parry, Ross and Sir John Franklin who had recently relinquished his post as Governor of Tasmania. The only amendment was proposed by Ross who suggested that if the expedition failed in the southwest, they should try and discover a northern route by way of Parry's unprobed Wellington Channel. The next problem, the choice of a leader, was far more contentious. Ross, though he had received tempting offers of a baronetcy and an especially generous service pension, fad already refused, having promised his wife that once home from the Antarctic his setvice polar days would be over. There remained of the available Polar men of national distinction only Sir John Franklin.

Throughout the country, Franklin's Arctic exploits were still legendary. His polar experience, moreover, had been acquired in the very region to which the new expedition was bound. Nevertheless, there were strong arguments against him. His age, almost fifty-nine, was not exceptional periaps for a naval officer before the days of the Retired List, but for the leader of an Arctic expedition he was, many thought, dangerously old and Barrow for one openly preferred a much younger man even though without Arctic experience. Nor was Franklin's reputation entirely without blenish, The circumstances of his recent recall from the Governorship of Tasmain—engineered in fact by a nulicious and intriguing subordinate whom Franklin had suspended—had been left, to those who did not know, strangely unexplained by the Colonial Secretary. Had he been weak or incompetent' Had he been indeckive perhaps, on lacking in energy? No one knew for certain And no official statement came to clear his name

It was indeed for this very reason, to clear his name and re establish his reputation of earlier Arctic days, that Sir John Frahlin stroves of despretrely to obtain command of the new expedition. With such a surplus of unemployed officers encumbering the Navy's Active Lat, it was indeed likely to be his last chance to obtain a sea going appointment of any kind 'I dread exceedingly', wrote his second wife Jane Frankin to Janes Clark Ross, 'the effect on his mund of being without honourable and immediate employment.' In the end after, for Frankin, days of agointang waiting, Sir Edward Pary's soice was decusive 'Ite is a fitter main togo', he declared to the First Lord of the Admirally, 'than any I know, and if you don't let hum go, the man will die of aspontent'.

disappointment ' 'We are commanded', wrote young Lieutenant Irving to his sister, 'by a fine old fellow, of whom you have read, I dareay, eating his boots 'It was no doubt a fair description of his new and elderly commander, robust, honest, God fearing, 'who was with truth to write 'the highest object of my desire is faithfully to perform my duty' A fuller, indeed a very life like picture of Franklin emerges from the letters of his two remarkable wives His first wife was Eleanor Porden, a young poetes in the formation unde who had deducated to have Franklin in their courting mode who had dedicated to John Franklin in their courting days 'An Esquimaux Girl s Lament She was the moving spirit in an earnest literaty coterie 'The Clouds' and an assiduous attender at Mr Baker's lectures at the Royal Society on the fashionable topic of terrestrain magnetism Devoted as the was to him, Frankin appears in her letters as reserved, stiff, conten tonal, provincial, a man whose narrow exampletization proved on occasions an embarrassing obstacle to one of Miss Porden's conducted and an embarrassing obstacle to one of Miss Porden's the sophisticated and convivual taste. His second wife, Jane Franklin, whom we have seen as the arbiter of social life in Tasmania, must have scened a less purzing companion. With the same resolute energy which Ross and Hooker had observed in Hobart, she plunged into the battles of social and official life in London and she was treless in her efforts to get Franklin appointed to command the Arctie Expedition

The ships selected were once again H M S Erebus and H M S

Terror, and their refitting and strengthening after their Antarctic voyages was the pride of the naval dockyards. Sheet iron covered their bows. A new and ingenious hot water system warmed the cabins. Adapted railway engines of twenty horse power were installed. And the Master Shipwright of Woolwich Dockyard invented a special device for raising the screw propellers to avoid entanglement with the ice.

Despite the optimism of Sir John Eurrow who was quite confident that twelve months would ensure the conquest of the North-West Passage, the expedition was equipped for three years on an unprecedented scale. Enormous quantities of provisions and fuel were carried; china, cut glass, and heavy Victorian silver encumbered the wordrooms; each ship had a library of twelve hundred volumes ranging from treaties on a team engines to the works of Dickens and Lever and volumes of *Panch*. Franklin was particularly concerned for the educational and spiritual welfare of his men while isolated in the Arctic wastes. Slates and arithmetic books, pens, ink and paper were provided for classes during the winter; testaments and payer were provided for classes during the winter; testaments and payer ten of which were psalms or hymas, was purchased for each ship. Of special Polar equipment, except for scientific research, there was none apart from large supplies of warm underclothing and a few wolf-skin blankets. The Arctic clothing of the Franklin expedition was the stout blue cloth of Her Majesty's Navy.

Late in the spring of 1845, H.M.S. Errbuy and H.M.S. Terrer, moved from Woolwich towards the sea. "We tried our strews," wrote Lieutenain trying of H.M.S. Terror," and went four miles an hour. Our engine once ran somewhat faster on the Birmingham line... it has funnel the same size and height as it had on the railway, and makes the same dreadful puffings and screamings, and will astonish the Esquimaux not a little." This first experiment in an Arctic ship was an unhappy angury for the protagonists of steam and screws. 'We can carry twelve days coal for it', added Irving, 'but it will never be used when we can make any progress at all by other means.' Ten years before, the men of Ross's paddlesteamer the *Fictory* had expressed a similar distrust of the new machinery.

For a few days in the middle of May the two ships lay at Greenwhen next convert, there include on the two simples as a concern upper works and when masts glutting in the early summer sun The expedition had yet to start but no one, neither the Govern ment nor the public, least of all its officers and men, had the ment nor the pound, east of an iss outers and men, had the slightest doubt of the outcome Was this not the best, the most lavishly equipped expedition ever to set forth for the Arctic? Out of the 134 men of the slips companies, lad not many already been fully trued and tested by the regions of Arctic service? As for any predictions of disaster, had any polar expedition manned and the state the state that the state data with the state of the st by the Royal Navy ever met with a major disater? Talk, the mere suggestion, that plans at least should be made for a relief expedition was quickly brunched avide and the general optimism was voiced by Sir Roderick Murchison President of the Royal Geographical Society, who proclaimed that Franklin and his men would do everything for the promotion of science and for the honour of the British name and Navy that human efforts can accomplish Only one discordant but distant voice was raised, accomputer only one discordant but distant olice was rated that of Dr Richard King who had been with Bick down the Great Fish River I have contended, he warned Franklin, 'against the present attempt by sea from an honest conviction of its impracticability in the present state of our knowledge of Aretic lands King had already submitted an alternative plan for overland exploration to the Royal Geographical Society But his prophecy of disaster and his alternative plans were alike contemptuously ignored

Yet dissite by avaiting the Franklin Expedition as the two ships towards the end of june crossed the Arctic circle west of Greenland, weaving their way through the ice in continuous daylight amazing to those new to the Arctic regions. There were high The weather through Baffin Bay had been remarkably fine And Dr Goodsir, the assistant surgeon on board Spirits were high and the assistant surgeon on board Spirits were already achieved a notable scientific success with his deep see equipment in dredging up lise animals from three hundred fathoms Far frompremontions, there was talk only of completing the expedition in a summer, of celebrations when they passed in triumph through the Bering Strait. Towards the end of July the two ships were seen by Captan Martin of the whaler Enterprise. ARCTIC CRUISE OF 'EREBUS' AND 'TERROR' 163

moored to an iceberg in Lancaster Sound, and Martin spoke to Sir John Franklin and several of his men. But he was the last man to do so. For from that date the Franklin Expedition, bound for the North-West Passage, disappeared.

Few exercises in historical detection have been more fascinating, and none more ingenious, than the reconstruction by Dr Cyriax of the fate of Sir John Franklin. Only a brief summary need be given here for the story is largely the story of the multitude of search expeditions which were in the next twenty years or so to preoccupy the whole attention and the whole resources of the polar world. From Lancaster Sound, Franklin passed into Barrow Strait and from there, following perhaps prematurely Parry's suggestion of an alternative northern route, he appears to have sailed northwards up Wellington Channel and thence back to Barrow Strait by way of Crozier Strait which separates Comwalls Island from Buthurt Land. The winter of 1845–64 was spent at Bereakey Island, then they sailed again, through Peel Sound, Franklin Strait and on into VictoriaStrait. There, on 12th September 1846, the Erebu and the Terror were baset in havy lee borne down from Melville Sound through McClintock Channel. This was for the winter of 1845–647.

The part of the Canadian Arctic Archipelago, known today as 'The District of Franklin' is—as we have seen from the voyages of Parry and Ross—a complex network of channels, stralts and sounds, It can be seen from the map (facing p. 86) that by linking Burrow Strait with the upper part of Victoria Strait, part at least of a North-West Passage had by this time been discovered by the Franklin expedition. All that now remained was to link Victoria Strait with Simpson Strait and the cosstal waters of Arctic Canada. In May 1847, this too was achieved when a small party led by Leutenant Gore set off for King William Island to bridge this final gap. The North-West Passage had not been completely navigated. But by land and sea it had been discovered and explored. as the ships drifted southwards down Victoria Strait Scurvy had already begun insideously to sap the strength of the men, and provisions, provided for three years on what to Sir John Barrow had seemed such an excessive scale, were by August 1848 nearing exhaustion

By the end of this third winter in the Arctic, Crozier was forced to abandon ship and on 25th April 1848 he and his second incommand Captain James Fitzymes added to a record previously left by Lucitenant Gore which they found in the north of King William Island 'H M Ships Terror and Erebus', they said, 'were descreted on the 22nd April, S leagues NWW of this, having been beset since 12th Sept 1846 'One hundred and five officers and men out of the original complement of one hundred and twenty nine were then alive

Crozer's plan apparently had been to travel along the west and south costs of king William bland in the hope of reaching the nearest post of the Hudson's Bay Company, Jort Resolution, by way of the Great Fish River A few men, unable to face such a journey, may have turned back to the thether of the drifting shaps but the majority, weak with hunger, with scurry steadly draming away the last vestige of viality, followed Crozier on this trage march Graves, skeletons, relex of the dead men were later found marking the route from king William bland and across to the Great Fish River (the Back River) This was the route of the last journey of the men of the Franklin Expedition, a journey

The fate of the drifting ships is less certain it seems probable that they foundered somewhere to the south west of King William bland nor later than 1849 for even then there may still have been a few survisors on board. Or they may have drifted, like Back's ship the Terror had drifted in 1836-37, out into Baffin Bay and through Davis Strait to the Atlantic In April 1851, the story goes, the mate of an English brig the Renoration saw two three matted ships very similar to the Erebus and Terror stranded on a large toe floe off the east coast of Newfoundland It is just possible that these were the ships of the lost expedition of Sir John Frankin.

In London there was no knowledge of these disastrous events Indeed, in 1847, while H M S Erebus and H M S Terror were ARCTIC CRUISE OF 'EREBUS' AND 'TERROR' 165

drifting helplessly with the ice down Victoria Strait, Lord Francis Egerton wrote (anonymously) in the Quarterly Review:

"With interest which accumulates by the hour do we watch for the return of these two vessels which are perhaps even now working their way through Bering Strait into the Pacific. Should the happiness be yet allowed us of witnessing that return, we are of opinion that the *Erkew* and *Terror* should be moored henceforth on either side the *Viscoy*, floating monuments of what the Nelsons of discovery can dare and do, at the call of their country in the service of the world."

In some minds, however, there were the stirrings of anxiety. Sir John Ross, whose suggestion that a relief expedition should at least be planed Franklin had rejected as an absurdity, urged the dispatch of an expedition in January 1847. In April Captain Beechey proposed that a relief expedition be sent down the Great Fish River in the direction of Prince Regent Inlet. A few months later a similar proposal by Dr Richard King, whose warnings of impending disaster the Geographical Society had so briefly discarded, was conveyed to Earl Grey, the Colonial Secretary. Earl Grey referred the matter to the Admiralty, the Admiralty sought the advice of the two most famous of living Arctic explorers, Sir Edward Pary and Sir James Clark Ross. But neither thought anything of Dr King's plan. They could conceive, they said, of no conditions in which the missing men would make for the Great Fish River. And even if they had done so, how, they demanded, could Dr Richard King, with a party to be carried in one cance, possibly be of the slightest assistance? Reassured, the Board of Admiralty turned its mind to more urgent matters, confident that they could rely in the last resort on the whalters and posts of the Hudson's By Company.

Nevertheless as the months passed by, there was evidence of a growing public alarm and in the end Their Lordships were forced line action. A plue of search was prepared based on a thorough exploration of the route Franklin had been ordered to take and with this was combined the stationing of relife parties on the continental coast and of relife ships at the Bering Straik. It was the beginning of a search by land and sea on a tremendous scale, a scale, as far as fleet operations were concerned, that had not been withessed since Barrow's Arctic campaign after the Napoleonic Wars But this was only the beginning. In the next ten years forty expeditions set out to find the missing ships, six of them travel ling by land along the coast of the Canadhan Arctic, and on one occasion a fleet of no less than fifteen ships was simultaneously deployed. In the course of these operations, not only was the fate of Sir John Frankin and his men revealed in all its tragec erroum stances, but the North West Passage which had challenged British seamen for so many centures was twice to be traversed, though on neither occasion entirely by sea. Nor was this the most important geographical discovery for by 1878, the dist of the last Franklin search expeditions, the intricate geography of the south and west parts of the Canadhan Arctic archipelago, with its multitudinous thanks, its marke of ice streen channels and straits, had almost wholly been elucidated Such extensive discoveries of new land were not made aguin in this region until the explorations of the Norwegan Otto Suerdrup in 1898–1902.

and stratts, had almost wholly been clucidated Such extensive discoveries of new land were not made aguin nithis region until the explorations of the Norwegan Otto Sverdrup in 1898–1902. The complicated manoeuvres of these various search expeditions though they added greatly to the detail of Arctic geography and to the development of polar techniques dul not constitute any notable advances in the broad evolution of polar exploration They will, therefore, only briefly be recalled Of the three simultaneous expeditions launched by the Admiratly in 1847, the Bering Strait expedition, consisting of the *Herold* and the *Ploere* in command of Captain Kellett, occupied thirs rune in exploring the costal waters north and west of the Strait, discovering on these voyages Herald Island (near Wrangel Island) to the north of the Chukchi Sea The mainland group, led by Sir John Richardson with the Hudson's Bay Company official Dr John Richardson returned in 1849 leaving Rae to continue work Sir the third group, approxiduing from the east by sca, was led by Sir Johns Chark Rows of Arctic and Antarctic Ime.

Ross's two ships, of between four and five hundred tons, were the Enterprise and the Intertigator and on board the latter was a young Licutenant Leopold McClintock the name of McClintock stands high in the development of Arctic exploration for not only did he play ultimately a distinguished part in solving the Franklin mystery buthe evolved through his unusual readiness to learn from the Eskimoes a new sledging and travel technique far in advance of his conservative contemporaries, stumch supporters of the old naval polar school. Rots sailed in 1848, the last year probably in which any of the Franklin survivors might have been found alive. After a winter, the winter of 1843-49, spent at the north-east end of Somerset Island, a bare seventy milles from Becchey Island where Franklin had wintered in 1845-46, they travelled, manhauling sledges, down the east coast as far as Fury Beach, along the north coast, and then west as far almost as Bellot Strait, the unlucky John Ross'a 'Brentford Bay'. These spring journeys added almost two hundred miles of new coast of Somerset Island, and Ross only just stopped short of the waters now known as Franklin Strait. The Franklin mystery however remained unsolved.

Sir John Franklin had now been missing for more than four years and his fate and the failure of these expeditions to discover it had become matters not only of national but of world-wide concern. Throughout Europe and North America, public Interest became wholly absorbed in the Arctic regions; in England, books of Arctic travel and adventure were in great demand; in London, in Brighton, crowds, admiring but alarmed, gazed at the panoramas of polar landscapes displayed in the shopwindows, pleturing in their minds the hardships and horrors of life in the Arctic wastes. The central attraction in London's pleasure gardens at Vauxhall in the sultry summer of 1852 was an immense and dramatic diorama of Arctic scenery. Meanwhile, throughout these hours and days and months of tension, Jane Franklin clung to hope and wrote letter after letter to her husband only to receive them back months later from one or other of the search expeditions. 'My dearest love,-May it be the will of God if you are not restored to us earlier that you should open this letter and that it may give you comfort in all your trials . . . dearest, if you ever open this, it will be I trust because I have been spared the greatest of all . . . At her suggestion, public prayers were offered in 1849 throughout the country for the safety of those serving in the Arctic regions.

Meanwhile the Admiralty, perplexed as to what should now be done, were bombarded by suggestions, by rumours, and by false messages purporting to be from the lost expedition. Some were found in bottles cast up on the seashore. One was attached to a small balloon which floated gently to the ground near Gloucester Amone the rumous however there were gleans of hope Eskimoes, reported the U ming Heals, travelling along the Frankin route had heard ships guns reserverating over the forcen sear. Two alumhoned three matted ships, the linewide Chemick declared, had been seen admft off the coast of Newfoundiand. But nothing was proved, nothing was certain, about the fate of the misung men.

At length, the gathering force of public anxiety compelled the Admiralty to take further action, this time on a most impressive teale, and the second half of the century opened with plans for a host of relief expediations most of them officially but some privately ponyored. To atimulate their efforts, the British Government offered a reward of twenty thousand pounds to any perion of any nationality who rescued the missing men, a reward of ten thousand pounds to the rescuer of any one of them, or to any who provided information leading to such a rescue, and a reward of ten thousand pounds to the first man to solve the mystery of the expedition is fate

Sir James Clark Ross having had no success in his attempt from the east, the Admiralty now decided to try from the west and to combine with this search from the direction of the Bering Strait another but much more formidable attack from Raffin Bay and Lancaster Sound In the autumn of 1850, therefore, a great concourse of ships put to sea. The squadron moving eastwards from the Bering Strait consisted of Ross's ships, the Enterptise and the Investigator, commanded respectively by Captain Collinson and MeClure, with Captain Kellett in the Ployre to stand by at Bering Strait Mosing westwards from Lancaster Sound were the harques Resolute and faststance, under Captain Austin, with Captain Erasmus Ommanney as his second in command. With them were two screw steamers, the Pioneer and the Intrepid, the first fullpowered steamers to be employed in ice navigation Other ships In this extern squadron were the brigs Leaf Franklin and Sophia both commanded by a whaling captain William Penny, and the schoner Felix and a supply ship fitted out by the Hudion's Bay Company and commanded by the seteran Sir John Rost This fleet was later joined by two small American brigs, manned by the United States Navy and commanded by Lieutenant E. J. De Haven,

### ARCTIC CRUISE OF "EREBUS" AND 'TERROR' 169

which had been bought and largely equipped by a retired New York shipping magnate, Henry Grinnell, who had been greatly moved by Lady Franklin's world-wide appeals for help. This American addition to the eastern squadron, which left New York City in May 1850, has its own place in polar bistory for it was the first American polar expedition since the tumultuous days of Wilkes; in launching it, and subsequent Arctic expeditions, Grinnell, who became the first president of the American Geographical Society of New York, stimulated the revival of American exploration as John Barrow had done in England earlier in the century. There was one more addition to the eastern squadron, the sailing ship Prince Albert, equipped privately by Lady Franklin and a group of friends.

The strategic plan behind these fleet manoeuvres was that the two main squadroms should converge from east and west thereby narrowing the search to the general area of Melville island and Banks Island. An initial search of Wellington Channel was to be carried out, as a subsidiary operation, by the eastern squadron. Meanwhile, Dr John Rae of the Hudson's Bay Company agreed to explore parts of Wollston Land and Victoria Island to supplement the search by sea. With so much simultaneous effort involved, it seemed impossible to those who read of these elaborate, costly and far-anging enterprises, that the Franklin mystery would not be solved.

'Yet,' from 1850 to 1854, though important geographical discoveries were made, little enough was found out about Franklin, Sulling from the west, McClure in the Inextigator, by linking Prince of Wales Strait with Parry's Melville Sound, proved the existence of a North-West Passage and was the first man alive to have done so. Collinson in the Entrypris, following closely in his wake, repeated his janior officer's discovery, and after a winter in Cambridge Bay went on in 1853 to explore part of the coast of Victoria Island and the west side of Victoria Strait. In the great expanse of Arretic sea covered for the first time by such large ships, and in sheer navigational skill, these are among the most remarkable voyages in the history of Arctic exploration. But from the point of view of the Franklin search it was, on McClure's side, an ill-conducted expedition. McClure, an ambitious officer more concerned it seems with being the first to discover the Passage than with the fate of Franklin and his men, arrived first at Bering Strait from the Pacific (hy a short cut through the Alcutum Hahnsk), refused to wait for his senior officer and set off on his own for Point Barrow. One expedition therefore became two and when Collinson came to search the vital area of Victoria Strait, only one side could be searched for only one shap was available. The Eskimose tirred to put Collinson on the track but he failed to understand them for the only interpreter was miles away on board the *Investigator* with McClure At one point, Collinson was only thirty miles away from the principal clue to the Franklin mystery. But a metal bolt with The Queen's Mark and a fragment of door frame from a cabin were the only relects found of the Franklin Expedition

Collinson must be reckoned one of the most magnanimous of communders. Reviewing these vojages, he said of McClure, 'To him belongs the honour of first navigating the Arctic Sea along the American coast, and the discovers of Prince of Wales Stratt... neither of us have succeeded in the grand object which animated our endeavour, but he, being hirst in the field, has added greatly to our geographical knowledge' McClure was accordingly avarded 45,000 by the House of Commons Commutee, with another 55,000 for his officer and crew, for the first ducovery, as it was then thought, of a North West Pasage

More success, as regards the discovery of Franklin relies, attended the other participants in the Admirality's earnpaign, notably De Haen, the leader of Henry Grunnell's expedition Landing on Beechey Island, near the entrance to Barrow Striit, he discovered clear evidence of the first wintering of the Franklin Expedition, a forge, a storehouse, a shooting gallery, hundreds of tins of meat, well presented, arranged meticulously in rows and discarded for some unknown reason, all the litter, the bottles, rope, scraps of newspaper, of an Arctic camp site occupied for months Nearby, three tombatones roughly care do commenorated Leading Stoker John Torrington of the Terrer, and a seaman and a marine from the Erdons Running away from the coast De Haen saw the deep marks of heavily Laden sledges which had evidently been hauled with the greatest labour over the frozen ground

On the mainland Dr Rae, confident all along that the mystery would be solved in the neighbourhood of Victoria Strait, searched

#### ARCTIC CRUISE OF 'EREBUS' AND 'TERROR' 171

its west coast (as Collinson did two years later) and found relics from the Erebus and Terror which had drifted down from the north. The remaining expeditions made only geographical discoveries; Austin and Ommanney along the coast of Prince of Wales Island, a Frenchman Bellot and Kennedy (who had replaced Commander Forsythe as captain of Lady Franklin's ship, the Prince Albert) by sledging to Bellot Strait, John Ross's 'Brentford Bay'. Yet another expedition set out in 1852 commanded by the elderly Sir Edward Belcher whom Dr Richard King in his caustic way described as a man who 'had spent a whole life in proving himself to be the very last man fitted for so honourable a service'. On this expedition, McClintock, commanding the steam tender Intrepid, made some fine sledging journeys in the lands north of Barrow Strait. The expedition is also memorable for the rescue in April 1853 of McClure and his men who had been forced to abandon ship. But in the following year the expedition was recalled. The Admiralty was tiring of the Franklin search.

On 20th January 1854 notice was given that unless news was received before the end of March, the officers and men of the Franklin Expedition would be considered to have died on Her Majety's Serice. Lady Franklin's reaction was characteristic. She refused her widow's pension. 'She changed', it was said, 'the deep mourning she had been wearing for years for bright colours of green and pink as soon as the Admiralty notice was gazetted.' And suspecting that the Admiralty had lost interest in the search after McClure's discovery of the North-West Passage, swe wrote, 'Ny Lords, I cannot but feel that there will be a stain on the page of the North-West Passage, and the abandonment of Franklin and his companions, are recorded in indisolubleassociation'. The people of London at least showed sympity with here sorrew and admiration for her indomirable courge.

> <sup>4</sup>My Franklin dear long has been gone To explore the northern sets, I wonder if um faithful Joha, Is still battling with the breeze; Or if e'er he will return again, To these fond arms once more To heal the wounds of dearest Jane, Whose heart is grieved full sore.<sup>2</sup>
So ran the ballad, 'Lady Franklin's Lament', on sale in the streets of London

In October 1854 startling, indeed horrifying, news came from Dr Rae of Hudon's Bay Company He had heard that the Eskimoes had seen a party of white men hauling boats towards the Great Fish River and there, near its mouth, he had found the remains of thirty of the men of Crozier's party who had left the drifting ships Guns, silver spoons and forks, were marked with the crests and initials of missing men. The fate of some at least of Sir John Franklin's expedition was known, a fate, in the words of from the Dr Rae, 'as terrible as imagination can conceive mutilated state of many of the corpses, and the contents of the kettles, it is evident that our miserable countrymen had been driven to the last resource' It was an outrageous suggestion and it caused an uproar in the British Press Lady Franklin alone was, outwardly, unmoved If Franklin's men had reached the Great Fish River from Beechey Island, she declared at once, John Franklin and not McClure must have been the discoverer of the North West Passage

The public conscience was deeply stirred and an expedition to settle so grave a matter was clearly an urgent national duty But Britain was now involved in the Crimean War and in 1855 Chief Factor James Anderson of the Hudson's Bay Company, at the request of the Government, undertook investigations More relics were found, a snow shoe marked 'Mr Stanley', a letter clip, part of a backgammon board presented to *Erebur by Lady* Frankin, but there, as far as the Admirally was concerned, the search ended and £10,000 was paid to Rae for discovering the fate of Frankin's men

But this was not the end for Lady Franklin. A public appeal was launched, the steam yacht Far of 177 tons, built for a member of the Royal Yacht Squadron an HS55, was purchased and in her, a vessel more appropriate to the clear and open waters of the Solent than to Arctic seas, Captan Leopold McChinock, available largely through the intervention of the Prance Consort, left Aberdeen on 1st July 1877 After two winters besch, first in Bdfin Bay, then in Beilot Strait, McChintock with his second in command, Leeutenant Hobson, marched southwards across Boothas Pennsula and on across the tex to King William kland There, on the

172

#### ARCTIC CRUISE OF "EREBUS" AND 'TERROR' 173

west coast at Point Victory, a caim was found with the record, stained by the rust of its tin case, which had been deposited by Captain Crozier eleven years before. It told the story of the end of the Franklin expedition, of the first winters, of the besetments, of the death of Franklin, of the abandonment of the ships on 22nd April 1848, of the death of twenty-four officers and men, as already described. On that day, Captain Crozier was about to start on the tragic march to the Great Fish River.

The discoveries of McClintock and Hobson on both sides of King William Island and south as far as the Great Fish River revealed In all their tragic detail the fate of the Franklin Expedition. Irrespective of the earlier award to Dr Rae, McClintock and the men of the Fox were voted 15,000 by Parliament. And the claims of the members of the Franklin Expedition (several had evidently managed to reach Simpson Strait) to have preceded McClure In the discovery of the North-West Passage were formally recognized by the Royal Geographical Society In the award to Lady Franklin of its Founder's Medal. For her, the years of tension were over. The battle which she had fought so bravely against inert, or as it so often seemed, insensitive officialdom had been won. Franklin Ad been vindicated at last.

Over the next twenty years the full measure of the tragedy was revealed by the discoveries of Captain Charles Francis Hall of Cincinnati and Lieutennit Schwarka of the United States Army whose expeditions, impired by the Franklin search, will be described in greater detail when we consider American explorations in the Arctic in the second half of the nineteenth century. All the way from Point Victory, skeletons, graves, relies of the dead marked the direction of Crozier's last march. Fifty miles to the south (sixty-five from the abandoned ships) a ship's boat lying on a sledge contained two skeletons side by side. Stowed lying on a sledge contained two skeletons side by side. Stowed heapness and no food beyond a little chocolate and some tea. Farther south, at Cape Herschel, lay the skeleton of Harry as if in sleep. Papers, including the parody of a sea-shanty written at the end of the second winter, proved identity and the remnants of uniform enabled a reconstruction to be made. Trousers and So ran the ballad, 'Lady Franklin's Lament', on sale in the streets of London

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During their travels around King William Island, Captain Hall and Lieutenant Schwatka heard many Eskimo stories about the last days of Frankin's men At 'Starvation Cove', as Schwatka named it, Eskimoes had found the remains of thirty-five men who had been dragging a boat with an awning At Terror Bay were thirty more lying huddled together insule a tent. There were stories, too, about the ships. One was found, the Eskimoes told them, near the entrance to Simpson Strait, with awnings screening her decks and a gangplank still resting on the ice. In great fear, they crept on board But there was no sound and they saw only the body of a white man lying on deck. They prized open the closed hatches and ranseled the cabins. But when they returned later to collect their plunder, the ship had foundered Only the tops of her masts were visible above the ice

Among the Eskmoses interrogated by Captain Hall were many who told hum how thin the white men had been, how their mouths had been 'dry and black and hard', how they had complained of loose teeth and spongy gums. These were sure signs of scury and there is no doubl, as MCClintick had surmated, that scurry, its enfeetbing effects accelerated by starvation and by exhaustion from the tremendous effort of hauling heavy boats and sledges on the long march towards the mouth of the Great Fish River, lay at the root of the Franklur tragedy

## PART THREE THE AGE OF ADVENTURE AND RESEARCH

of the seventeenth century seamen This led some years later to the opening up of a northern sea route for Russia and provided at long last a relatively short (though uncertain) passage between Russia and the Far East

The mid nueteenth century which saw the start of the explorations thus briefly surveyed was a period in Europe when the gathering forces of liberal opnion, when stiffled impulses to personal freedom broke through old barriers standing since the Napoleonic Wars. In the midst of this general fermentation of decas, it witnessed new and widespread advances in scientific thought which had disturbing social and intellectual repercussions. It witnessed also, paradoxically with the greater emphasis on individualism, an intensification of nationalism which the new and amazing instruments of closer human intercourse--the seamilitys, the spreading railways, the electric telegraph—did little to allay To offset this, however, there wis in science the beginning of international co operation and the first International Polar Year of 1882 (the forerunner of the International Geophy sical Year) was a striking advance in a field of intellectual endea your in which the development of co operative and international effort was becoming all the more essential because of increasing specialization

Some reflection of these broad movements can be perceived in the evolution of polar exploration, in the decline, for example, of the national navel expeditions in favour of private and indepen dent enterprise, in the rise, first evident in North America, of the individual adventurous explorer who was little concerned with scientific motives, and in sharp contrast to this, in the development of the purely scientific expedition concerned not with exploration but with research

The advent of the independent private explorer, engaged in adventure or research or a combination of both, with plans and projects which were his sown and not those of governments, is a distinguishing characteristic of the second half of the numteenth century. The leaders and promoters of such private expeditions in America and in Europe were not supported, as the earlier expeditions in ad been, wholly by government funds, though governments were often called upon to contribute They relied to a new and large extent on public subscriptions, on handsome donations from the newly arisen capitalist class, and on subventions from the proprietors of the new popular newspapers in return for exclusive rights of publication. A North American newspaper, the New York Herald, whose proprietor James Gordon Bennett in 1872 commissioned Stanley' to find' Livingstone, was the first to appear as a substantial sponsor of exploration of this kind when it sponsored Lleutenant Frederick Schwatka's expedition of 1878 in search of Franklin relies.

It was fitting that the United States, where in the fifties and slattes the ploneer was striking out across America's own last frontler (the frontier of the Far West), should have been foremost in encouraging the independent Arctic explorer. The first American Arctic expeditions were sponsored by Henry Grinnell, the wealthy New York shipping magnate who had made a fortune through buying the business of a man curiously named Preserved Fish. He had already (as related) sent out Lieutenant De Haven to take part in the Franklin Search. Two years later Dr Elisha Kent Kane, the surgeon on De Haven's expedition who had in his youth explored the Philippines, submitted to the newly founded American Geographical Society of New York and to Grinnell's this first president, his plans for a new expedition whote purpose was to combine a further search for Franklin with an attempt—and this was Kane's real object—to reach the North Pole across the great barrier of ice which, he argued, would he found to surround an open polar sea. The search for Franklin had, as Kane well knew, a powerful humanitarian appeal and Grinnell's response was no lest generous than It had earlier been to the heart-rending letters of Lady Franklin. In May 1854 the doctor on the Kane expedition, Isace Israel Hayes, Ied a party westwards across Smith Sound and named Grinnell Land while Kane with another party explored north wards up the Greenland coast and named Kane Basin, north of Inglefield Land In the course of these last explorations Kane and his party became the first white men to set eyes on the great Humboldt Glacier, sixty miles long, so called after the German geographer and traveller a level ay four one connection with Antarctic discovery it rose, Kane wrote, in a solid glassy wall three hundred feet above sea level a long ever shining line Here was a plastic, moving, semi solid mass, obliterating life, swallowing rocks and islands, and ploughing its way with trensistible march through the crust of an investing sea'

Kane, moving westwards, reached a channel (Kennedy Channel) leading out of Kane Basin towards the north but when he returned he found his base in sore distress. The Advance was beset Food was nearing exhaustion. The upper works of the ship had had to be bumt for fuel. And scurvy had broken out among the crew Eventually, in 1855, being unable to hold out any longer, they made an adventurous journey in three small boats to a Danish settlement in south west Greenland and their were rescued by a relief expedition dispatched, with the help of Congress, by the American Geographical Society and the New York Clumber of Commerce

Kane has been described as 'the outstanding American polar idol of the mid century' His Arcne Exploration, acclaimed by Washington Irving, could be seen on every parlour table in his native city of Philadelphia and lovers of Byron, it appears, were enthralled by his picture of these newly discovered I cy hills of cold sublimity' Kane's notoriety, however, was not solely on account of his Arctic adventures' At an early age he had fallen in love with thirteen year old Margaret Fox, one of a trio of spiri tualist sisters from Rochester to whose 'obscure and ambiguous profession' he was accutomed to refer. This secret liaison was the target of a scandalous and exceedingly popular book, The Love Life of Dr. Kane

Two years after Kane's return, Isaae Israel Hayes put forward a plan of his own for an attempt on the Pole, an enterprise, he declared, which would be greatly to the credit of 'our national character'. The Pole, however, had none of the appeal of the Franklin Search and despite the exertions of the American Geographical Society, not only were funds hard to raise but there was some sharp criticism of Hayes' proposed adventure. Eminent authorities, one New York newspaper remarked, considered that 'all pretence, either of mercantile value or scientific discovery, had been exhausted with reference to the Polar sea'; if a sea-passage across the Pole linking the Atlantic and Pacific Occans was Hayes' object, why then 'the Pacific railroad would be built before Dr Hayes could return'. Only a powerful and portentous intervention by Dr Gould of Harvard saved the situation, 'It is the duty of mankind', he declared, 'to explore and more than this, it is a duty which seems to devolve properly upon our nation. Europe has contributed more than her just proportion of geographical expeditions..., We Americans now owe it to the world and to ourselves to prosecute these

The searches. Once again Henry Grinnell came to the rescue and with further help from a group of prominent New York business men, Hayes sailed from Boston in July 1860, nine months before the bombardment of Fort Sunter by Southern guns began the Civil War. On the day of departure, Henry Grinnell presented Hayes with the flag of Wilkes's United States Exploring Expedition with the flag of Wilkes's United States Exploring Expedition with the breezes of the North Pole, and having done so you will take special care of it and return it to me.' A slight extension of Kane's explorations up the east coast of Ellesmere Island, however, was the nearest to the North Pole that the Hayes expedition could reach.

Meanwhile, in March 1860, on the eve of Abraham Lincoln's momination by the Republican Convention, another American Arctic explorer appeared, Charles Francis Hall, already mentioned in relation to the Franklin Search. An impoverished printer from West Cincinati, he had no exploring experience, no scientific knowledge, no commercial or political influence or standing. Nor did he have any of the geographical ambitions of Kane or Hayes; he was moved solely by a deep distress at what he considered to be the shameful relaxation of effort in the search for Franklin. He was far from being discouraged by the findings of the British expeditions. Was there not, he asked, even now a glimmer of hope that a few men might still be found alive? And even if he failed in this, was there not a chance that he might find journals, log books, durines which might reveal for the future guidance of the world all the secrets of this dread for the future guidance of the world all the secrets of this dread for the future guidance of the world all the secrets of this dread for the future guidance of the world all the secrets of this dread to McClintock who had by then returned from the last British expedition of the Franklin Search, Hall convinced the warm hearted citizens of Ohio and Connecticut that he might yet be in time and with further aid from Henry Grinnell, "the honored father of American Arctic discovery", he sailed in the Rescue in May 1860, passing on his way out of Boston Harbour the schonerr United Steter with Hayes on board

The cost of Hall's first Arctic expedition was less than a thousand dollars of which Grannell contributed a third He had no shap He travelled in a New London whaler, sailing on a routine trap His expedition was indeed a striking contrast to the massive and cotily expeditions dispatched by the British Navy Living for two years among the Eskimose of Baffin Island, wearing Eskimo dress, cating raw seal meat, living in their now houses, and traveling with dogs and sledge, Hall became convinced that the Arctic explorer of the future must learn, seperally in the eating of raw food, 'to Eiguineaux us him sell' He found no relies of Sir John Franklin He made, however, one astonshing discovery, bringing back to America many relies of Frobisher's unfortunate stateenth century expedition, all of which have suice and guite unaccumitably duagneared.

which have since and quite unaccountably disappeared. With a family of Eskimoes sitting cheerful but silent by his side, Hall lectured all over America to raise funds for a more ambitious expedition 'to solve the mysternes enshrouding the fate of Frankin's men' Grannell contributed generously to the support of the Eskimoes But, like many another potential patron, he had been hard hut by the Civil War However, with the help of the whaling companies and of the newspapers Hall obtained enough for a modet expedition and in another whaler he set off in high spirits in July 1864 to spend five years without a break in the Arctic, for a white man living and travelling alone with the sojourn, Hall added considerably to the geography of the Melville Peninsula (to the north of Hudson Bay), and sledging across the Rae Isthmus to King William Island, he discovered, as related, a great may relies of the Franklin expedition.

Hall had now become, like Elisha Kent Kane, an Arctic hero to the people of the United States and his expedition in 1871 in which he sailed with his Eskimo companions and the German maturalist Dr Bessels in a naval tug the *Polaris* was considered worthy of support by the United States Government. There was no question this time of any Franklin search. Following Kane and Hayes, Hall's aim was no kess than 'the discovery of the northerm axis of the great globe if possible, or the absolute proof its inaccessibility'. As in the case of Hayes's North Pole adventure, Grinnell saw to it that Hall carried with him the flag of the Wikkes Expedition.

Hall's achlevements on this, his last expedition, brought nearer than it had ever been the possibility of an assault on the Pole. In a number of great sledging journeys, he reached the northernmost limits of the Greenland ice sheet and discovered at the foot of its glasiated escarpments Hall Land, green, pleasant, plentiful in game, a delight to the eye after the desert of ice over which he and his men had sledged so wearly. North of Hall Land green Lincoh Sea. Crossing Kennedy Channel (discovered by Kane) Hall travelled up the east coast of Ellemere Island and reached two hundred miles beyond Kane's farthest north, to latitude 82° 11'. But these were the last of the Aretic journeys made by the printer from Cincinati who died before reaching the ship, exhausted from the strain of such tremendous sledging efforts. The *Polasis*, homeward bound out of Smith Sound, was struck by an enormous floe. And just as stores, records, clothing, equipment, were being lung from the reeling ship, she was wept away through the Aretic twilkplet, with most, starving and dazed, of the coast of Labrador.

The survivors of Hall's last expedition reached New York in 1874, the year of the birth of Ernest Henry Shackleton who as a boy was enthralled by Hall's books. So narrow an escape from total disater however did not discourage Henry Grinnell from looking forward to the day when the greatest of all Arctic trumphs would crown the efforts of American explorers Receiving back the flag of the Wilke Stredution the declared himself willing 'to send it again if there is any American expedition fitted out for the discovery of the Pole' In Britan and in Europe meanwhile, polar exploration was developing along very different lines, in Britan traditional, in

Europe experimental under the influence of new and unorthodox ideas The British Arctic Expedition of 1875-76 was probably no very exceptional example of the conservative, indeed complacent spirit of the late Victorian Navy It consisted of two ships, the Alert and the Discovery, and was commanded by Captain George S Nares who, in curious contrast to his new post, had been recalled by the Admiralty from command of H M S Challenger in the Antarctic, a ship then being used as a floating laboratory by a group of civilian scientists engaged in the most important oceanographical investigations to be conducted in polar waters during the nuneteenth century. The expedition which Nares joined was the very antithesis of such a progressive, scientific enterprise Far indeed from looking forward, it was in concep tion, in its organisation and methods, a reversion to the ideas of fifty years ago Only in the carriage of some Eskimo dogs, in the attachment of one of Hall's Eskimoes, Hans Hendrick, and in the use of fresh musk ox meat to supplement the heavy tins of preserved food provided from Admiralty Stores, were any conces sions made to the new techniques of travel and survival perfected mainly by North American explorers

The intention of the British expedition was to plant the Union Jack beyond America's farthest north and at the same time, by showing the flag, to counter the drive of the American whater who had followed in the wake of Kane and Hall to the rich whaling grounds north of Smith Sound The tactics disgued to achieve these objectives will be familiar to those who remember Pary's explorations. The slaps were first to ram their way through the ice to the laghest possible latitude. Then officers and seamen would take to the ice, man having ponderous boats and sledges until they could haul no more Nevertheles, the outcome of these herote efforts was remarkable, no less so than in Parry's day, for having imposed upon themelves these intolerable but customary conditions, the officers and men of the Navy proceeded by sheer courage, endurance, and patriotic fervour to beat all Arctic records.

Nares, first of all, following Hall's route up the west coast of Greenland and through the ice-strewn narrows of Smith Sound, brought his ships with superb skill to the very edge of the Arctic Ocean. Then the man-hauling parties set out along the Ellesmere Island and Greenland coasts. One party, the first summer, rounded Cape Columbia, the northernmost point of Ellesmere Island and explored westwards for two hundred and twenty miles. Exhausted by the strain and weakened by scurvy-from which the American expeditions, thriving on their Eskimo diet of raw fish and seal meat, had been so remarkably free-only two men had strength enough to haul the sledges on return. A second party that same summer, led by Lieutenant Albert Markham, advanced across the sea ice towards the Pole. Making no more attained alloss the sea he cowards the role manage in hole than two miles a day, they struggled on and by 11th May reached latitude  $82^{\circ}$  48', beating (by a mile or two) the high latitude achieved by Parry and by Hall. The return journey had all the possibilities of final tragedy. One boat had to be abandoned, for five men had to be carried on sledges, leaving only six men and two officers to haul, and once again the toll of scurvy was devastating. Out of the hundred and twenty-one men of the Nares Expedition, there were fifty-six cases of scurvy.

The following summer another party, again led by Lieutenant Albert Markham, carried the record still farther north, fortyeight geographical miles beyond the point reached the previous year, and there it stood until an American expedition of 1882. Remarkable as these achievements were, the Nares Expedition was the last expedition of its kind. Never again in the nineteenth century were such heavily manned naval vessels working under purely service conditions to explore the polar sea.

Meanwhile a German scientist, the industrious and prolific geographer Petermann, evolved a theory which gave some hope of a less arduous approach to the North Geographical Pole. Because of a branching of the warm waters of the Guil Stream north of the Bering Strait, Petermann argued that there was some probability in this part of the eastern Arctic of a relatively Ice-free route towards the north. Two young Austrian scientists, Licutenant Karl Weyprecht of the Austran Navy and Leutenant Julus Payer of the Austran Army, were greatly attracted by this notion and with the support of a rich patron, Count Wilczek, set off on a reconnaissance along the coasts of Novaya Zemlya in the summer of 1871 They met httle ice and were so encouraged that they sailed again the following year in the steamer Tegethoff on a voyage which, though it gave little enough support to Peter mann's theories, resulted in the discovery of Fraz Josef Land.

In October 1872 the Tegethoff was beset and all winter difficed helplessly with the ice to the north west All the following spring and summer, Weyprecht and Payer tried desperately to escape by borng and saving a way through ice nearly thirty feet in thickness and had indeed given up all hope when on 30th August 1873 they saw on the horizon what seemed in their relief to be nothing less than 'a radiant Apine land', the snow slopes of the archipelago of Franz Josef Land

It was October before they made landfall on one of a cluster of islands, a dismal, anything but radiant, place of rock and snow and broken use, without game, without indeed any sign of life except the sparse lichens which were the only trace of vegetation During the wunter they explored and mapped and when April came they decided to abandon their ship and make by boat for their base on Novaya Zemlya There, off the coast, they were rescued by a Russian vessel fishing, on 24th August 1874 The discovery of the islands of Franz Josef Land-one of which Weyprecht and Payer called Wilczek Island after their patronfilled the unexplored gap between the very much earlier discoveries of Spitsbergen and Novaya Zemlya More important, however, for the future evolution of Arctic exploration was the hypothesis Weyprecht and Payer put forward on their return, that these islands were perhaps outliers, on the Antarctic model, of some greater land mass, possibly even a continental land, in the midst of which was the Pole This proposition, strange but perhaps no stranger than Kane's obsession with an open polar sea, reveals the total ignorance which existed even as late as this in the nuncteenth century about the true nature of the Polar Basin

This same belief in a southward stretching central polar land mass led Lieutenant George Washington De Long of the United States Navy to select Wrangel Island in the East Siberian Sea as a likely stepping-stone to the Pole; an island which was also near enough to the Bering Strait to be affected by Peterman's warm Japanese current. De Long was no scientist like Weyprecht or Payer. His expedition was an ambitious adventure, spectacular enough to attract the backing of James Gordon Bennett, the proprietor of the New York Hereld, who had sponsored Lieutenant Schwatka's expedition the previous year. Bennett had at first thought of using balloons to reach the Pole. Finally however he bought a yacht, the Pandora, in which Allen Young had unsuccessfully attempted the North-West Pasage in 1875-76, and in this, manned and equipped by the United States Navy, De Long salled from San Francisco in 1879. He renamed his ship the Jeannette.

The expedition was in itself a total failure. The Jeannette was caught in the ice near Captain Kellett's discovery, Herald Island, was sweet weretward: past Wrangel Island (which proved to be relatively small) and then drifted in a north-westerly direction for seventeen monthy, only to be crushed in the ice north of the New Siberian Islands on 12th June 1881. Her crew managed to reach the estuary of the Lena river, but hunger and cold killed all but two, including De Long himself. For the future of Arctic exploration, nevertheless, this expedition was of the greatest significance. In 1884, there years after the sinking of the Jeannettr, a pair of oilskin breeches and other wreckage from the same ship were found on the extreme south-west coast of Greenland. This curious and chance discovery was to lead to the most ingenious of all the attempts on the Pole, Fridtjof Nansen's drift across the polar bain.

<sup>6</sup> Of all these various attempts to approach the Pole the last to be described, the one led by the American, Major Adolphus W. Greeley, is most oddly out of context for it originated in a project, an international project, which was the very antithesis of exploration of the record-breaking kind. Lieutenant Karl Wepprecht, when he returned from the Franz Josef Land expedition, proposed to a meeting of the German Scientific and Medical Association at Graz in 1875 that a new direction should be given to polar exploration; he considered that far too much effort had been inspired too often not by any desire to advance scientific knowledge but by considerations of national ad personal prestige. What was required, Weyprecht argued, now that so much especially in the Arctic had been explored, was not only more intensive scientific exploration but some co-ordination and carefully integrated scientific plan. He proposed therefore that co-ordinated and simultaneous scientific observations using comparable means and comparable methods, should le made in both the Arctic and Antarctic regions, observations which, on analysis, might lead to the discovery of fundamental laws and principles These would be to the benefit not of pur cular nations but of the whole of markind

There was much opposition at first to Weyprecht's ideas But the young Austrian scientist was a determined man Four years later, in 1879, his proposals were approved by the first International Polar Conference at Hamburg and they led to the first International Polar Year of 1882-3 Fifteen scientific stations were planned, four of them in the Antaretic though little came of these Of the Aretic stations, in Ellesmere Island, Greenland, Baffin Island, Spitsbergen, the Kara Sea and at the mouth of the Yenesey, that on Ellesmere Island was the responsibility of the United States and was in charge of Mapi Adolphus W Greeley of the United States Army In composition (apart from two Eskimo hunters) a military expedition, its principal function was the making of meteorological and magnetic observations in Hayes's Grinnell Land in accordance with the international plan in the mind of its leader, however, there was also another objective, and one quite out of tune with the spint of Weyprecht's Polar Year, no less indeed than an American assault on the Pole, or at least an attempt to beat the record gained for P gained for Britain by Lieutenant Albert Markham of the Nares Expedition In this Greeley was strikingly successful In April 1882 successful In April 1882 sledging journeys with dog teams carried Lieutenant Lockwood, Sergeant Brainard and the Eskimo Frederick north eastwards from Ellesmere Island along the unexplored coast of north Greenland north Greenland and north as far as latitude 83° 24', four miles beyond the point reached by Markham in 1876 The rest of the story of this expedition which planted the United States fig nearest the Pole forms both a tragic and, in its home administra tion, a discreditable chapter in the history of American polar exploration. At home, indecision, incompetence and corruption worse even than that of the Wilkes Antarctic Expedition; in the field, great courage, starvation, madness, death. When eventually, after innumerable and digraceful delays, relief arrived in June 1884, only seven men including Greeley himself survived, barely alive. 'Did what I came to do', Greeley hound strength to tell his recuers, 'but the best record!' It was the spirit which drove on another American Robert E. Peary to the conquest of the Pole in the first decade of the twentieth century.

### The Scandinavian Ascendancy: Nordenskiöld and Nansen

THE explorers and scientists Nordenskiold and Nansen who were the founders of a new Scandinavan school of Arctic exploration in the last thirty years of the nineteenth century came from countries where the urge to explore, to cross part of the national heritage It was indeed a national impulse as characteristic in its way as that which had created the American frontiersman and pioneer Baron A E Nordenskield, though born in Finland, came of an old Swedish family He had been compelled as a young man to leave Finland (at that time part of Russia) for political reasons, and it was in Stockholm that he first embarked upon his Accuc studies He was by training a scientist, a chemist and a mineralogist, and gained his first Arctic experience on a scientific expedition to Spitsbergen in 1858, led by the Swedish geologist Frofessor Torell The geographical and geological problems of Spitsbergen, whose coasts had been visited by Russian expeditions sent by Catherine the Great in the seventeensixties, had been explored over three centuries by a succession of Dutch and British whalers (including William Scoresby) and had attracted Swedish scientists ever since the visit in 1827 of the Swedish geologist, Professor Keilhau

In 1861 and again in 1864 (with the help of his wealthy patron Baron Oscar Dickson) Nordenskold returned to Spitsbergen to measure an arc of the meruden and to map parts of the archapelago 'with an accuracy', the American explorer Greeley affirmed, 'hitherto unattained in any Arctic land'. Two years later he moved westwards to explore a region which was by comparison almost unknown, the wast and lofty ice sheet, fifteen hundred miles long and six hundred miles wide, which almost covers Greenland, and spills over in the form of chiffs and glaciers, into the sea. One or two desultory Danish expeditions in the eighteenth century had made no impression on this great desert of ice and in the ninetcenth century it seemed no more than a gigantic waste land until a Danish inspector for southern Greenland, Dr Henry Rink, began to ponder on its geographical significance and on the possibility that it might be the source of Atlantic icebergs, and a relic perhaps of the last lee Age. Thereafter scientists and explorers of many nations were drawn to Greenland to explore the ice sheet, and to investigate its history, formation and movement and the influence of his vast and persistent expanse of ice on weather.

With a Swedish botanist and two Lapps, Nordenskiöld in 1870 tried unsuccessfully to cross the ice sheet at its narrow, southern end. This first scientific reconnaissance was followed by numerous Danish expeditions and on one of these, Jensen's expedition of 1879, the first ice-free rock outcrops, known as numatak, of which rumours had been current in the eighteenth century, were discovered. The discovery of these, the ice-free peaks of sub-glacial mountains, faintly costed with earth, gave rise to a currious and exciting idea. Might there not be deep in the interior of Greenland not ice but stretches of cultivable land, rich agricultural land where corn and grass might grow in the midst of this desiccated field of ice 2

After another visit to Spitsbergen in 1872 on which after failing to approach the Pole with reinder teams and sledges, he crossed the ice-cap of North East Land, Nordenskild turned to a very different problem, the navigation of the old North-East Passage. For the Western world, the North-East Passage had long lost its attraction as a possible seavay to the East. In North America, trans-continental railways were spreading fast. Indeed, as Nordenskiföld in the steamship *Rega* moved towards the Bering Strait in 1878, the Colombian Government granted De Lesseps his concession to build the Panama Canal. Nevertheless, for Russia, Nordenskiföld was cowinced, the navigation of the North-East Passage could be of vital importance; it might open up a commercial highway along the Siberian coast over which the mineral resources, scarcely probed, of the immense territories of eastern Russia might be brought cheaply to industrial Europe and in particular to Scandinavia; it might even link the north Russian ports with the ports of the Parifie Ocean There were In addition strong scientific arguments in favour of the sorger since it would enable hum not only 'to carry on researches in geo graphy, hydrology, geology, and natural history' along the costs but 'to survey an almost unknown scaof enormous extent'. In July 1877, these arguments gained Nordenskold the support of the Kang of Norway and Sweden, of his patron Earon Oscar Diekson and, notably, that of a rich Russian merchant A. Sibrankov who like Nordenskold saw considerable commercial prospects for Russia in the opening up of the North East Pasage A year later, after two reconnoliting sorges into the Kara

A year later, after two reconnoliting voyages into the Kara Sea, Nordenskield in the three hundred ton steam and saling ship the Kega, with the Lana in consort as far as the Lena River and two of Sibiriakov's cargo boats bound for the Yenesey, sailed from the Norwegian port of Tromso In response perhaps to Wepprecht's plea for greater international co-operation in polar exploration Nordenskield's expedition had a distinctly international flavour and leutenants of the Swedish, Dansh and Italian navies, a lieutenant of the Russian Army, Swedish salior and erew

and stew Nordenskold, remembering the disaster to the Tegrhoff off Noraya Zemlya, decided from the start to keep close to the North Siberian coast being confident that 'the open murgable water, which two years in succession had carried me across the Kara Sea extended in all probability to the Bering Stratt'. Thereafter his voyage, carefully, metueulously, planned, was singularly devoid of the tragedier, the dramatic excapes, the tales of hardshup and endurance by which polar exploration is so often only remembered. It was indeed remarkably uneventful By 6th August the convoy was at the mouth of the Yensery, at a secure and ample island anchorage close to the mainland which Norden skield had marked down on his reconnaissance voyages. Just a he named an adjucent island after his Russian patron Shirakov, so thus, an anchorage he prophesied which would one day be of 'great importance for the forefage commerce of Suberi's, was one dister Baron Dickson, an anchorage now known as O Diksona (Dickson Island), a mest important harbour on the Soviet Northerm Sci Route

Beyond the Yenesey, the ships launched into waters unknown except to the small native craft of the north Siberian tribes. But fog rather than ice was their worst enemy. Through August, Nordenskiöld wrote, we continued to sail and steam along the coast, mostly in very close for, which only at intervals dispersed so much that the lie of the coast could be made out. In order that they might not be separated, both vessels had often to signal to each other with the steam whistle. The sea was as bright as a mirror. Drift ice was seen now and then, but only in small quantity and very rotten; but in the course of the day we steamed past an extensive unbroken ice-field, fast to the land, which occupied a bay on the west side of the Chelyuskin peninsula . . . the northernmost promontory of Asia. . . . . Nordenskiöld then resolved to sail north-eastwards to discover if land lay between the peninsula and the New Siberian Islands. But the mist thickened into fog and finding the Vega facing a labyrinth of ice be returned on his tracks to where he first entered the pack. He then made for the clearer water off the coast.

Hugging the coast, Nordenskiöld steamed south-eastwards through waters marked as land on his maps to the mouth of the Lena river. 'If the coast had been followed the whole time,' he noted in his Voyage of the Vega, 'if the water had been clear, and the navigable water sufficiently surveyed so that it had been possible to keep the course of the vessel near the land, the voyage of the Vega to the mouth of the Lena would never have been obstructed by ice. . . . . This time they reached the New Siberian Islands with ease and Nordenskiöld was reminded of the discovertes by the early Russian explorers of ivory and other prehistoric remains when he dredged up, in his search for marine life, the decayed remnants of mammoth tusks. He rejected the temptation to land and explore, however, for fear of jeopardizing the expedition and turned instead southwards towards the mainland. There they met the first human beings since leaving the Kara Strait, dressed in reindeer skin, swarming out in their skin canoes and boats, laughing and gesticulating as Nordenskiöld distributed tobacco and Dutch elay pipes. Ethnographically, these tribes were akin to the Eskimoes and Nordenskield observed how closely their household implements resembled those he had seen from old Eskimo graves in Greenland. Their contemporary

contacts, however, appeared rather to be with the south and east, for they spoke no Russian but could count up to ten in English, and this and the possession of a Chanese coun and an American cent piece suggested trade with the American whalers of the Pacific rather than with Russia overland

Winter now was almost upon them Off North Cape the ice was closely packed around the ships and only one hundred and twenty miles from Cape Dezhner, on the very threshold of the Arctue and Pacific Oceans overlooking Bering Strait, their way was barred by a belt of floes It was only a few miles wide But it was solid enough to stop the Fega

Apart from volent movements of the ice in mid December which made Nordenskold hurricelly set up a depot on shore, it was a peaceful wurter. And with the spring, carvans of sledges drawn by reindeer began to pass on their way to the Bering Strait But there were still three months to wait. Then one July inght, juit as they were sitting down to dinner, convinced that the ice barrier would not move for some days, they suddenly felt a faint movement of the shup and bollers were lighted at once and the Kegs moved off 'The sea was mirror bright and nearly clear of ice, a walrus or two stuck up his head, strangely magnifed by the fog, in our neighbourhood, seals swam around us in large numbers, and flocks of birds, which probably breed on the step cliffs, swarmed round the vessel The traw in at repeatedly brought up from the sea bottom a very abundant yield of worms, molluscs, crustacea, etc A zoologist would have had a rich workng field '

Early on the morning of 20th July, dark beights could be seen to the east through the dispersing fog 'These were the mountain summits of the easternmost promontory of Asia by 11 a m we were in the middle of the sound which unites the North Polar Sea with the Pacific, and from this point the Vega greeted the Old and New Worlds with a display of flags and the hring of a Swedsh slutte'

Nordenskold's predictions about the value of his voyage to Russia have been more than justified With the aid of powerful modern ice breakers, with aircraft, with meteorological statons established along the coast to observe the variations of weather and of ice, with the aid of an elaborate hydrographic service to chart and light and buoy these dangerous and often, even now, impassible waters, the Soviet Union has maintained along Nordenskild's route a more or less regular highway for shipping under the Chief Administration of the Northern Sea Route ('Glaverwonportu'). New ports have sprung up, their vas thinterland has been exploited, and it was along this route during World War II that Lend-Lease supplies from the United States were shipped to the Soviet Union in her most critical hours.

The next to appear in this saga of Scandinavian exploration is the tall, fair-haired Norwegian, Fridtjof Nansen ('a true Viking', Admiral McClintock called him), a man who in daring, in endurance, and in intellectual statute is supreme among Arctic explorers. He was by training and by inclination a scientist, a zoologist who turned later to oceanography, mathematics, astronomy, and much else, and a scientist Nansen remained all his life, even when burdened in later years with grave national and international responsibilities. He was also in a very special sense an adventurer, loving exploration not only for its excitements, or for the satisfaction of physical achievement, but because he was convinced (with fibren whom he so greatly admired) that the key to man's destiny lay in the study of personality and in the development of individual character and that only in the silence and solitude of the wilds, alone with Nature, could man hope to discover himself. There was no doubt an element of escapism in this mind-searching Nordic approach, and indeed for Nansen escape was a necessity. Science alone was not enough; it was too cold, he said. But in the Arctic, Nansen wrote, 'I found the great adventure of the ice, deep and pure as infinity, the silent, starry night, the depths of Nature herself, the fullness of the mystery of life, the eternal round of the universe and its eternal death'. Only in the Arctic could Nansen find relief from the dark and sombre imaginings, the doubts and fears with which in the restiess, turbulent civilized world he was so constantly afflicted.

Nansen's Arctic career began in the summer of 1882 at the age of twenty-one when he joined a sealer working in Spitsbergen and Greenland waters to gain experience of zoology in the field. Two years later, while a member of the staff of Bergen Museum, he read of Nordenskiöld's landing on the east coast of Greenland and of his penetration of the ice sheet, and it was then after reading Nordenskield's description of the ice sheet surface that Nansen had those first daring and imaginative ideas which were to trans form Arctic exploration. He planned to cross Greenland on other that the state of th

Scientific work—postgraduate studies on the structure of the central nervous system—kept him bury for three years He then started to put hin plan into action To many, the notion of a party of young men attempting to ski across the Greenland ice sheet seemed an irresponsible, indeed a longbable idea Even Norden skold was sceptical in the end, however, the Swedish explorer came under the spell of this impulsive, blunt, but supermely confident young man. The risk he thought—and he had no illusion about the risk—was worth taking and he wrote in support of Names a spinleation for funds, pointing out that 'the investiga mental significance for science that its scarcely possible at the present time to set a more important goal for a polar expedition

Elsewhere Nansen received much discouragement. He was reminded of the disaster which had overtaken the German expedi tion under Koldewey, on the east coast in 1869 He was reminded that even Nordenskield had failed, and that on the west coast, only two years earlier, a young American Robert E Peary had suffered infinitely worse misfortune Nevertheless, with funds from Denmark supplementing those from Norway, he went ahead with his plans, three Norwegians (one, a retired ship's captain, Otto Sverdrup) and two Lapps were selected, special pack sledges were designed, and Nansen took lessons in the Eskumo language from Dr Henry Rink, the specialist on Greenland Simplicity and efficiency of equipment were char acteristic of all Nansen s expeditions and he himself was largely responsible for its design Indian and Norwegian snow shoes sleeping bags of reindeer skin, the famous portable Nansen cooker, all these appeared on this first expedition to Greenland Nansen himself, as always, personally supervised every detail, and made sure that every possible contingency was foreseen

In May 1888 Nansen and his party of five expert skiers sailed in the Norwegan sealer *Jaron* for the East Greenland coast but landed, because of gales and draft, two hundred miles south of their planned starting point. In the centre of the ice sheet, storms held them up in August and they found their planned route due west was too long and even akis too slow if they were to catch the last boat leaving the west coast for Norway. They then lashed the ski-sledges together and hoisted a tarpaulin still. 'Our ship', wrote Nansen, 'llew over the waves and drifts of snow with a speed that almost took one's breath away. We were swirled over the rough surface, and often we simply jumped from the creat of one wave to another. . . . It was rapidly getting dark, but the full moon was rising, and she gave us light enough to see and avoid the worst creases. It was a curious sight for me to see the two vessels coming rushing along behind me, with their square Viking-like sills showing dark galant the white suowfield and the big round disk of the moon behind. . . . Fast and faster I go flying on, while the ice gets more and more difficult. . . The ground here is scamed with creases e. . . creases after crease, running parallel with one another and howing dark blue in the moonlight.' When they reached the west coast, however, after a journey of over four hundred milles, a journey which had involved a climb to nine thousand feet above the level of the sea, the ship had gone.

After spending the winter of 1838-59 among the Eskimoes Namen returned to Norway and to immediate fame. For Namen the scientist, the expedition brought its own rewards in his realization of the full significance of this great ice mass, reduced through the discharge of galeiers, renewed by continual precipitation. For Namen the man, the journey was an unforgettable experience. '... When the moon came up and ... played over the tops of the ice ridges and bathed the whole of this stark world of ice in its silvery rays, then peace descended all about us and life became beauty.'

Namen's was the first of many crossings of the Greenland ice sheet; by the American Robert E. Peary, by the Swissde Quervain, by a Dane J. P. Koch who wintered (with Alfred Wegener) in Dronning Louise Land. Of these Peary's journey in 1871 when in ciphty days he travelled fourteen hundred miles across the ice sheet at its northern end, moving in from the west, was the boldest wenture, for almost nothing was known at that time about the northern or north-eastern parts of the interior of Greenland. Descending rapidly towards the east coast Peary reached the edge of a great rock cliff, overlooking 'Independence Bay' This was not as he though part of the East Greenland Sea but the western end of a deep ford Nevertheless, by this journey Peary utually established the musulenty of Greenland, even though it had yet to be completely proved Peary's Greenland journeys, however, were essentially training exercises, rigorous tests to prepare lumself and hus equipment for a very much more ambit tous project, the attainment of the North Pole and it is in that context that they will be described

Nansen, meanwhile, had been contemplating an even more audacious and more controversal enterprise, his drift across the polar basin in the *Fam*. The viela first came to him long before his Greenland crossing when he happened to read an article by the Norwegian meteorologist Professor Henrin. Mohn na daily newspaper Magenblods: In this Mohn argued that the wreekage from De Long shup the Jeannete, which had sunk three years earlier off the New Siberan Islands, could only have drifted across the polar sea to south west Greenland's east coart, round its southern extremity at Kap Farrel, and up the west round its southern extremity at Kap Farrel, and up the west in 1890, after his return from Greenland, published his plan 11%, he declared, 'a floe could drift right across the unknown region, that drift might be enlisted in the services of explora tion' Using this trans polar current, using a ship so slimlly shaped that he could ship Me an eel out of the embraces of the ice, Nansen was confident that in two years' time, he too, like the wreekage from the Jeannette, could cross the polar basin

In February 1890 Nancen addressed the Norwergan Geographical Society and casting back to the labours of Parry and his men, of Nares and Markham, against the powerful Arche drift, he drew attention to the fundamental principles on which har plans were based 'If we pay attention to the actual forces of nature as they exist here, and try and work with them and not against them, we shall find the safest and castest way of reaching the Pole it is useless to work, as previous expeditions have done, against the current 'He them marshalled his evidence There was not only the drift of wreckage from the *Jeannete* Had not a throwing stick used only by the Alaskan Eskimoes of the Bering Strait been found on the Greenland coast? Had not the driftwood found all along the east coast of Greenland proved to be of Siberian origin? Even the sediment which he himself had collected from the drift ice east of Greenland had been proved to come from the Siberian rivers. About the existence of a trans-polar current at least there was no doubt. 'It may be possible', Nansen confessed, however, 'that the current will not carry us exactly across the Pole, but the principal thing is to explore the unknown

Whether a ship could safely drift as the ice-floes drifted was to many, however, a very different matter. General Adolphus Washington Greeley, leader of the disastrous American expedi-tion of 1881-84, a great admirer of the Arctic technique of the



British Navy, expressed the strongest disapproval 'it is doubtful', he declared, 'if any hydrographer would treat seriously his theory of polar currents, or if any arctic travellers would endorse arctic exploration is sufficiently credited the whole scheme with rashness and danger in its legitimate and sanctioned methods, without bearing the burden of Dr Nansen's illogical scheme of self destruction ' In London, in 1892, Nansen boldly confronted an audience at the Royal Geographical Society and found the Arctic Admirals of the Franklin Search assembled in impressive strength But his reception there was only slightly less discour aging Admiral Sir George Nares, in calm disregard of the evidence, declared the chances of a northerly drift to be small Sir Allen Young, the unsuccessful navigator of the North West Passage, thought like Weyprecht that there would be land in all directions near the Pole and that this would be Nansen's greatest danger Admiral Sir George Richards was not in favour of 'amateur nautical expeditions' Even old Sir Joseph Hooker, the survivor of Ross's Antarctic Expedition, though he would not say that Nansen's project was impossible, considered nevertheless that it 'would not justify the exposure of valuable lives for its attainment' and expressed the hope that Nansen would 'dispose of his admirable courage, skill and resources in the prosecution of some less perilous attempt to solve the mystery of the Arctic Area' Only Admiral Sir Leopold McClintock and a merchant officer Captain Wiggins who had navigated the Kara Sea, had any praise for Nansen's vision and daring 'This', McClintock declared, is the most adventurous programme ever brought under the notice of the Royal Geographical Society 'Nansen, encouraged by praise from so eminent an explorer, was quite unmoved by these earlier rebuffs Expressing his gratitude to 'the eminent Arctic men', he declared 'I could get no better encouragement for my expedition, because their criticism has not been able to convince me that I am wrong in my opinion about the currents or about the expedition'

In Norway there were also some critics, but Nansen received all the support he needed and he experienced none of the difficulties met with before his Greenland expedition Two thirds of the cost were provided by the Government and Storthing, private subscribers headed by King Oscar provided the remainder, and on 24th June 1893 the Fram (Forward), specially designed by a Scottish architect, sailed for the Arctie under the command of Captain Otto Sverdrup, Nancen's companion on the Greenland rossing, with the thirteen Norwegian members of the expedition. Food and scientific equipment had been most carefully selected with the advice of experts, Norwegian, Swedish, German, Dutch, in all the different scientific fields including that of the physiology of diet and nutrition. Russia too contributed, and Siberian sledge dogs were purchased and three supply depots in the New Siberian Islands were stocked at the expense of Nicolai Kelch of Irkutsk. It was to the north of these islands in September 1893 that the

Fram, after coasting along Europe and Asia, drove deep into the pack. The long drift them hegan. By the end of the month, the ship was frozen in and her crew resigned themselves to two, possibly three years of isolation and wandering. The fram's rudder was hauled up; her six-knot engine was dismantled, olled and stored away; and a joiner's shop was rigged up in the hold. There was constant distraction to while away the hours and days; soundings and temperatures had to be taken in the depths of the sea when leads or pools in the ice could be found; magnetic observations were recorded; Nansen in traditional polar style edited a weekly newspaper Fransjos. Only the occasional unexpected appearance of a bear, clumuy but menaeing alongside the ship, broke the monotony of this carefully organized routine. Though the From rose, as Nansen had foreseen, easily, indeed superbly, over the floes, sometimes her course was erratic and alarming. On occasions her bows would swing round to the south as if-Nansen thought-she was yearning for southern shores. Then as suddenly she would swing round to the north again as if drawn forward by some invisible power towards the unknown. But despite these disconcerting, apparently random manoeurers, they were in general moving with the current steadily north-west along the route of the wreckage from De Long's Jeannette.

Jeannette. Of the thirteen men on board, Nansen perhaps felt most acutely the monotony and confinement of the voyage. 'I long', he wrote in his diary, 'I long to return to life..., the years are passing here.... Ohl at times this inactivity crushes one's very soul; one's life seems as dark as the winter night outside; there is sunlight upon no other part of it except the past and the far, far distant future 1 feel as if I must break through this deadness, this inertia, and find some outlet for my energies. Can't something happen? Could not a hurricance come and tear up this ice, and set it rolling in high waves like the open sea?

It toring in man the indeed almost passed since the Fram left Two years had indeed almost passed since the Fram left Norway and it was becoming evident that despite her north westerly course, the would not pass across the Pole Early in the spring of 1895, therefore, Nansen decided upon one of the most daring exploits in the history of polar exploration, to leave the Fram to the skill and pattence of her capital Otto Sverdrup and with one companion, H Johansen, dogs, sledges, two kayaks and a hundred days' food, to strike out across the floes to the Pole Even Nansen, the dedicated scientist, could not refram from setting this chance to plan this country's flag at the northerm extremnty of the axis of the earth

On 14th March 1895 Nansen and Johansen left the warmth and safety of the Fram and launched out into the Arctic wasteland, travelling at first swiftly and easily over flat ace, then laboriously and painfully over ice massed into immense ridges, so tumultuous and jagged that it overturned the sledges and slashed the thin skins of their Eskimo kayaks 'Ridge after ridge', Nansen wrote, and nothing but rubble to travel over and from the highest hummock only the same kind of ice was to be seen It was a veritable chaos of ice blocks, stretching as far as the horizon ' After twenty three days, in cold so intense that their clothing froze and cut deep sores in their wrists, they reached a latitude of 86° 14' N , two hundred and twenty four nautical miles from the Pole, one hundred and sixty miles further north than had ever been attained before But in such conditions they could do no better and on 8th April 1895 they turned south on the first lap of the long homeward journey over the ice to the nearest land, Franz Josef Land

Through April, May and June they travelled over ice becoming treacherous as it thinned and weakened under the warmth of the summer sun, and often they were forced into long detours to avoid open stretches of water On 11th July 1895 Namen wrote, 'A monotonous life this on the whole, as monotonous as one can well imagine it—to turn out day after day, week after week, month after month, to the same toil over ice no sign of land in any direction.... Our hearts fail us when we see the ice lying before us like an impenetrable maze of ridges, lancs, brash, and huge blocks thrown together pell-mell, and one might imagine oneself looking at suddenly congealed breakers. There are moments when it seems impossible that any creature not possessed of wings can get further.... 'Shortly alterwards, however, the edge of the ice faintly appeared and beyond it the dark surface of the sea. In the distance, they saw land, 'At last the marvel has come to pass-land, land, and after we had almost given up our belief in itl .... So this was what land looked like now that we had come to itl 1 had imagined it in many forms, with high peaks and glittering gladers, but never like this.' Lashing the kayks together with the sledges, they rigged a sail and sped over the water, extatic at the sensation of dancing over the waves after so many months of heavy, unremitting toil.

so many months of neavy, uncentrating Osef Land in a rough stone After a winter in northern Fraz Josef Land in a rough stone hut, living off bear's mest, getting their light and heat from walrus blubber, Nansen and Johansen headed south and there in May 1896 met Jackson of the Jackson-Harmsworth Expedition. There can never have been a more astonishing or more dramatic encounter. First they heard the barking of a dog, then unbelievably the sound of a voice, 'a human voice, a strange voice, the first for three years'. Only by reading Nansen's own description in his Farthers North can one sense to the full the tension and emotion of the scene.

cinotion of the scene. Frederick Jackson, an Englishman who had been sponsored after the American fashion by Alfred Harmsworth (later Lord Northcliffe), hoped like Weyprecht and De Long to find in Franz Josef Land the beginning of a land route to the Pole, in course of his explorations he was able to check the surveys of Weyprecht and those of an Englishman Leigh Smith (who visited the islands and lost his yacht the Eiro in the ice in 1881–82) with results that were to change completely the map of Franz Josef Land. In another respect, too, Jackson's expedition deserves notice. He used ponies to pull his sledges instead of dogs—these were kepi for hunting—and when men from the Jackson-Harmsworth Expedition joined Scott and Shackleton in the Antarctic they went full of praise for Jackson's sledging methods. To Scott and Shackleton these were greatly preferable to the methods used by Nansen, Amundsen and other Norwegans which involved, as sledge loads lightened on the homeward journey, the killing of their dogs for dog food, or even, to save the transport of other food, ther slaughter for human consumption

Now, users stangent to taken who had only two lesking kayaks For Nansen and Johansen, who had only two lesking kayaks to carry them across the hundred and sixty miles to the nearest land, the meeting with the English expedition was an almost miraculous pieces of good fortune. For Jackson, however, who was just about to start on another trip northwards to search for land leading to the Pole, it put an end to all his hopes since Nansen had proved that sea and only sea—sea not open as imagined by Kane and others but perpetually frozen over—lay around the Pole and filled the polar basin

When Nansen and Johansen reached Norway on board Jackson's shup the Windward they seemed to all the world like men returned from the dead But the first news, the day after their arrival, of the fate of the Fram was no less starting, after a drift of thirty five months she had broken out of the pack north west of Sputbergen and undamaged, without the loss of a single man on board, had arrived in Tromso It was the last act, the wholly trumphant climax, to what General Greeley had described as "Dr Nansen's illogred scheme of self destruction"

The Fram expedition was by no means only a great Arctic journey, created by the vision and genuus of an exceptional man its scientific work consisting of long and continuous observations in the highest northern latitudes, mainly in oceanography and meteorology, proved of fundamental importance for polar science, and indeed provided the basis for all future Arctic work in this respect and in the new attention Nansen paid to scientific principles in such matters as diet and nutrition, the Fram expedition raised to a new level standards of polar exploration

Nansen's subsequent career in political and diplomate life, as the protagonsi of Norwegan independence, as the Lague of Nations Commissioner after the First World War who organ ized the repartnation of prisoners and the relief of famine, is our side the scope of this book. The Nobel Prize was his reward for a lifetime of unceasing devotion to the cause of human knowledge, human freedom, and human happiness In all these diverse activities he showed those same gifts of imagination and vision which he displayed in the realm of scientific exploration.

Nansen the scientist was also the scholarly historian of the early Viking voyages to the Arctic. But his mind was never confined by the past. Already, before the nineteenth century was out, he was reaching forward to the new instruments of polar exploration, to the submarine which would one day link the Atlantic and the Pacific by a voyage beneath the ice, to the use of balloons and aircraft. He was the founder and first president of an international society for the exploration of the Arctic by aircraft and in the summer of his death in 1930 he had planned to fly in the Graf Zeppelin over those frozen seas through which the Fram had drifted.

Fridtjof Nansen died with ooe geographical ambition unat-tained, an expedition to the South Pole. It had been in his mind ever since he returned from his Arctic drift and he kept the Fram in reserve for that purpose. In 1907 his fellow countryman Roald Amundsen pleaded to be allowed to borrow the Fram for another Arctic drift expedition, this time to cross over the Pole. To Nansen, this request faced him with one of the most difficult decisions of his life. He was getting on in years and it meant the final abandonment of all his Antarctic ambitions and it was with the greatest reluctance that he agreed. He little knew then that Roald Amundsen's Arctic expedition would be diverted, to the astonishment of Scott and indeed of the world, to the very project which he himself had for so long had in mind.

# The Scandinavian Ascendancy: Sverdrup and Amundsen

HE Fram arrived at Tromso on 24th August 1896 and almost at once there was a fresh surging forward of exploration in the Arctic led again by Norwegians, both of whom owed their inspiration and one his whole Arctic training and carcer to the great Fridtjof Nansen These explorers, Otto Sverdrup, captain of the Fram, and the much younger Roald Amundsen, had none of the high intellectual attainments, the scientific know ledge, the breadth of vision, the searching profundity of mind which were the marks of Nansen's genius They had become, however, no less than he, masters of the technique of polar exploration and in the nine years 1898 to 1906 their voyages and discoverics added almost as much new land and sea to Canada's future Northwest Territorics as all the ships of the thirty year Franklin Search

It was natural enough when the sponsors of the Fram expedition found Nansen unwilling to embark so soon on another extensive Arctic voyage that they should turn to Otto Sverdrup, his right hand man on the first Greenland crossing and on the polar drift Once again the Fram was to be the ship, but the destination this time was to be the north of Greenland where the inland journeys of the American Robert E Peary had shown that there were many problems to be elucidated and new discoveries to be made 'Together with Dr Nansen and my owner', Sverdrup after wards wrote, 'I agreed on the following route, which was to be up Smith Sound and Kane Basin, through the Kennedy and Robeson Channels, and as far along the north coast of Greenland before wintering From there we were to make sledge expeditions to the northernmost point of Greenland, and as far down the east coast as we could attain ' These expeditions, enlarging and consolidating Peary's discoveries, would settle any last remaining doubts about the insularity of Greenland and would complete the exploration of the northern and eastern coasts. "There was no question', Sverdrup added, 'of trying to reach the Pole.' For the unsuspecting Norwegians North Greenland was an unnappy choice since it provoked an immediate clash between

puestion, steading backworegiant North Greenland was an innappy choice since it provoked an immediate clash between Sverdrup and Robert E. Peary, Peary has already appeared on his first Greenland expedition of 1886. In 1891 he returned, accompanied this time by a very remarkable man, his negro servant Matthew Henson whom Peary had first met serving in a hat shop in Washington. This was the expedition in which Peary, Henson, a young Norwegian hunter Eivind Astrup, and some Eskimoes reached 'independence Bay' on the east coast after a journey of 1200 miles, In 1894, blizzards and an epidemic among his dogs forced Peary back after 130 miles, but he started across the ice sheet again in 1895 and despite the loss of all his estential upplies in a snow-drift noce again reached the east coast. After age of twenty-four Peary had written to his mother:

At the age of twenty-four Feary had written to its motion At the age of twenty-four Feary had written to its motion is known from one end of the world to the other'. A year later is known from one end of the world to the other'. A year later is known from one end of the Winted States Nay and while working on the Nicaraguan Canal happened to read while working on the Nicaraguan Canal happened to read and while working on the Nicaraguan Canal happened to read avenue leading to the most cherished of all geographical prizes, avenue leading to the most cherished of all geographical prizes, the North Geographical Pole. For many years these were secret ambitions. But in January 1897 as Sverdrup and Nansen were discussing their proposed explorations around North Greenland, Peary promulgated his plan 'for an extended scheme of Arctic exhibitors. Indward expedition of 1898-1902. That Sverdrup's Greenland explorations were not, like his, ultimately directed towards the Pole secmed to Peary inconceitable. Its swo ny in such a famous and experienced Norwegian explorer a potential and highly dagerous rival, threatening to mothing years informating factor in the appropriation by another of my plan
and field of work 'Such were the terms in which Peary bitterly referred to Sverdrup's plans for exploration Since Sverdrup intended to sail the *Fean* through Smith Sound,

Since Sverdrup intendet to sait the *Fram* intogene intendent is it was with to Peary that he should get there first. The meddent is worth recording as an illustration of the rivalnes, the suspicions, and jealousies which obsessed the minds of some of the exery professional, and independent kind in their over oblight exploring and independent kind in their over whelming ambition to achieve personal fame and fortune through polar exploration. As it happened both Peary and Sverdrup were the fram, while we for the winter south of the Bache Pennsula. The following spring, to save further embar rassing complications, Sverdrup switched his plans and returd into jones Sound where the *Fram* patient is plans and returd land and in the spring not only was this long and deeply indented coast—King Occar Land—mapped by Sverdrup is second in command Gunar Itashesn with an accuracy seldom excelled on such recontasisnee exploration, but in the coarse of numerous long idedging journeys new lands were sens still further west.

In preparation for a fresh and extensive campaign, the Fram was then moved up to the head of Jones Sound for a third winter and in the spring Axel Heiberg Island, Isachsen Island, Amund and Ellef Ruppes Islands (so called after the brewers who sup and Ellef Ruppes Islands (so called after the brewers who sup ported the expedition) were mapped and their geology and natural history studied These, known as the Sverdrup Islands, and the mountains and bays of King Oscar Land were discoveries which in their extent can only be compared with the discoveries made during the widespread manoeuvres of the Franklin Search To have accomplished so much with a single ship, to have margated her through such a mare of channels swept by violent and contary currents, constantly imperilled by ice, to have brought ship and crew—in common only with Sr John Rois—safely through four consecutive polar winters, these were achievements which marked Sverdrup as an outstanding leader and the greatest uce pilot of his day

Otto Sverdrup returned to Norway in 1902 A year later Roald Amundsen embarked on an Arctic voyage Amundsen like Peary was a professional explorer, a man for whom exploration was not an interlude, or a pastime, or an opportunity for research, but a profession which he had preferred to medicine as a career. Shrewd, far-sighted, methodical (in all except financial matters), he prepared himself with considerable care. He learnt semanship in a siling vessel. He learnt something of the technique of scientific exploration with de Gerlache's Belgian expedition of 1897, the first to winter in the Antarctic. And since magnetic studies seemed likely, from the point of view of grant-giving organizations, to be an essential adjunct to the project he had immediately in mind, namely the navigation of the North-West Passage, he studied terrestrial magnetismat Hamburg.

A quarter of a century had elapsed since the last attempt on the North-West Passage. In 1875 Allen Young, following McClintock's recommended route down Peel Sound, had been stopped by ice near the entrance to Bellot Strait (see map, facing p. 86). In the following year he tried again but was diverted by the Admiralty (on the Insistence of the Royal Geographical Society) follow the route taken by Allen Young and because the North-West Passage itself aroused little interest, planned to combine with this voyage a year's magnetic observations in the vicinity of the North Magnetic Pole.

The North Magnetic Pole. At midnight on 16th June 1903 Amundsen's ship the Gjøa, of 100 tons burden, cutter-rigged and equipped with an auxiliary motor, slipped out of Christiania Harbour; sccretly it was said, Amundsen was then only twenty-nine. By August, Beechey Island (where Franklin bad spent his first winter) was reached and Amundsen made good progress down Peel Sound. The critical moment came when the Gjøa neared the De la Rouquete lands where Allen Young's yacht the Pandore had been stopped. But this time there was no massive barrier of ice, and as Amundsen in anxiety paced the narrow deck, he felt an irregular lurching motion of the ship, imperceptible at first, then as he wated for it, becoming more and more distinct. 'I would not have sold this slight motion for any amount of money', he confessed. 'It was a swell under the boat—a message from the open sea. The water to the south was open.' After fogs and gales and snowstorms in Franklin Strait and Rae Strait, the Gas reached fair weather and smooth water to the south east of King William Island and there in a small harbour, Gos Haven, excellently situated for Wirk the magnetic observer, in relation to the Magnetic Pole, Amundsen spent two winters, nuncteen months and IF or Amundsen, Amundsen of the Antarctic, the man destined to be first at the South Pole, these months, sledging along the east coast of Victoria Island, learning from the Eskimos their technique of travel, and most important for his future polar purneys, their methods of feeding and handling dogs, were months of priceless experience At the end of July 1905, the Gas sailed and by August was in

At the end of July 1905, the Goas saled and by August work the waters of Cambridge Bay reached by Collinson from the west in his much larger ship the *Enterprise* in 1852 August 7th, the dy the Goa's anchor dropped in the shallows west of Cape Collowine was, wrote Amundten, 's significant day in the history of our Expedition-for we had saled the Goa' through the latherto unsolved link in the North West Passage' After a third winter at King Point, north of the mouth of the MacKenzie River (where Wirk died) the Goa saled in 1906 into the Pacific Geean Careful plinning, great determination, luck, most of all perhaps the wise selection of so small a ship, had enabled Amundsen to achieve the first of his polar ambunons, the navigation of the North West Passage

These great Norwegan voyages belong like those of Norden skold and Nansen to an era of Scandmavan exploraton com parable with that of the Viking Age. One other and leaser Scandinavan venture, moreover, of the closing years of the nuneteenth century is worth recalling because it introduced a new technologue nto polar exploration. This was the attempt by the Swedsh technologust Salorom August Andree to reach the Pole by balloon. Andree, a zalous social reformer, a man who saw in technology the only means whereby the new das coveries of science could be properly applied for the betterment of mankind, was a typical product of the liberal tendencies which accompanied the remarkable industrial and technological ad accompanied the remarkable industrial and technological the Eagle, the instrument by means of which the mysteries of the polar basin were to be revealed by methods less arduous than for an hour or so, then the wind rose again from the east and they travelled westwards into an key fog and threw out knives, ropes, an anchor, scientific instruments, anything to gain height Even so, the *Engle's* car began to lit the ice, and continued bumping, rusing, falling, bumping, so incessantly that they could get no rest and were forced to descend and anchor to an ice floe for twelve hours or so. Then they were off again But almost the envelope, and a fine drazele forze on the clouds, ice began to coat of the journey in twenty one hours they made two hundred and thirty kilometres but were only eighty kilometres north north east from ther last starting point. On 14th July, though they were sailing high at the time. Andree for some unknown reason brought the balloon down and anchored to the ice. It was the last flight of the *Engle*.

Then began the long march over the sea ice by three men who were probably less well equipped to counter the ferocious advance of an Arctic winter than any in polar history They had three choices of destination Cape Flora on Franz Josef Land where Frederick Jackson of the Jackson Harmsworth Expedition had left supplies, the Seven Islands off Nordaustland, or Mosselbukta They chose the first though it was twice as far away and spent twelve days marching to the south east, making little headway against the contrary drift of the ice of which Andrée seems to have had little knowledge. Andree then turned towards the Seven Islands But still the drift was against him Eventually, after journeying at an average speed of three miles a day, they reached White Island (Kirtoya) all utterly exhausted It was then 17th September and White Island was the first land they had seen since 11th July 'Our provisions', wrote Andree in his diary, 'must soon and richly be supplemented, if we are to have any prospect of being able to hold out for a time' By the middle of October all three men had died and thirty three years later their remains, their logs, their journals, Strindberg's daily shorthand letters to his fiancée, and a number of rolls of film subsequently developed with great skill by Swedish experts, were found by a Norwegan scaler

were tound by a Norwegan searer In Sweden the news of the fate of Andree and his companions assumed the proportions of a national tragedy, beightened as it was by the appearance in the printed films of the three men who had been the victims of this Arctic tragedy thirty years before. Though courageous, this first attempt to fly to the Pole was a premature and ill-planned adventure. 'Many people', Nansen told the Royal Geographical Society in 1892, 'think that the North Pole can be reached by balloons or balloon ships, and that it will be so reached one day. I do not deny the possibility of this; on the contrary I repard it as very probable. ..... Nordenskiöld who had been contemplating the use of captive balloons (a very different proposition) to reconnoitre above the pack ice of the Arctic went further and declared of Andrée's project, 'It is a long time since I embraced a proposal for a polar expedition with such enthusiasm'. This lavish expression of confidence by so experienced an Arctic explorer is astonishing. Andrée admittedly had been experimenting with balloon navigation ever since his first meeting with the American balloonist Wise in 1876 when he discussed the possibilities of using the trade winds for long ballooning journeys. But his earlier flights though numerous had all been brief. His steering equipment was rudimentary, its principles falsely based. His calculations of speed and course, on the evidence of his diaries, were wildly unreliable. His lack of precautions too against a forced landing, especially as regards clothing, contrast inexplicably with his forebodings at the start of the Eagle's journey. Nevertheless in this first use of flight, in the stress moreover which Andrée laid on the future importance of air photography and mapping from the air-these ranked high among the motives of his expedition-the voyage of the Eagle has its place in polar history. Ill-fated though it was, it foreshadowed the birth in the twentieth century of the air age in polar exploration.

## XVII

## The Turn of the Century: The Revival of Antarctic Exploration

HE massive and exhaustive operations of the Franklin Search, the further explorations, British and American, springing from it, and the subsequent brilliant sequence of Scandinavian discoveries in the Arctic did not wholly divert attention from Antarctica An early, indeed the earliest, pro tagonist of the resumption of Antarctic exploration in the second half of the nucleon of Amartic exploration in the exploration in the balf of the nucleon tentury was an American, Captan Matthew Fortaine Maury, Superintendent of the Hydrographic Branch of the United States Navy and the occasion was a meeting of the Royal Geographical Society on 26th November 1860 when Maury read a paper, "The Physical Geography of the Sea, in connection with the Antarctic Regions' Concluding his address, Numer the device of the Sea and Sea address and the sea and sea address and the sea address address and the sea address add Maury, who had earlier promulgated a scheme for international co operation in meteorology, pleaded in similar terms for a resumption of international effort in Antarctica In this, he urged, Britain through the medium of the Royal Geographical Society should take the lead

Maury in his determination to stir his audience into action used powerful and forthright language In the Arctic, great strides had been made, but for the last twenty years, he declared, neither France nor England nor Russia nor for that matter the United States had done anything to advance Antarctic exploration though inner Antarctica was 'as little known as the interior of the moon The reproach was greatest in England's case Did not the Antarctic continent now lie within eight or ten days' steaming of the nearest British possessions? Should it then, he asked, be any great matter to seek out a winter harbour for one or two vessels, and to explore from there by boat or over the ice? The Antarctic indeed lay at Britain's door But if the British, Maury declared, 'made not haste to undertake the duty, it might be that the go-ahead American nation would yet be before them'.

Maury's eloquent allusions to Britain's duty to posterity, and to the last great British Antarctic explorer James Clark Ross, drew only a chilly response. Captain Washington, former secretary of the Royal Geographical Society who had become Hydrographer of the Navy, pointed out that Englishmen, Russians and Frenchmen had done more to explore Antarctica than the United States and he demanded 'whether it might not rest with the United States to take up the question and to send out an expedition . . .?' Maury, in reply, however, would commit himself no further than 'to give fair warning that if England did not undertake these explorations, the Americans would show the way'. As it happened neither the United States nor Britain, as Washington admitted, seemed likely to be in any position to indulge in Antarctic exploration. The United States, as Maury spoke, was on the eve of a sanguinary and debilitating Civil War and in any event her government was still too hotly involved in congressional battles with Charles Wilkes to take kindly to any fresh projects for American exploration in the Antarctic. In Britain the prospect was no more hopeful. Lord Ashburton, the President of the Royal Geographical Society, closing the discussion after Maury's paper, expressed the hope that 'the Government would undertake the proposed exploration of the Antarctic Seas which would be as much for the general benefit of mankind as it was for the glory of this country'. But he knew very well since his own society had for the past ten years been the centre of a vigorous and relentless pressure on the Government to provide funds for the Franklin Search, that after such heavy expenditure on exploration, fresh projects would be regarded with the utmost disfavour.

Nevertheless over the years Mauy's plea, echoed in German ruber than in international terms by Dr Georg Neumayer, Director of the Matine Observatory at Hanhurg, had its effect. Ten years after Mauy's visit to England, a great project of exploratory research was initiated by the Royal Society and the Admiralty in the very field of study, the physical geography and biology of the Antarctic seas, upon which Mauy had addressed the Royal Geographical Society. This project, the Challenger occanographical expedition was, however, exclusively concerned with mantime exploration. The land explorations 'over the ice', conducted from a winter anchorage as Maury proposed, were to wait until the turn of the century

were to wait until the turn of the century. The Antarctic 'as fir as the neighbourhood of the Great lee Barrier' was included in the *challenger* expedition's almost global programme of maritime research and exploration in deference to the deep sea soundings and dredgings by Sir James Clark Ross which had laid the foundations of Antarctic oceano graphy But these polar investigations represented only a small fraction of the work to be done and it was not until February 1874, two years and two months after her departure from England, that H M S Challenger crossed the Antarctic Circle in approximately 78° 22' E, opposite that part of Antarctic 3.

The Challenger, a wooden corvette of over two thousand tom and the first steam vessel to cross the Antarctic Circle, steered esst and north east, skriting the floating pack, and made soundings and dredgings as far almost as the charted position of Wilker's (doubtful) Termination Land 'No sign of the coast was seen and by March the Chollenger's Antarctic explorations were work and her commander, Captain George Nares, R N, turned towards Englind and, as we have seen, to fresh adventures in the Arctic The civilian staff, meanwhile, under the direction of Professor C Wayille Thomson of Edinourful Innversity, furned to the ggantic task of working up and publishing (in fifty volumes) the massive accumulation of observations

The responsibility for this great work fell before long upon a young Canadan of Scottish origin, John Murray, who had been engaged as biologist for the voyage But so enormous was the task of sitting, analysis and interpretation that twenty years passed before he was able at a meeting of the Royal Geographical Society in November 1893 to give some account of the Challenger's Antarctic findings

It is a curious fact that the *Challenger* expedition which never to uched, which indeed never saw, the Antarctic coastline was the first to demonstrate beyond reasonable doubt the existence of an Antarctic continent. The sequence of the ingenious argument which led John Murray finally to this conclusion is herefore worth recalling. On more than one occasion during the second quarter of the nineteenth century icebergs had been observed drifting northwards with rocks embedded in them. One had been seen by John Balleny in latitude 61° S. and the ever alert and inquisitive Charles Enderby had drawn Charles Darwin's attention to it. Darwin argued that since the iceberg had been sighted at least 450 miles from Balleny's admittedly doubtful discovery of Sabrina Land and since both Balleny and before him Cook had sailed some way south of that point without encountering land, the iceberg in question must have drifted northwards at least a hundred miles. The rock embedded in it, moreover, must similarly have travelled at least that distance from its parent source and since it was deeply embedded it had probably travelled a good deal further north before melting caused it to drop into the ocean or to be deposited on some distant shore. The boatswain of H.M.S. Beogle had already told Darwin of a similar rock-carrying iceberg which he had seen on a sealing voyage to the east of the South Shetlands. Furthermore, Dumont d'Urville, the French Antarctic explorer, had been told of the discovery of 'erratic boulders', probably dropped from (cebergs, which had been found in 1830 by the naturalist of an American expedition on the shores of the same volcanic islands. On the basis of these facts and taking into account the large number of icebergs which had been observed in recent years drifting northwards as far even as 35° to 40° S., Darwin concluded that if 'but one iceberg in a thousand, or in ten thousand, transports its fragment, the bottom of the Antarctic Sea, and the Shores of its islands, must already be scattered with masses of foreign rock -the counterpart of the 'erratic boulders' of the northern hemisphere'.

It was soon evident that the dredging up of such rocks might provide valuable clues to the geological nature of Antarctic land and this the *Challenger* expedition proved to be the case. In the central parts of the great ocean basins only rocks of volcanic origin were dredged up. But in high latitudes in the South Atlantic and in the Central Pacific, just beyond the limit to which Antarctic icebergs had been seen to drift, fragments of continental rock, granite and quartz, were found and as the *Challenger* approached the Antarctic Circle, rocks of similar orgin-granites, diorites, schists, quartzites, sandstones and limestones-increased in number until at the most southerly junits reached they made up the bulk of the deposits Further evidence that these rocks had organited from some great southern continential land mass was provided by the discovery of a mineral, glauconite, in the blue muds of the Southerm Occan Glauconite, it was known, was generally found in the muds along continential shores in association with the debrus of continental nocks

oi continential rocks Recaptulating these arguments, Murray, on a foggy November Recaptulating these arguments, Murray, on a foggy November Geographical Society how the existence of an Antarctic continent could be deduced from the rocks dredged up by the *Challager* expedition But, he continued, the argument could be carried further than that, for not only the nature but also the size of the Antarctic land mass could be deduced, in the latter case from the knowledge of the depths of the surrounding ocean He then proceeded to show by means of an outline map (which remained without amendment for a good many year) the probable position and extent of Antarctica and to present his audience with a remarkable word picture of the continent, derived from all the evidence then available

Facus one ocean, Murray postulated, were volcanic mountain ranges, facing others, lower hulls and aweeping lowland plans while over most of the continent there lay a heavy and perpetual cap of ice and anow, the inner nucleus of rock being revealed only in adjacent islands and in mountain ranges fringing the coast From the central highlands, ice and snow descended and accumulated in undulating fields and plans and terminated ultimately in one vast glacer which projected over the low lands into the ocean and formed the flat topped ice cliffs with perpendicular walls which Wilkes and Dumont d'Urville and Biscot had seen When the forefront of this great creeping glacer projected mi sufficient depth large blocks of ice broke off to form the wandering icebergs of the Southern Ocean These, often some first in length, floating sometimes a hundred to two hundred feet above the surface of the sea, would collide, their fragments and with accumulations of snow to form the pack which had for generations filled with alarm the hearts of Antarctic mariners. Murray completed his ingenious and realistic picture of Antarctica with a vivid description of the life and journeyings of the the first to discern. 'Waves dash against the vertical faces of the floating ice-islands as against a rocky shore, so that at the sealevel they are first cut into ledges and gullies, and then into caves and caverns of the most heavenly blue from out of which comes the resounding roar of the ocean and into which the snow-white and other pertels may be seen to wing their way through guards of soldier-like penguins stationed at the entrances. As these iceislands are slowly diffied by wind and current to the north, they tilt, turn, and sometimes capsize, and then submerged pronge and spits are thrown high into the air, producing irregular pinnacled bergs higher possibly than the original table-shaped mass. As decay proceeds, the imprisoned boulders, stons and earth are deposited over the ocean's floor as far as sub-tropical regions.'

Murray did not confine his portrait of Antarctica to a description of land and ice. He talked also of the meteorology of Antarctica, of the zone of permanently high pressure which lay above the continent; he described how, deep below the cold waters of the Antarctic Ocean, were warmer waters which flowed southwards as the colder surface waters drifted north; and he spoke of the great profusion of animal and vegetable life which the *Challenger* Expedition had found in Antarctic seas, especially in the deepest waters above the ocean floor. From these depths they dredged up animals which could be recognized as descendants of those which once occupied the shallower waters washing the shores of a great continent.

Murray concluded his masterly reconstruction with a ferrent appeal to his audience that, in the interests of science, Antarctic exploration be at once resumed so that the first landings could be made on the mainland. Little progress indeed had been made in this direction since the American Maury, in 1860, had so blundy urged upon the Birtish the task, indeed the obligation, to carry forward the great discoveries of Ross. In 1873–1874 a sealing and reconnaissance expedition under Captain Edward Dallmann, the first German expedition to the Antarctic, made some minor discoveries in the vienity of Graham Land In 1880 Licutenant Bove of the Italian Nary produced an abortive scheme for a two year expedition to Antaretica which was to form part of the First Polar Year Five years later the British Association set up a commuttee, which included in addition to the Arctic admirals, fismous scientists like Sir William Thomson (Lord Alevin) and Professor Huxley This drew attention to the selentific importance of Antarctic exploration, its members discussed and argued But nothing happened

In the end it was use whalers, British and Norwegian, and not the scientists who give the first boost to Antarctic exploration by the last decade of the nuneteenth century, the Greenland whale fishernes had reached their lowest ebb, for the Greenland whale fishernes had reached their lowest ebb, for the Greenland whale in the workshow of right "whale—had by then almost disappeared Remembering Ross's claims to have seen the 'nght' whale' in the Antarctie, a Dundee whaling firm in 1892 sent four whalers into this region and sent with them—largely on the advice of Leigh Smith, the explorer of Franz Josef Land—two naturalist (one, William Spiers Bruce, was to achieve eminente as an Antarctic explorer) equipped with instruments loaned by the Royal Geographical Society. The vogace, principally in the Weiddell Sea, was profitles for Ross's 'nght whale' was never found and the naturalists were given little chance to do scientific work. Neverthelets, the effort was not enturely wasted, for in the Gollowing year a Norwegian expedition under the same Captain C A Larsen who had landed Names on the east coast of Greenland for his ice sheet crossing was encouraged to make a voyage to the South Orkneys and Weddell Sea, and this in turn led to the first important step in the advance of Antarctic exploration

When Larsen returned to Norway in July 1893 he gave an account of his voyage to old Commander Foyn, the doyen of the Norwegian whaling industry, a Norwegian Charles Enderby, who was an enthusiastic supporter of exploration and was greatly interested in Larsen's account of his voyage in little known Antarctic seas When, therefore, soon alter he had seen Larsen, Foyn was approached by a young Norwegian, H J Bull, who had failed to arouse enthusiasm for Antarctic whaling in Australia, with a request that he should back a whaling and exploring voyage to the Ross Sea, Foyn was sympathetic. The result was that in September 1893 the whaling ship Antaercic sailed from Norway under the command of Captain Leonard Kristensen, with H. J. Bull on board. Among the crew of the Antaercic was a remarkable young Norwegian C. E. Borchgrevink who had been teaching languages and natural science in Australian schools. He was passionate about exploration and in him Bull found a fellow enthusiast. It was probably due to their joint insistence that the first landing was made on the coast of Victoria Land, a coast which had not been visited since the days of Sir James Clark Ross.

The landing was made on 24th January 1895 near Cape Adare. 'The sensation', wrote Bull, 'of being the first men who had set foot on the real Antarctic mainhand was both strange and pleasurable, although Mr Foyn would no doubt have preferred to exchange this pleasing sensation on our part for a right whale, even of small dimensions.' To commemorate the landing a pole was erected carrying a box painted with the Norwegian Ike, Penguins were snatched, screaming and struggling, from a local colony for the naturalists at home; specimens of rock were collected for the geologists; and specimens of lichens and seaweed were brought on board in triumphant refutation of Ross's statments about the absence of vegetation in Antarctica. But vegetable life was the only sign of life they saw. On the sea-shore, as Bull and Borchgrevink left, there lay two dead seals, their skins hairless, smooth and hard, preserved by the freezing air. Surely this, Bull thought, was proof that no hand marmals could exist, for how could they have overlooked so luscious a meal?

The conclusions which the Norwegians drew from this first landing confirmed all the American Maury's expectations of nearly forty years before. 'During our exploration ashore', they wrote, 'we got a strong impression that the bay at Cape Adare inside the low promontory would provide many advantages as a landing place and station for a new expedition. It is probable, at least, that a vessel moored inside this promontory would lie protected against the outer floes as well as against the ice forming in the bay itself ... among the rocks of Cape Adare, a shelter could be found for a house, and the low promontory would furnish plenty of space for moving about, for an observatory, etc. ... and if by ill luck the relief party did not succeed in fetching away the explorers during the second season, the penguin colony would afford an inexhaustible larder and stock of fuel ' In the mind of one member of the crew of the *Assarctice*, Carl Borchgrevink, there had already formed a determination to put these possibilities to test

While the Antarctic, southward bound, was lurching through heavy seas, there arose in the calm surroundings of the Royal Geographical Society a heated discussion about the revival of British Antarctic exploration This took place in 1893 after John Murray's eloquent and persuasive address on the discoveries of the Challenger expedition and during it various proposals and plans were put forward, the most far sighted (if one looks ahead to the encumnavigations of the United States Navy in the nineteen-forties) being those advanced by old Sir Joseph Hooker who half a century earlier had been with James Clark Ross in Erebus Hooker proposed an expedition of two ships which would sail clockwise and anti clockwise round the continent, charting the position of the pack, looking for 'water sky' or open water beyond it, and for possible avenues through the encircling ice A year spent in such general exploration, he argued, would reveal the points at which a full scale attack could most profitably be launched After such matters of strategy had been debated, Murray revealed that he had personally been in communication with geographers and scientists all over the world All, he declared, and none more so than his colleague the learned and prolific Dr Neumayer of the Marine Observatory, Hamburg, had enthusiastically acclaimed his suggestion that a great scientific expedition to the Antarctic be launched from Britain forthwith

John Murray had not been alone in his efforts to recruit support for such a British enterprise for his Chairman, the President of the Society, Clements Markham, had also written a great number of letters, to learned societies, to influential men throughout the world and in particular to the Governments of Austrilia and New Zealand He had moreover already set to work a committee of the Society to thrash out the best methods of renewing Anarctic exploration

Markham's part in the Antarctic revival at the end of the nineteenth and early in the twentieth century is comparable with that played by the Society's earlier president John Barrow in promoting the revival of Arctic exploration after Waterloo. His name, no less indeed than that of his personal protégé and chosen leader Robert Falcon Scott, is indissolubly joined with the first great land explorations of the continent and so influential were his interventions, so massive and dominating his role, that some slight sketch of his career and personality is necessary for the understanding of this second great phase of Antarctic history.

Markham was born in 1830, four days after the foundation of the Society whose destinies, as an honorary secretary and as president, he was to govern in unchallenged supremary for many years. Leaving school at an early age he joined the Navy and served as a midshipman in H.M.S. Asitsmace during the Franklin Search. It was an experience which like Barrow's boyhood voyage on a Greenland whaler inspired a lifelong enthuliarm for polar exploration and delicious memories of those carly glorious days lingered with him all his life. Indeed when in later years he began to devote his great energies to the organization of polar affairs it was to the days of Franklin and the Search expeditions affairs it was to the days of Franklin and the Search expeditions that he looked wistfully back, days when ships under bullowing sail manned by men who were the pride of the Queen's Navy braved, like their forebears of Elizabethan times, the perils of the polar seas. It was in keeping with his veneration for the old naval tradition in polar exploration that Markham should have been the sturdiest supporter of Nares' Arctic expedition in 1875.

Markham resigned from the Navy at the age of twenty-one and after some adventurous wanderings among the lnear rules of Peru became a clerk in the India Office. He achieved some distinction later by leading an expedition to Peru which culminated in the transport of cinchona plants to India and the establishment there of a flourishing quinine industry. Soon after his return Clements Markham was elected an honorary officer of the Royal Geographical Society and with one year of absence in 1868 when he served as geographer and geologist to Lord Napier's Abyssinian Expeditionary Force he served the Society as honorary secretary and finally as president until 1905. In the varied business of the Society Markham found a congenial outlet for his ambitions, his enthusiasm and his formidable energy. An astute committee man, a skilled exponent of all those complicated tuctics and subtle manoeuvres whereby a resolute man with time and patience can gradually gather into his hands the reins of power, Markham and the Society soon became virtually synonymous Though there were doubtless some, easualtes along the line of his forward march to higher office, who found him dominating, even ruthless, it was probably no bad thing that the Society should have been ruled by so matterful a president at a time when through it the nation was involved in many great projects of exploration. In all these projects, in Africa, in Australia, and in the Arctic an the form of the Narse expedition, Markham played a powerful though sometimes an invisible part. However, with Namen's revelation of the true nature of the polar basin, the Arctic (which had in any cvent become largely a Scandinavan preserve) lost some of its attraction. Towards the turn of the contury, therefore, Markham hike Murray and Neumayer, decided to devote himself to the reweal of exploration in Antarctica, almost untouched ance James Clark Ross and still the greatest unknown region of the workl

Markham's attitude towards Antarctic exploration, however, was very different from that of the scientist Murray Markham was inspired by the romance of exploration, as he was inspired by the romance of history, and of heraldry. For him, Antarctica provided the stage for epic adventures, for episodes of personal heroism and of national achievement no less glorious than those of Elizabethan and earlier times which he himself had chroniced in flambogant prose and with small regard for accuracy in several imposing volumes. In the forefront of this pagent of Antarctic endeavour there was always the vision of the fighting shape of the Royal Nay and of a splendid remaissance of British naval activity. This he was resolved must be the first result of the new efforts

An excellent opportunity to launch a world wide appeal on behalf of Antarctic exploration came to Markham in 1895 when in his sixty sixth year he presided over the meetings in London of the sixth laternational Geographical Congress During these, Dr Neumayer of Hamburg read a paper on the past and future of Antarctic exploration, while John Murray and Sir Joseph Hooker gave strong support from the scientific point of view As the Congress progressed, enthusiam in favour of a new Antarctic expedition mounted But the highlight of the proceed ings was provided by the young Norwegian C. E. Borchgrevink who, having failed to persuade the Royal Geographical Society to pay his fare from Australia, had succeeded in raising funds for his passage so that he might describe to the Congress his landing at Cape Adare. Borchgrevink's announcement that he had discovered living plants on the coast of Victoria Land raised considerable excitement and altogether his youthful rest and passionate enthusiam made a great impression especially on Neumayer, Hooker and Murray. To them Borchgrevink disclosed his plans for a new expedition which would attempt the first wintering on the mainland.

The elimax of these international deliberations took the form of a unanimous resolution addressed to the world. 'The exploration of the Antarctic Regions', the Congress declared, 'is the greatest piece of geographical exploration still to be undertaken.' And it demanded that 'in view of the additions to knowledge in almost every branch of science which would result from such a scientific exploration the Congress recommends that the scientific societies throughout the world should urge in whatever way seems to them most effective, that this work should be undertaken before the close of the century'.

Armed with this impressive testimony of international support Markham for two years bombarded the Treasury and Admirally with requests for funds to launch an Antarcite expedition manned by officers and men of the British Navy, But to no avail. In 1897 therefore he turned with undiminished vigour upon the Council of his own Society and persuaded them with all the power and eloquence at his command that funds must be made available from the Society's own modest resources to launch an expedition on their own. A relatively large sum, L5,000, was voted and it was agreed that a public appeal should be made for further support.

No time could have scened more favourable, no moment more propitous, for such an appeal to the people of Britain on behalf of a great national pioneering venture. The eighteennineties was a renascent period, marked by a great quickening of imagination. It was an era of hope and of action. It was characterized also, perfuse because of that growing sense of personal constriction which seems so eithet to accompany rapid industrial expansion and technological advance, by a hunger for vicarious sensation, for romance by proxy, tastes which were stimulated, exploited and fulfilled by writers of current fiction and above all by the mass pournalism of the new 'Yellow Press'

stimulated, explorted and fulfilled by writers of current fiction and above all by the mass journalism of the new 'Yellow Press' In literature these psychological needs were met by the works, for example, of Ruler Haggard, of Robert Louis Stevenson, of Josph Corrad, by the new romances of science of H G Wells, and, most of all, by the writings of Rudyard Kipling whose panegyrics of the Brituh pioneer pitting himmel against harbars nature or against barbarsm at the ends of the earth recalled to those then suffering from an overdose of *fin de nacle* the refreshing spirit of Elizabelind adys. More important, however, and especially so in the development of exploration, was the way in which this and popular newspapers like the Daily Meil These, because of a nation wide circulation never before attempted or achieved, could now bring romance to an increasingly industrialized and urbanized land, a land where in the mineties, with the first eleteric trans, tubes and motor cars, the suburban apravi begin

The year 1897 in which Markham launched his public appeal was also notably augencious. It was the year of the Diamond Jublice, and all London was ablaze with pagentry in trumphant eclebration of the greatest of all British adventures, the adventure of Empire, symbolized in the person of the Queen. Nevertheless, despite these augencious circumstances, Markham's appeal made little headway. Not even among Colonial premiers attending the First Colonial Conference could be arouse more than a formal interest though, as he did not fail to remind them, it was to just such voyages of exploration and discovery that they oved the territories which they represented. Abroad, however, and in England too in another direction, the aguitations of the International Congress bore fruit. In Germany plans for an Antarctic expedition guined considerable support. In Belgun, an expedition promoted by a young leutenant in the Belgun Nayy, Adiren de Gerlache, suled from Antwerp in 1897. And in that of finuless and dishearteming effort in a strange city, found a patron for his Antarctic project in the person of the wealthy maguine proprietor Sir George Newnes The Belgian expedition, a parsimonious affair meagrely supported by the Belgian Government and the Belgian Geographical Society and made possible only by a generous donation from Madame Osterreith whose beneficence gained her the title of 'Mere de l'Antarctique', sailed in the Belgics, a Norwegian sealer of 250 tons. Among the sailors and scientists there was Roald Amundsen as first mate; an American surgeon and anthropologist Dr Frederick Cook who had joined on failing to promote an American Antarctic expedition; and (among the scientists) a Roumanian and two Poles. Reaching the South Shetlands early in 1898 de Gerlaches ailed southwards to the Palmer Archipelago and in the course of some twenty landings carried out important geological and zoological investigations and made the first accurate surveys of the region.

In February the  $B^{2}_{gleca}$  steamed further south along the coast of Graham Land towards Bellingshausen's Alexander I Land. Twenty miles of Impassible pack-ice bounded the coast and it was already late in the season but de Gerlache pushed on until early in March, in 71° 30'S, juit as he tried to turn back to the north, the Belgizo was beset. In May the long night began and the first winter to be endured by explorers in the Antarctic. On the fifteenth the sun set at noon and disappeared for seventy days and only the fittul brilliance of the moon or the occasional glow of the Aurora Australis flooding over the dismal frozen scene lightened the dejected spirits of the inexperienced men of the Belgizo.

Åmidst the restless grinding of the floes, churned into violent motion by frequent storms, the winter passed and in July daylight returned. But it was another six months before the ice relaxed its grip on the *Belgics* and then only by blasting and saving through pack ten feet thick could the ship be released for ber homeward voyage in the spring of 1899. Considering how inadequate were its resources the de Gerlache expedition was a remarkable success, for apart from valuable work in the Palmer Archipelago, it had, due to its unsought sojourn in the ice, been able to carry out a longer series of continuous scientific observations in the Antarctic than had ever been achieved before.

To Markham whose own project for a National Antarctic Expedition under the aegis of the Royal Geographical Society industrial expansion and technological advance, by a hunger for vicarious sensation, for romance by proxy, tastes which were stimulated, exploited and fulfilled by writers of current fiction

sumulated, exploited and fulfilled by writers of current fiction and above all by the mass journalism of the new 'Yellow Press' In literature these psychological needs were met by the works, for example, of Rider Haggard, of Robert Louis Stevenson, of Joseph Conrad, by the new romances of science of H G Wells, and, most of all, by the writings of Rudyard Kipling whose panegyrics of the British pioneer pitting himself against nature or against barbarism at the ends of the earth recalled to those them suffering from an overdose of fin de siecle the refreshing spirit of Elizabethan days More important, however, and especially so in the development of exploration, was the way in which this hunger for vicarious sensation was catered for by the new cheap and popular newspapers like the Daily Mail These, because of a nation wide circulation never before attempted or achieved, could now bring romance to an increasingly industrialized and urbanized land, a land where in the nineties, with the first electric trams, tubes and motor cars, the suburban sprawl began

The year 1897 in which Markham launched his public appeal was also notably auspicious. It was the year of the Diamond Jubilee, and all London was ablaze with pageantry in triumphant celebration of the greatest of all British adventures, the adventure of Empire, symbolized in the person of the Queen Nevertheless, despite these auspicious circumstances, Markham's appeal made little headway Not even among Colonial premiers attending the First Colonial Conference could he arouse more than a formal interest though, as he did not fail to remind them, it was to just such voyages of exploration and discovery that they owed the territories which they represented Abroad, however, and in England too in another direction, the agitations of the Inter national Congress bore fruit in Germany plans for an Antarctic expedition gained considerable support in Belgium, an expedition promoted by a young lieutenant in the Belgian Navy, Adrien de Gerlache, sailed from Antwerp in 1897 And in that same year the young Norwegian C E Borchgrevink, after months of fruitless and disheartening effort in a strange city, found a patron for his Antarctic project in the person of the wealthy magazine proprietor Sir George Newnes

And the expedition for the first time in Antarctic history carried dog-teams in charge of two Finnish Lapps.

On 14th January 1899, just as the black pools between the ice floes were turning to blood red under the spreading rays of sunrise, the Southern Cross came within sight of the Balleny Islands. Ten days later they were in the thick of the pack with the ship groaning under an ice pressure so intense that Borchgrevink decided to turn back to the north and try again further to the east. It was a successful manocuvre. Open water was reached in latitude 70° S, and longitude 174° E, and by 17th February they were in Robertson Bay, off Cape Adare, where Borchgrevink had landed from the Antarctic in 1894, Looking up once again at the dark rocks of the Cape named by Sir James Clark Ross, Borchgrevink was deeply conscious that this was a historic moment. 'It was a moment', he wrote, 'which, I believe, will live in the memory of my staff and myself, as we slowly moved towards the low beach whereon man had never attempted to live before. At 11 p.m. for the first time in the world's history, an anchor fell at the last terra incognita on the globe.' But there was a striking difference in the scene from when he had last been there. Now the waters of the Bay were almost free from ice and the rocks of the Cape were dark and bare. Only an occasional ice-block stranded on the narrow pebbly beach reminded him of the frozen landscape he had seen five years before.

By 1st March unloading was completed, the Union Jack presented by His Royal Highness the Duke of York was holsted, and the Southern Core steamed away from Carpy Ridley, the first winter camp on the Antarctic mainland. The building of a wooden hut, roofed with carwas and scal-skins weighted with sacks of coal; the setting up of meteorological and magnetic observatories nearby; these were the first tasks in what is now an established routine. Then, before winter set in, Borchgrevink and Bernacchi climbed 3670 feet to the summit of Cape Adarc.

Like the Belgin expedition best in the pack far to the east, Borchgrevink and his men found their first Anarctic winter a dismal experience. 'During the gradual shortening of the days' Borchgrevink confessed, 'we experienced great depression, as if watching ourselves grow old. We were getting tired of each other's company and began to know every line in each other's edge of the Ice Shell and showed that it had receded thirty miles since Ross's day; the first live insects had been recorded from the mosses and lichens which stained the rocks of Roberton Bay; and a useful series of observations in meteorology and magnetism had been made. More important than these discoveries, however, was the fact that Borchgrevink had shown that wintering on the Antarctic continent was physically possible (Hanson's death having been not from exposure or cold but from Ross's 'Barrier' land journeys into the interior could be made.

Borchgrevink's own reception was not enthusiastic. He was blamed for lack of tact in dealing with his staff; he was blamed for falling to press farther forward into the interior; and his articles in Newnes' magazines describing his adventures in the racy style of the new popular journalism provoked acid comments from esger critics. Nevertheless despite such shortcomings, despite every discouragement, and in the face of the active opposition of the most powerful of polar impressarios, Clements Markham, C. E. Borchgrevink had taken the first steps along the route to the South Pole. Ar even Clements Markham, in happy allusion to the days of the Franklin Search, was compelled to admit, 'hereafter the Continent may be penetrated by sledges on the principles adopted by McClintock, and important discoveries may be made there'. faces the days were now very dark, though the horizon towards the north west was slightly crimison. The darkness and the slence in this solitude weighs beavily on one's mind. The slence roars in one's ears it is centuries of heaped up solitude

For seventy five days, from 15th Mayunti 29th July, they were in darkness and then to deepen the gloom of their imprisonment Nicolal Hanson, the zoologist, died

Spring was beralded by a slow and stately procession of pen guins returning over the ice to summer quarters and then the first explorations began, confined by the mountain walls of Victoria Land to the vicinity of Robertson Bay Excellent chart-ing and mapping was done by Colbeck and two great glaciers were explored and gratefully named by Borchgrerunk after Sir George Newnes and Sir John Murray who had so encouraged hum at the International Geographical Congress But it was not intil 28th January when the Southern Cross returned that they could explore further abroad, to Ross's Coulman Island, across Lady Newnes Bay and further south into the region round Mount Erebus and Mount Terror which Borchgrevink named Newnes Land By the middle of February 1900, with freezing winds coating the Southern Cross with ice, they reached the 'Barrier' and by the middle of the month, at a point about longitude 164° W where the ice eliffs were low above the water, Borchgrevink landed and set out on the first sledging journey across the surface of the Ross Ice Shelf It was a momentous occasion, the first step towards the great explorations by Scott and Shackleton which during the next ten years were to reveal to a fascinated world the grum majesty of inner Antarctica Of this first journey over the ice Borchgrevink, in an address to the Royal Geographical Society, surprisingly gave only a brief and laconic account 'At this place', be stated, 'I effected a landing with sledges, dogs, provisions and instruments, and leaving the vessel with the rest of the expedition in charge of Captain Jensen, I myself, accom panied by Lieutenant Colbeck and the Finn Savio, proceeded southwards, reaching 78' 50' S, the furthest south ever reached by man '

In the summer of 1900 Borchgrevink arrived in England from Australia to present the results of his expedition These were far from negligible Colbeck had made the first reliable chart of the continent was to be determined, its interior deeply probed. The depth of the great ice sheet was to be discovered and the movements and composition of the ice were to be investigated. Observations were to be carried out in meteorology and magnetism, and gravity measurements were to be made. 'All this', Murray had earlier said, 'should be the work of a modern Antarctic expedition. . . .' Although the expedition would be expected to thrust forward into the interior, the South Pole, 'bould not be its goal.' A dash at the South Pole,' Murray declared, 'is not however what I now advocate, nor do I believe that is what British science at the present time desires. It demands rather a steady, continuous, laborious, and systematic exploration of the whole southern region with all the appliances of the modern investigator'.

To Clements Markham, this very sober analysis no doubt sounded a trifle anzemic but it was not here that their principal difference lay. This emerged as they began to discuss the composition of the wintering parties and in particular the leadership of the expedition. Markham favoured a predominantly naval expedition for work both on land and at sea. Murray, however, believed that the wintering parties should largely be composed of civilians who would, under the leadership of a civilian scientist, be entrusted with the scientific work. This division of responsibility between the Navy and civilian scientists had, Murray knew, worked admirably on the *Chollenget* expedition. Why should it not work again? To Markham, however, who had behind him the admirals of the Royal Geographical Society, the mere suggestion that naval mene, even though working on land, should be led by a civilian was anathema. On land as on the sea, he insisted, only to a naval officer could the safety of naval men be entrusted. It was more than a passing difference of opinion. It was a fundamental difference in approach which was soon to lead to an open breach between the two parties to the enterprise.

This, however, was not the only difference between Murray and Markham during their discussions about the organization of the National Antarctic Expedition. Murray maintained that only when funds sufficient to cover the whole cost of the expedition had been assured should any expenditure be incurred. Markham again disagreed. If money to equip one ship could be

## XVIII

## Scott and the Discovery Expedition

Difficult as he found it to adjust his mind to the new scientific approach, 'doctrinaire' though he considered the scientific men to be, Markham was well aware that the most ardent champions of a new Antarctic expedition He therefore decided to ensit their support through the medium of the national academy of science, the Royal Society, which had for generations advised the Government on all scientific matters, and as a first step in this new direction he invited the Royal Society to summon a special meeting to consider the scientific ments of such an enterprise

This meeting, attended by Neumayer, Murray and Sir Joreph Hooker, exceeded all Markham's expectations, so great was the enthusiam, so numerous and varied the proposals for research The support of the Royal Society was assured 11 was now time to discuss operational plans For the Royal Society, John Murray was the obvious spokesman, for the Royal Geographical Society, it could have been none other than Clements Markham humself

At the start all went smoothly enough and Markham agreed broadly with Murray's outline plan. This was for an expedition of two ships which, after landing a wintering party on the shores of Bismarck Strait, Graham Land, would sul for Victoria Land There, in McMurdo Sound, in the shadow of Mount Erebus, the principal base would be established for two Antarctic seasons The ships themselves were not to winter, they would return to pick up both wintering parties in the third season, having spent the interval in refitting and in oceanographical observations

The aims of the expedition, conceived on a grand scale, were to be exploration and research The nature and extent of the technique from the United States and it is interesting to recall in connection with the serialization in his newspapers of articles from the polar regions that in America, James Gordon Bennett, owner and editor of the New York Herald and a member of the Council of the American Geographical Society, had been the first, thirty years before, to provide first-hand accounts of exploration for his readers. These journalistic developments whereby that new phenomenon 'the man in the street' could follow daily the exploits of his countrymen in remote and dangerous regions had a twofold effect on polar exploration. On the one hand, the newspapers came to be in a powerful position to stimulate public interest and support. They were, moreover, able to provide large subscriptions to expeditions in return for exclusive articles. On the other hand, such articles were bound, if they were to satisfy popular demand, to be concerned with adventure rather than with research. For the more scientifically minded promoter or leader of an expedition this was sometimes the source of embarrassment for, valuable though the financial support of the news-papers was, there was the danger that it might compel an excessive emphasis on the adventurous side of exploration, on record making journeys, on dashes to the Poles, rather than on less sensational scientific work. It was, moreover, a danger, or at least a dilemma, which became increasingly acute as not only the newspapers but the film, radio and television moved into the field of polar exploration towards the middle of the twentieth century.

But to turn lack to Clements Markham. With considerable funds now in hand and with the backing of the Royal Society, he once again approached the Tressury and they, impressed perhaps by such evidence of public and scientific support and no doubt by this time more than a little weary from such a continuous and intense bombardment, agreed to contribute £45,000, a sum equal to the total Markham had already collected. For Markham, this was a victory amply descreted and he immediately set about the selection of a ship and a leader. The matter of the ship was quickly settled for the Adminilty were prevailed upon to design a new wooden ship, the steam barque Discovery, and building suarted at once in Dundee. The problem of the leader was a more complicated and a more controversial matter. collected, why, he demanded, should they not go ahead? No doubt there was logic in this argument. If discoveries came up to expectations, public enthusiasm would be aroused, if on the other hand some disaster befell them, was it concervable that the Government would not come to the reseure of a naval and national expedition? Based though it may have been on such practical considerations, Murray found Markham's proposal unpalatable and from that moment he withdrew unobtrusively from further discussion of the arrangements

Unruffied by these sarly distensions Markham pursued his own undeviating way Following the recommendations of the International Geographical Congress, he co-ordinated plans with Professor Erich von Drygalski's German expedition which was preparing to explore to the south of Kerguelen Island and with the organizers of a Swedish expedition destined for the Weddell Sea which was to be led by Otto Nordenskipold, nephew of the conqueror of the North East Passage Then, despite his diagreements with John Nurray, he secured the appointment of a joint Society By 1859 he had succeeded in raising towards the cost of the expedition the sum of 155,000

The Government still showed no signs of willingness to help either with money or with men but Markham's fund was now rapidly and handsomely augmented by gifts from two members of the Royal Geographical Society's Council The first, for £25,000-more than twice the cost of the Belgica expeditioncame from Mr Llewellyn Longstaff, one of those generous benefactors of exploration whom Victorian capitalism had bred The second large subscription came from Alfred Harmsworth, later Lord Northeliffe, who a few years earlier had financed the Jackson-Harmsworth expedition The role of the Press as supporters of exploration has been so considerable in the twentieth century that Alfred Harmsworth, a pioneer in this field as far as Britain is concerned, deserves more than a passing reference in any survey of polar history The founder of the first newspapers with a mass circulation, the Evening News, the Daily Mail and, in 1904, the first illustrated daily newspaper, the Daily Mirror, Harmsworth had brought about no less than a journalistic revolution He had borrowed a good deal of his journalistic flagship of the Channel Fleet. Then in June 1900 he was promoted commander and a month later the post was his.

Scott, establishing at once his own high standards of pro-fessional efficiency, went furiously to work, bent on mastering all aspects of the expedition, including the plans for scientific research. He was by no means without technical and scientific training-the torpedo in which he had specialized was the most modern development of naval science-and in his grasp of scientific matters he showed a remarkable and to some a surprising quickness and ability. The most urgent task however was the selection of the members of the expedition and here those divergencies began to emerge among his employers on the Joint Committee just as they had emerged in the conversations between Markham and Murray. The Joint Committee envisaged only a small naval nucleus but both Markham and Scott would have preferred a predominantly naval expedition. In favour of this there was not only the general advantage voiced by Markham's Special Antarctic Committee (echoing Sir John Barrow) that "apart from the valuable scientific results of an Antarctic expedition, great importance must be attached to the excellent effect that all such undertakings . . . have invariably had on the Navy. . . . . . . . There was Socie's decided preference for a purely naval party. From an early date', he subsequently admitted, 'I had set my mind on obtaining a naval crew. I felt sure that their sense of discipline would be an immense acquisition, and I had grave doubt as to my ability to deal with any other class of men.' In the end three officers of the Royal Navy were appointed, Royds, Skelton and Barne. Then Markan intervened with a new

In the end three officers of the Royal Navy were appointed, Royds, Skelton and Barne. Then Markham intervened with a new proposal. By the 'Navy', Scott mean the 'Royal Navy' but Markham now added two officers of the Merchant Navy, one with previous knowledge of Arctic ice conditions, the other an expert in the handling of sails, a skill still essential in Antarctic conditions, as Markham knew. The first was Lieutenant Albert B. Armitage of the Peninsular and Oriental Line who had been a member of the Peninsular and Oriental Line who had been a member of the Peninsular and Oriental Line who had been therest Henry Shackleton, was a junior officer who had spent much of his roving and adventurous life in sailing ships; he was given a sub-lieutenant's commission in the Royal Naval Reserve. This first appearance of Shackleton on the polar scene is a Markham's own account in his Lands of Silence of how Robert Falcon Scott, then aged twenty eight, came to be chosen reveals for how long he had been brooding over the prospect of a great naval Antarctic expedition 'I had selected', he wrote, 'the fittest commander in my own mind in 1887, when I was on board the Acture in the West indies, the guest of my cousin Commodore Markham When we were at 5t Kitts, March 1, 1887, the licutennis 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 mat and sail, pull down to the starting point, anchor and spread awning agem. The race tried several qualities For a long time it was a close thing between two middhupmen, Robert Falcon Scott and Hyde Farker However, Scott won the race and on the 5th he dined with us He was then eighteen and I was much struck with his instelligence, information, and the charm

Indeed Scott was Markham's beau tdeal of a young British naval officer, closely moulded by the training and discipline of a service to whose traditions he was dedicated with an almost religious fervour When therefore Scott and Markham met by chance in a London street in June 1899, the meeting seemed to Markham providential Here, just as the question of leadership of the Antarctic expedition was about to be decided, was the man of his choice For Scott, itoo, the meeting seemed exceptionally fortunate A young torpedo licutenant, ambitious, on the alert for new opportunities, for new ways of advancement quicker than the routine channels of promotion seemed ever likely to provide, he saw in Markham a suggestion that he should apply for the post not only the chance of achieving rapid professional distinction but a splendid opportunity of enhancing through polar service, as many a British naval officer had done before him, the presing of the Country and the Navy Two days after his meeting with Markham, Scott applied for the post of leader of the National Antarctic Exceedition

Until this meeting Scott had never seen himself as a polar explorer Buthe had ample time for reflection, for a year passed while committees discussed and the Admirally considered his application Meanwhile he returned to his ship, the Mojettie, The Discorey's destination was the Ross Sea where Scott's immediate tasks were to explore the Ice Shelf and to discover the mountainous land eastwarfs of it which James Clark Ross thought he had seen. But Discovery was a slow ship, carrying sails in order to economize in coal, and it was not until 1st January 1902, after visiting Australia and New Zealand, that she reached the pack almost on the Antarctic Circle. Though legally she was a merchant vessel, life on board during the slow outward voyage was governed by strict naval discipline. Ward-room and mess-deck, to Shackleton's amusement, messed apart. No detail affecting the order of the ship or the behaviour of officers and men secaped the stern and meticulous eye of the young commander.

In little more than a week, Disorer was through the pack and off Cape Adare where Borchgrevink had landed. Then came the voyage southwards along the mountainous coast of Victoria Land through drifting ice towards the historic landmark Mount Erebus, proudly displaying her plume of smoke, After a landing there and another at Cape Crozier, Discorery turned eastwards, coasting along the front of the Ross Ice Shell which in height as in depth, as Borchgrevink had found, had greatly diminished since Ross's day. Sailing beyond the limit reached by Ross to about 150° W., Scott saw in the distance the now hare rocks of the mountains which Ross had seen. He called the new territory King Edward VII Land. Dense pack-ice prohibited any close approach so Scott turned westwards again towards the inlet in the ke Shelf ('Discovery Inlet') where Borchgrevink and his dog-teams had landed.

Here, where the lip of the great Ice Shelf was no more than fifteen feet above the level of the sea, Armitage and a sledging party landed. Scott meanwhile prepared for a recommissione by a new and exciting method, reconnaissance from a captive balloon. The Swedish explorer Baron Nordenskiöld had given much thought to the use of captive balloons for reconnaissance in the Arctic but the suggestion that Scott should use one came from old Sir Joseph Hooker. The balloon, a small Army balloon presented by an enthusiastic hady supporter of the expedition, could only take one passenger and Scott, in some treplidation, went up alone on this first Antarctic ascent. 'As I swayed about in what appeared a very inadequate basket', he wrote, 'and curious occasion in that there was thus introduced, through the agency of Scott's own patron, the man who was to become his greatest personal rival in Antarctie exploration

The scientists were the next to be selected Dr Koettlitz who had been, like Armitage, a member of the Jackson-Harmsworth expedition, Dr Edward Wilson, a biologist and a painter and draughtsman of unusual skill, and three other scientists, one of them, the physicit Louis Bernacchu, member of Borchgrennk's Southern Crois expedition, the only man who had ever been to the Antaretic before A naturalist was needed and the post was offered to W S Bruee but he with the support of rich industralists from Paisley was organizing a Scottish National Expedition to the Weddin Sca So T V Hodgson of the Plymouth Biological Station was appointed and the scientific stalf was completed by the selection (at the instigution of the Royal Society) of a geologicst, Professor J W Gregory, whose work on the Great Rift Valley of Africa had brought him world

No sooner had Discovery been launched by Mrs Clements Markham when a violent dispute broke out between the two societies about the leadership of the land parties The Royal Society assumed, as indeed Gregory himself had assumed, that he, as the appointed leader of the scientific staff, would be in charge of all land explorations because he was after all not only a distinguished scientist but an explorer of long experience But Markham would have none of it Then as H R Mill, the historian of the Royal Geographical Society, describes, 'at the eleventh hour the crisis passed Gregory resigned from the expedition, the centre of gravity of which shifted from research to adventure This change did not mean that scientific work was suspended, merely that it was placed on a lower level in the general plan ' Despite this shift of emphasis, the scientific side was well looked after The staff was reorganized by George Murray, Keeper of Botany at the British Museum, a geologist and a physicist were added, special training was given in magnetism, oceanography and meteorology and when the Discovery expedition sailed from Cowes in August 1901 it was probably better equipped for scientific work on land and sea than any previous expedition

reader, recited poetry, preferably the poems of his favourite Robert Browning, in an engaging Irish brogue, and having something of a flair for journalism, edited the South Polar Tinex, the lineal descendant of Sabine's Winter Chronicle and North Georgia Gazette on Parry's first North-West Passage Expedition. This was illustrated by the delicate drawings and water-colour sketches of Wilson, the first of many paintings and sketches by him which catch so destreously not only the brilliant hues and changing lights but the darker, harsher moods of Antarctica. Another more bointerous publication was The Blizzard, now a collector's place among Antarctic bibliophiles.

Midwinter's Day (which in fact was not celebrated until August) was marked by the opening of the Royal Terror Theare, featuring as its first performance "Ticket of Leave, a screaming comedy in one act', followed by a Nigger Minstrel Show, and one is reminded again of Parry and his men and of Licutenant Beechey's Arctic production of 'Miss in her Teens' off the coast of Melville Island. Then for two months all hands concentrated on preparing for the first of the great Band Journeys in Antarctic exploration. The starting date was 2nd November 1902, the time 10 a.m., when Scott, Wilson and Shackleton set out with three sledges and all nineteen dogs on their first thrut across the 'Barrier'. For Scott, his mind constantly preoccupied with every detail of the preparations, it was a tense and anxlous moment. As he well knew, he and his men were mere beginners in this business with equipment virtually untested, and what lay beyond in the way of weather or physical obtacles was quite unknown. Even the eternally optimistic Shackleton, jovial, buoyant, picturing already in his mind a triumphant return from the South Pole to permanent fame and fortune, had occasional misrivines. gazed down on the rapidly diminishing figures below, I felt some doubt as to whether I had been wise in my choice 'The balloon rose five hundred feet, hovered, sagged uncertainly, then as Scott remembered to throw out the sandbags (not one by one but all together) it shot up to eight hundred feet and from this allitude, anchored only by the thin wave rope, he saw how the ice shell rose steadily towards the south in a series of long and parallel undulations, alternating bands of light and shadow marking each rise and fall. Far away in the distance, eight miles away Scott calculated, Armitage and his party could be seen as black dots moving microscopically over the monotonous grey of the snow After Shackleton had ascended to photograph this future field of exploration, Scott steamed wextwards up McMurdo Sound to Rois Island to prepare for the first Antarctic winter

Scott and his men did not winter on land as Borchgrevink had done They wintered on the ship like Parry and his men off Melville Island, though there were observation huts on shore, on the south western corner of Ross Island, and store huts sufficient to accommodate the whole expedition in case ice crushed Discorry at her winter moornings

Then began a period of intensive training for the first sledge journeys the following spring Skiing, sledging, the handling and feeding of dogs all this had to be learnt from the beginning for although Scott and Markham, on a brief visit to Norway, had sought the advice of Nansen and Amundsen, these British sailors, stumbling heavily over the ice, bruised from innumerable falls, were the rawest of recruits by comparison with the Scandi navians used from childhood to speeding swiftly over the snows But control over the dogs was their greatest problem At the merest touch of their inexperienced hands, it seemed, an apparently docile dog team would be transformed into a welter of snarling animals and tangled harness, exhausting their patience and defying their most ingenious efforts to restore discipline and peace Man hauling in the old traditional style soon appeared not only more reliable but mfinitely preferable to these refractory and unpredictable beasts

On 23rd April 1902 the sun sank at noon, to disappear for four months There was plenty, apart from work, to keep the men from moping during the winter darkness Shackleton, a voracious to raise almost the entire sum. The Morning, a Norwegian ship, was purchased in November 1901; Captain Colbeck, the experienced first mate of the Southern Gross was in command; and with Mr Rupert England, Lieutenant G. F. A. Mulock, R.N., and Lieutenant E. G. R. Evans, R.N. (later 'Evans of the Broke' and Admiral Lord Mountevans) as officers, she sailed in November the following year. Markham, jubilant, celebrated his success by composing an anthern, which was set to martial music, entitled 'Intrepid Souls'.

Intrepid Souls have these men I ween Who brave the Antarctic cold No dangers that threaten their lives are seen When they seek the brave and bold.

Seeking where the lost have been Discovery's masts will soon be seen.

Soon the Morning will start and the time draweth nigh To sail o'er the ice-clad main When they'll seek around with a watchful eye Nor at any toil complain.

Seeking where the lost have been Brave Scott and his crew will yet be seen.

The joy with which the Mentag was received at Hut Point, however, was overshadowed by Scott's carefully weighed decision, based on medical advice, that he must send Shackleton home. It has been a great blow to poor Shackleton', he wrote in his diary, and Shackleton admitted years afterwards that it had indeed been the bitterest disappointment of his life. Physically, he appeared more robust than any on the expedition. Infraughout his roving youthful life, he had in the barbaric conditions of sailing ships been accustomed to endure bardhips and face dangers greater than any his companions had experienced. Yet it was he and not they who had been compelled to fill the humilisting role of passenger on the return sledge journey. This was not only a deeply wounding blow to his pride, it was a hattering of all those hopes of fame and fortune with which, in this new popular age of polar exploration, an admitring people and agrateful government seemed very likely to reward the victorious explorer. for he saw how the strain was telling. But the greater test was to come on their homeward journey. One by one their dogs ded or had to be shot and to Scott, who had already found the slaughter of scals for dog food an unbearable sight, this was a deeply painful and indeed unforgettable experience. On the homeward journey, hunger begin to weaken them for their rations had been cut to a minimum and the depots, when they reached them, proved quite inadequately stocked. Snow blindness attacked first one then the other and then, worst of all, scurry set in, so seriously in Shackleton's case, with haemorrhage and breathless ness and paroxyms of coughing, that Scott had to forbid him to pull on the march. With Scott and Wilson pulling alone, and Shaekleton keeping pace only by an immense effort of will, the shap was reached on 3rd February 1903 after an absence of ninety three days.

Much had happened during their absence Skelton and Armi tage had ascended a great glacier to the west of Ross Island-the Skelton Glacier-to a height of 9000 feet and there in latitude 78°S, they found themselves on a summit of a mountain range continuous with the mountains of Vietoria Land, and joined, it seemed likely, with the distant mountains seen far to the south by Scott and his see shelf party. This range of mountains buttressed a vast plateau of see and snow which stretched out endlesily before them

No less heartening as Scott, Shaekleton and Wilson approached Ross Island was the sight of the relief ship, the Morning, lying out beyond the tcc in which Discorery was still locked. The dis patch of the Morning had been a personal triumph for Clements Markham and the Council of the Royal Geographical Society, for after the departure of the Discovery for the Antaretic the joint committee of the two societies, the scene of so much argument about the leadership of the land patties, had dissolved and Markham had been left with the truly formidable task of raising no less than 155,000 to equip the relied expedition. His very eloquent allusions to the courage, the fortitude and the patriotism of the men isolated in Antareties had left the Treasury unmoved New Zealand, with an eye perhaps to her future. Ross Depen dency, had contributed, but no more than £1000 It was therefore left to Markham and the Royal Geographical Society Government has been miled from the first as to the cost of the expedition. He sent an ultimatum to the Society, demanding the instant handing over of the Manning, and taking the rescue of the Discorry out of its hands, as the Admiralty was undertaking to bring back the naval members of the expedition.<sup>1</sup> There were many among Markham's colleagues who found these pungent disclosures uncomfortable. But Markham was unabashed. Had he not in his earlier conversations with John Murray firmly held to the belief that once sufficient funds to launch the expedition had been found, the rest would follow?

The Admiralty's arrangements for the new relief expedition were wasteful and extravagant to the point of absurdity. Not content with only the Morning, they purchased a Dundee whaler, the Terra Nora, and employed Shackleton to supervise her stores. They then rushed her out to New Zealand not under her own steam but towed by relays of warships through the Mediter-ranean, through the Suez Canal, and through the Indian Ocean. Scott meanwhile was wholly unaware of these hectic and extraordinary activities and when on 5th January 1904 the ships strived at the ice edge with peremptory orders to him to abandon ship and return at once with his men, this proclamation he says 'descended on us like a boit from the blue'. Confronted by this demand, of all demands the most intolerable to the captain of a ship, that he should thus precipitately abandon the Discovery to the mercy of the still encircling ice, Scott had no choice but to obey and the laborious work of carrying, piece by piece, stores and instruments and scientific collections ten miles across the ice to where the relief ships Ly was gloomily begun. But all the while he was watching intently for the slightest sign of a break-up of the ice and early in February some thawing could be seen. Slowly, the Discovery edged forward until only six miles separated the ships. Then she was stopped. But there was some hope now that by ramming, sawing and the use of explosives the ice might be loosened enough to enable her to get through before the new winter ice grew round her. The crews of all three ships then set to work. By 12th February there were three miles to go. On the 14th only yards remained. On the 16th, one last explosion and the Discovery was free. On 5th March, after a sojourn of two years and two months on the mainland, the expedition crossed the
However, the order had been given and Shackleton, though he was convinced that a month would have seen him fit, surrendered his place to Licutenant Mulock of the Aloriang Psychologically it was the most critical moment in his career for, as he embarked disconsolately on board the Aloriang, he was filled with an intense determination to return Next time he would return in triumph Nothing less than the attainment of the Pole itself would com pensate for this undeserved and humiliating retreat from Antarctica

In October 1903, at the close of Scott's second winter, the land journeys started again and on 30th November Scott ascended another great glacter to the vest and saw, as Skelton and Armitage had seen the year before, the infinite sweep of the polar plateau, lifeless, featureless its grey monotonous surface merging imperceptibly with sullen skies. Far to the south lay the Fole Once again the dogs failed them and much of the journey which carried them this time three hundred miles from the ship was made man haoling siedges over the precipitous and tumbled ice ilops, hauling breathlessly with webbing harness round ther waits and with braces over the shoulders, up and down through the thin and stilling are of the glacier

At home, meanwhile, anxiety was growing about the expedi tion And Markhamespecially agedseventy three and less vigorous and confident now after three years of constant work and worry, was seriously alarmed by Colbeck's report that he had left the Discovery frozen in Supposing that during the coming second summer there was once again no break up of the ice, what then would happen if he and the Society, as seemed all too likely, failed to raise the large sums required to fit out another relief expedition? It was a frightening prospect, so alarming indeed that Markham decided that even the Government this time might relent and come to the rescue of the National Antarctic expedition The Government's reaction was swift, decisive and in several respects astonishing and H R Mill, a contemporary, in his Record of the Royal Geographical Society, 1830-1930, has left a succinct though restrained account of the proceedings 'Mr Balfour, then Prime Minister', he records, 'was roused from his usual philosophic calm He made caustic remarks in the House of Commons on the way in which he conceived that the expedition of Professor van Drygalski; the Swedish expedition led by Dr Otto Nordenskjöld; the Scottish National Antarctic expedition led by the young Edinburgh naturalist W. S. Bruce; and finally the French expedition led by the scientist Dr Jean Charcot through whose initiative France returned to the Antarctic for the first time since Dumont d'Urrille. Scientifically, the Swedish expedition was the most illuminating. All, their aims being severely scientific, form an interesting contrast to the 'Discovery' Expedition.

The German expedition in which the scientist Drygalski was in charge both by land and sea was supported wholly by the Imperial Government. Sailing in the Gouss, named after the famous German mathematician whose calculations of the probable position of the South Magnetic Pole James Clark Ross had set out to confirm, Drygalski called at his base at Kerguelen Island where an observatory was being built and then made for the mainland in the general direction of Knox coast. Land was sighted in February 1902 but proved unapproachable so magnetic and astronomical observatories built of ice blocks were established on the floes off the coast. The following spring sledging parties advanced aeross the ice towards a black hill fifty miles away on the mainland and here Drygalski, like Scott, used a captive balloon and ascended to fifteen hundred feet to photograph the distant and gently rising polar plateau. The land he named Kaiser Wilhelm II Land, a name retained today, and after another winter and more scientific journeys in the spring, the Gouss returned to Cape Town in February 1903.

Nordenskjöld's Swedish expedition, supported wholly by Swedish philanthropists, arose out of his work as a geologist in Tierra del Fuego when he developed the theory that the southern tip of South America was geologically connected with the northernmost extremity of Graham Laad. After an unsuccessful attempt to penetrate the Weddell Sea in the same steam whaler, the Anaeric, which had carried Borchgrevink to Cape Adare, Nordenskjöld spent two winters in the north of Graham Land. The Anaeric foundered in the ice on her way to bring out the party, but the Sweder were rescued by an Argenithe naval versel which hapeared by a strange coincidence on the very do on which the capital and five men of the Anaercic isogreed into the Antarctic Circle, the Discovery moving at a snail s pace, eking out the miserable allowance of coal which was all that the Admiralty s elaborate relief arrangements could supply

Scott after a long slow voyage round Cape Horn during which many oceanographical observations were made returned triumph antly to England and on 7th November 1904 gave an account of his achievements to a crowded audience in the Albert Hall His was a proud record The great Ice Shelf had been followed to its eastern end beyond the limit reached by Ross King Edward VII Land had been discovered A range of mountains had been found stretching far southwards and buttressing a vast plateau and this Armitage had penetrated to 130 miles at an elevation of 9000 feet while Scott, Shackleton and Wilson, pushing forward towards its south western base, reached 82°17 S, 207 miles beyond the previous farthest south in the second season Scott himself had ascended to the great plateau and penetrated even more deeply southwards During both seasons a massive accumu lation of scientific observations was made Their subsequent publication in a series of magnificent volumes remains to this day a tribute to the great stride forward made by the expedition in the development of Antarctic science

The large audience in the arena of the Albert Hall (induding the American Ambassador) listened entranced to Scott's story The screen upon which the lantern projected photographs of the expedition a dramatic discoveries was flanked on both sides by the sledge flags of all the officiers designed, as Mill records, by Sir Clements Markham with loving care according to strict heraldic rules To Markham the evening was the triumphant climax to all his efforts not least because the expedition (to quote Mill agam) had proved, to the delight of its promoter, that the officers and men of the British Navy could still go almost anywhere and do almost anything? His monumental work accomplished he retired the following year from the presidency of the Royal Geographical Society

The drama of Scott s first expedition must not be allowed to obscure the achievements of other, less sensational, expeditions at work simultaneously in the Antarctic with all of whose organ izers Markham had been in touch following the exhortations of the International Geographical Congress. These were the German

#### SCOTT AND THE 'DISCOVERY' EXPEDITION 249

source of the icebergs and ice islands of the Antarctic seas. No landing could be made, indeed no approach was possible nearer than two miles, but Bruce named the new territory Costs Land after James and Andrew Coats of Faisley. And Coats Land it is today, an inhospitable land but, with open water off its coart, a welcome sight to the few explorers, Filchner, Shackleton, Sir Vivian Fuchs, and a few more who have succeeded in reaching it through the ice of the Weddell Sea.

But Bruce's Scottish expedition will not only be remembered by this new and large addition to the Antarctic coastline. Falling to obtain support from his own government for the maintenance of the meteorological station on Laurie Island, Bruce handed this over to the Argentina Republic. It was an act of some significance in the subsequent political history of Antarctica for it provided a starting point for Argentina's future assertion of sovereignty over Laurie Island (and by extension over the South Orkneys us a whole) in defance of earlier British clium. camp, having made their way over the sea ice from the islet on which they and the entire ship's company had successfully survived the winter

The rescue of Nordenskyold and his men had provided the motive for Jean Charcot's expedition but when he heard that they were safe he turned to the exploration of Alexander Land and of the west coast of the Graham Land pennsula Alexander Land proved no more accessible than it had been in Bellingshau sen's day but between 1903 and 1905 Charcot eharted many of the slands of the Palmer Archipelago and the British maps of this first voyage by a French explorer whose subsequent explorations were to win for France great distinction un Antarctica

In terms of discovery, the most ambitious of these expeditions was the Scottish Antarctic Expedition led by a fervent Scot and dedicated scientist, W S Bruce, into the unknown and dangerous Weddell Sea Bruce, who had served as a naturalist on the steam whaler Balaena in 1893 and had been a member of the Harmsworth-Jackson Franz Josef Land expedition, had recently taken part in a summer expedition to Spitsbergen supported by a man with whom he became close friends, the rich industrialist Mr Andrew Coats of Paisley Bruce now enlisted the wealth of the Coats family in aid of his new and ambitious venture and by February 1903 in a Norwegian steam whaler renamed the Scotta he crossed the Antarctic Circle and moved freely into the Weddell Sea But in 70° S, the Scotia was beset, escaped and made for the north to find a harbour for the winter in Scotia Bay, on Laurie Island in the South Orkneys When the Scotia left in November 1903 for her second attempt on the Weddell Sea, a meteorologi-

cal party, later replaced from Argentina, was left behind This time the Soria penetrated the rotating pack ice of the Weddell Sea with no great difficulty and reached 74° S in 22° W, slightly to the east of James Weddell's 'farthest south' early in the nneteenth century Beyond, land could be seen, low and flat and featurcless with a coastline of cleanly and deeply sculpted ice cliffs akin to those seen on the far side of the continent by Biscoe, Wilkes, Ross and others: These were the termination of the great downpoung of ice from the central highlands which John Murray had so rividly described, and the

# PART FOUR THE HEROIC AGE

### The Conquest of the North Pole

When the American Ambassador Mr Choate addressed Scott's audience in the Albert Hall on 7th November 1904, he declared, 'if you will only let Captain Scott planting the Union Jack upon the South Pole and let our Peary proceed with his disciplined followers and plant the Stars and Surjes upon the North Pole, why then you will make the two ends of the great world meet and leave the globe that we inhabit as it properly should be—in the warm and fraternal embrace of the Anglo-Sxon race.'

It was a timely preface to the events of the next eight years when the eyes of the public throughout the world were focused on the race for the poles. The scientists might say, as indeed they never tired of saying, that the geographical poles were no more than mathematical points in space, that their attainment could add little or nothing to human knowledge. To the public, however, and notably to the people of Britain, a country where the intellectual impact of science appeared to be imposing an increasingly materialistic and impersonal pattern of life, the prospect of these heroic and intensely personal endeavours was most exhibitating.

The nineties, it has been said, 'was a decade pre-eminently of the magazine superment'. The same might be said of the first decade of the treatieth century which saw the beginning of what has often been called the 'Heroic Age' of polar exploration. The creation of the Heroic Age and of the concept of the polar hero aved much to the new journalism, to those newspapers and magazines with mass circulations which were greatly aided early in the twentieth century in the distribution of news by the telgram and the wireless message. Through these new means of national and international publicity, denied to the explorers of an earlier age, the polar leader could now become almost oversight a public hero, his name a household word For many indeed, absorbed by the story of his romantic adventures, he became a dream figure with whom they could happily identify themselves in brief moments of escape from the new imprison ment of urban life

Of the men who were to enjoy this new and widespread notoriety-Scott and Shackleton, Peary and Amundsen-none was more obsessed by his ambition to conquer, as he expressed it, 'the last great geographical prize' than the American Arctic explorer Robert E Peary From 1886 when he made the first of many expeditions to Greenland he had been fitting himself and perfecting his technique and equipment with this single end in view and in January 1897, on the eve of his Windward expedition of 1898-1902, he openly avowed that his plan had 'for its main purpose the attainment of the North Pole Clements Markham had expressed the views of many explorers when he said 'Since Nansen's discovery that the Pole is in an ice covered sea there is no longer any special object to be attained in going there' But Peary s approach was different He had no interest in scien tific work He was an engineer and a technologist, a military planner concerned with the strategy, tactics and logistics of his polar eampaign However illuminating Nansen's geographical discoveries may have been, all that mattered to Peary was that Nansen had failed to reach the Pole

The main achievement of Peary's first year of work, made the more anxious as we have seen by his fear that Otto Sverdrup might forestall lum, was the establishment of an advanced base at Fort Conger, at the north east corner of Ellemere Island Travelling according to plan through the darkness and cold of winter when the ice was hardest Peary reached Fort Conger by January 1899 By the autumn of that year fourteen tons of supplies had been deposited between Fort Conger and his ship the Wind ward which had been unable to approach any nearer because of the ice of Smuth Sound In the spring of 1900 further supplies were brought up until the base was fully stocked for the attempt on the Pole

The first problem was the choice of a route Fort Conger had one great advantage, that of flexibility, for from it there was the choice of two routes to the Pole, from Grant Land, the northern

At the end of the Windward expedition in 1902, Peary returned to work in the naval dockyards. He had failed but nevertheless he was not too old to try again and he devoted every minute he could spare to raising funds for a new expedition incorporating all those improvements in equipment, in tactics and in technique which his latest, most gruelling and most bitter experience had taught him. The pivot of his national campaign was a group of wealthy New Yorkers headed by Herbert L. Bridgman who formed the Peary Arctic Club and by 1904 they had raised one hundred thousand dollars for a new ship, the Roosevelt, specially designed and built to penetrate the ice of Smith Sound and to carry the expedition far up the coast of Ellesmere Island to save the long journey over the ice to the advance base. Outlining his plans to the Secretary of the Navy Peary declared, 'I should expect to accomplish the distance to the Pole and return in about a hundred days or a little more, an average travel of about ten miles a day." 'This plan', he added, 'is the result of some twelve years of travel in these latitudes.' Never indeed had he felt more confident of success. And in so far as a stimulus was needed to spur him on to victory it was provided by the news that the British under Captain Robert Falcon Scott had landed and advanced deeply into Antarctica. It might after all turn out that Britain and not the United States would be the first to conquer one of the poles of the earth.

In July 1905 Peary, now fity, sailed from New York City in the Rossereit which, after some damage to her bows, reached Cape Colombia on the north-east coast of Grant Land within ninety miles of the advance base at Cape Heels. The first party started off over the ice in February 1906 and the Peary system of Arctic tactics then took its classic form. The backbone of his force were the Eskimoes, men, women and even children, the tribes from whom Peary, like the earlier American explorers Hall and Schwatka, had learnt in earlier days the basic techniques of Arctic travel and survival. They were employed to drive the dog-teams, Peary having over a hundred dogs. They were employed to build snow-houses (igloos) for use as stoging camps along the route; these had great advantages for they saved the creation of cumbrous itents and were warmer and infinitely more wind-proof. The women, meanwhile, were employed to and in the spring of 1902 switched his starting point to Grant Land In March he left Fort Conger, distant from the Pole by about 450 miles in a strarght line, and left land behind him at Cape Helca no 6th April But once again he was defeated in places the snow overlying the pack was so for that 'the dogs wallowed belly deep' Continually he and his men were forced to double in their tracks or to make long and exhausting detours to find easier, less hummocky ground In mid April, after a blizzard had at the pack less margins. They will observe the sailed set the pack ice moving, two wide channels-one he called 'The Grand Canal -opened across their path and forced them far off course. In such conditions, advancing at a rate of no more than six miles a day Peary reached to latitude 84° 17' N on 21st April 1902 It was one more failure and one which Peary, so often described as the man who never failed, took greatly to heart Nevertheless like the earlier Greenland venture it was not wholly unprofitable for he had been able to establish a number of advance depots along this new route ready for another attempt and he had learnt one Invaluable lesson This was that even here, far to the west of the east Greenland current, the prevailing drift of the lee was from west to east (map, p=199) To offset this a course NNW would have to be set. He learnt other lessons too that were to stand him in good stead, that a rapid return, a return which would leave little time for sleep or camping, was vital if he hoped to follow the line of his outward tracks 'i recognized', Peary wrote, that the entire pack was moving slowly, and that our trail was everywhere faulted and interrupted by new pressure ridges and leads in a way to make our return march nearly, if not quite as slow and laborious as our outward one ' There were improvements also that he could make in equipment and in the logistics and tactics of the assault Sledges must be lighter to ride easily over the hummocky Ice, and wider to bridge channels and water leads A ship must be found that would penetrate through Smith Sound to the very edge of the polar sea, saving the long journey to the advance base Finally a pioneer party was needed to push ahead and take the burden of breaking the trail Through them the final assault party would pass, the energies of men and dogs conserved for the last lap of the race These were all lessons put to good use on his next and, as he hoped, his final expedition

256

Peary returned safely, though as he admitted by the narrowest of margins, only to see the Rooscell, despite the superb navigation of her British captain, Bob Bardlett, suffer such heavy damage from the ice in Smith Sound that she had to be reconditioned at *corranous cost. However, once again the Peary Arcibic Club came* to the rescue and in July 1908 Peary sailed again on his last polar venture. The party, Peary's disciplined followers' as Ambassador Choate called them, consisted of Bob Bardlett, the capitaln of the *Roserelt*, Matthew Henson, the doctor Goodsell, and two young men Borup and MacNillan. They called it at Etak in torth-west Greenland (just north of the present United States Air Base at Thule) and collected fifty Eskimose and two hundred and fifty dogs; by the autumn the advance land base at Cape Colombia had been stocked; and by February 1909 Peary was ready to move off.

Peary never failed to learn from his previous failures and this time a course was set somewhat west of north to allow for the easterly drift. As a further precaution depots were left on the north Greenland coast so that in an emergency a return from the Pole could be made eastwards, disgonally with the set of the lece. In case the drift was found to be unexpectedly reversed, depots were also left to the west of Cape Colombia. As it turned out, however, these precautions were unnecessary for there was no strong westerly wind to reinforce the drift as there had been in 1906.

Throughout March they again had low temperatures and violent winds and were held up for days at a time variing for the ice to close in over the broad black leads of water which they continually encountered. But they kept going, the advance parties, worked unmercifully by Peary, bearing the brunt of the strain. By 1st April they had reached  $37^{\circ}$   $47^{\circ}$  N, the nearest man had reached to the Pole. Four of the advance parties each led by a white man had already returned to the base with the worst of the dogs harnessed to their sledges. Now, two hundred and eighty miles from the base and one hundred and thirty-three miles from the Pole, it was time for the last party to turn back. This was the party led by Bob Bartlett, the Briths logation of the *Rosereit*. Peary trusted Bartlett as he trusted no one except Matthew Henson, the negro, and be was anxious to show the sew the seal and walrus clothing which Eskimoes and white men wore alike There were five white men in Peary's expedition and as always of recent years, his devoted servant and the most trusted of all his companions, Matthew Henson, the only negro explorer in Arctic history

The essence of the Peary system was the dispatch of small ad-vance parties to blaze the trail and set up camps and depots along the route to within striking distance of the Pole thereby saving the strength of the men and of the dogs reserved for the final dash A very similar technique in a very different field was employed in 1953 by Sir John Hunt and the men of the British Everest Expedition There too advance parties went ahead to prepare the route and to set up a camp within striking distance of the summit ready for the final assaults 'To have a sufficient number summit ready for the funal assaults "To have a sufficient number of divisions, or relay parties, each under the leadership of a competent assituant, to send them at appropriate and carfully calculated stages along the outward pourney \_\_\_\_\_\_ and to return by the same route \_\_\_\_\_\_\_ ung the beaten trail and the already eon atrueted [gloos], these were the essentials of the Peary system Each of these parties would 'knut together' the breaks in the trail created by any drift of the ice. 'They would thus keep it open for the assult party returning from the Pole After so many years of concentrated effort, after so much carfed thought and metculous preparation, it seemed only right that thus time fortune should favour Peary But again he had no luck. Not only the surface and drift of the ice but the weather were against him and with a record low tempersture of --60° F

After so many years of concentrated effort, after so much careful thought and metreulous preparation, it seemed only right that this time fortune should favour Peary But again he had no luck. Not only the surface and drift of the ice but the weather were against him and with a record low tempersture of  $-60^\circ$  F or 90° of frost his speed was reduced to half his estimate At this rate there was no hope whatisever that his provinous would last this journey to the Pole and back. Some record, however, had to be achieved not only to redeem his own name and reputation but to encourage his supporters of the Peary Arctic Club in New York. The Pole was clearly unsatuanable but he was only saxy furthest north. Discarding almost everything from his sledges and collecting together the least exhausted of his dogs he pluged on, bending "every energy to setting a record pace" in a half gale and heavy drift he persisted until Cagna's record of 1900 had been beaten. In continuous daylight they travelled for ten hours at a stretch, racing against the approach of the full moon. The ice appeared motionless. But they could hear the flows grinding and groaning on all sides as they neared the 89th parallel. It was not the bitter wind they feared, though it losked their faces like a whip of steel, nor the pressure ridges which rose dark and massive in the distance. The water-leads were the greatest menace. It was in constant dread', Peary confessed, 'lest we encounter an impassable one toward the very end. With every successive march, my fear of such impassable leads had increased', and indeed at every ridge he hurried forward fearing to see from its summit a broad, black stretch of water barring their way to the Pole. Early in April clouds obscured the sun and left them to march on in a grey and colourless and melancholy light. But they were not depressed, for they were near now, near enough to be certain of success.

On 6th April 1909 Peary with Matthew Henson and four Eakimoss reached the North Geographical Pole; "The Pole at last. The prize of three centuries. My dream and goal for twenty years." Five flags were planted, the American flag, the Navy League flag, the Red Cross flag, the 'World's Ensign of Liberty and Peace', and the colours of the Delta Kappa Epsilon Fratemity at Bowdoin College of which Peary was an alumnus. In a crack in a near-by ice ridge Peary then placed a botte containing a strip of his national flag and a brief record of the journey, due credit being given to Herbert L. Bridgman and the Peary Arctic Club of New York City whose stremous efforts had made possible the acquisition 'of this geographical prize for the honour and prestige of the United States of America'. In another document he, Robert E. Peary of the United States Navy, claimed the entire region in the name of the President of the United States

On 7th April Pezry turned south towards Cape Columbia and there sixteen days later he composed his message to the world. "My life-work is accomplished. The thing which it was intended from the beginning that I should do, the thing which I believed could be done, and that I could do, I have done. I have got the North Pole out of my system after twenty-three years of effort, hard work, disappointments, hardships, privations, more or jesuffering, and some risks. I have won the late great geographical gratitude he felt for Bartlett's extraordinary skill as a navigator He chose Bartlett's party therefore as the last to leave, explaining afterwards 'It seemed to me that, in view of the noble work of Great Britain in Arctic exploration, a Britash subject should, next to an American, be able to say that he had stood nearest to the Pole 'The truth, however, was that he could not bring him sell to allow any other white man to share his trumph

Peary and five men-four Eskimoes and Matthew Henson, who was almost as skilful as they in the technique of swift Arctic travel-faced two great hazards as they set out on 2nd April on the last stage of the Polar nazaros as mey set out on r.m. A privon me last stage of the Polar yourney A twenty four hour gale might spring up and open wide and impassible leads in the ice, danger ouly delaying them But more dangerous still was the immunent approach of the full moon and of the spring tules. These, Peary leared might sur the great ice fields around us into restlessness and create a network of water leads across the path, some open, some perhaps thinly and deceptively coated with new ice whose strength would have to be gauged to a nicety if dogs and sledges were not to plunge into the deep and icy water below Never theless, as he climbed a great pressure ridge behind his snow house and looked towards the north he was swept by a sudden surge of excitement 'I felt', he wrote, 'the keenest exhilaration, and even exultation, as I climbed over the pressure rdge and becasted the keen as rsweeping over the mighty tee, pure and straight from the Pole itself I was a fine marching morning clear and sunlit, with a temperature of manus 25°, and the wind of the past few days had subsided to a gentle breeze. The going was the best we had had since leaving land The floes were large was me pen we nad had unce leaving land The itors were infor-and old, hard and level, with patches of sapphire blue tce (the pools of the preceding summer) While the pressure refers surrounding them were stopendous, some of them fifty feet high, they were not especially hard to negotate, either through some gap or up the gradmal slope of a huge drift of mow The brilliant sumbolt the sond once of the source wave where the consunlight, the good going save for the pressure ridges, the con sciousness that we were now well started on the last lap of our journey, and the joy of again being in the lead, affected me like wine The years seemed to drop from me, and I felt as I had felt in those fifteen years before when I headed my little party across the great ice cap of Greenland

after they left Cape Thomas Hubbard has only been elucidated over the years, notably by the distinguished Arctic explorer Vilhjalmur Stefansson who was able to check some of Cook's claims on the ground during his own explorations eastwards of the Beaufort Sca in 1913-18 while on the Canadian Arctic expedition. After leaving Cape Thomas Hubbard, far from travelling northwards to the Pole, Cook probably travelled south along the west coast of Axel Heiberg Island. He then passed an unobtrusive and uncerneful winter in Jones Sound and calmly returned to Greenland. The journey to the Pole, so vividly described, seems from any the machine hut pure faction.

to have been nothing but pure fiction. What led Cook to indulge in such an elaborate fraud has never been discovered. Was it pure chicanery? Was it from some distorted, cynical sense of humour? Or was it perhaps sheer malice against Peary, guessing as indeed turned out to be the case, that in the absence of independent and reliable white witnesses on both sides, he, an experienced and quite reputable explorer, had at least as good a chance as Peary of being believed. There is still an interesting pychological problem to be solved in the strange case of Dr Frederick A. Cook.

strange case of DF reserver. A. Cook. Sufficient evidence to demonstrate the improbability of Sufficient evidence to demonstrate the improbability of cook's clums came only slowly to light. Cook's party photographed allegedly at the Pole In April 1903 are shown wearing carried, nor was any musk-ox shot. Stefansson's findings were even more damaing, for he showed by following his tracks that Cook could never have seen what he claimed to have seen if he had followed the northern route, and that certain inecapable landmarks along this route Cook never mentioned at all. At the time, however, the true facts were far from clear. Cook had on his side a great many upporters who pressed his claims against divided into the partisms of the two rival explorers. But if Cook's solver could not be disproved, Peary's claims were no casier to substantiate. Bob Bartett could testify that thy had here with one hundred miles of the Pole. But thereafter what happened? And was it not strange, Peary's copnents, were quick to ask, that no white man had been permitted to accompany him on the last and crucial stage of the journey? prize of the North Pole for the credit of the United States This work is the finish, the cap and clumax, of nearly four hundred years of effort, loss of life, and expenditure of fortunes by the civilized nations of the world, and it has been accomplished in a way that is thoroughly American I am content ' He was indeed content and when he had telegraphed his message from Labrador Peary was able at last to relax and to enjoy to the full the delicious prospect of his triumphant arrival in America. But he hid not know that a fine drive series an even

in America But he did not know that a few days earlier an even more dramatic message had astonished the world, this time from Copenhagen, which declared that the sender, the American explorer Dr Frederick A Cook, accompanied only by two Eskimo youths, had reached the Pole on 21st April 1908, a year, therefore, before Peary The strange ease of Dr Cook is a subject for psychological rather than for historical study For Dr Cook was no ordinary charlatan, if he had been, the Peary-Cook controversy would never have lasted as long as it did He was, on the contrary, an experienced and respected polar traveller who had been the anthropologist on Perry's Greenland expedition of 1892 and a few years later had served as doctor on de Gerlache's Belgian expedition, the first to endure a winter in the Antarctie pack Nor was the lengthy and arduous journey so vividly described in My Attainment of the Pole by any means wholly imaginary There is no doubt that in 1907 Cook with one white companion, Rudolf Francke, sailed for the Arctic in the yacht John R Bradley, named after his patron There is no doubt that they wintered at Etah far up the north west coast of Greenland, nor that in February 1908 they left with Eskimoes, dogs, sledges and a canvas boat, crossed Smith Sound and crossed Ellesmere Island westwards to Cape Thomas Hubbard, the northernmost tip of Axel Heiberg Island This was a tough journey of over five hundred miles and Cook deserves credit for it But then the mystery begins According to Cook's own account, he and two Eskimo youths started in March for the Pole five hundred miles away, reached it in April and after a stay of twenty four hours returned by way of the Ringmes Islands to Grunnell Pennsula on North Devon Island, having been lost in fog on their way There they wintered, then crossed Smith Sound to Greenland in the spring of 1909 What actually happened to Cook and his party to prove the insularity of Greenland when he reached his so-called 'independence Bay'. But the Denmark expedition of 1906-07 and the later explorations of the Danish explorers Captain Ejnar Mikkelsen and Knud Rasmussen showed that 'Independence Bay' was not a bay but a deep fjord and that Peary's 'Navy Cliff' was a bundred miles from the sea. 'Peary Channel' was similarly disposed of by Rasmussen who found in place of it 'an extensive ice-free upland abounding in game'. As the result of these successive revelations, the United States As the result of these successive revelations, the United States Government in 1915 withdrew Peary's maps of this part of Greenland. If such rach and extravagant claims diminished the confidence of the exploring and scientific world, so also did Peary's published accounts of his polar journey. He published no scientific reports for although some desultory investigations were excessionally carried out by members of his expediations, he himself had no interest in science. His books and articles accordingly were addressed to a exclusively nominar accordingly were addressed to an exclusively popular addressed and were written in a highly coloured prose with many a manifest exggeration-fantastic heights of pressure ridges, for example -designed to add to their dramatic appeal. The first published account of the cost of the farmatic appeal in the first published accounts of his great polar journey appeared throughout 1910 in Hampton's Magazine in the United States and in Nati's Magazine In Britain. As stories of adventure they make exciting reading. But they offered nothing in the way of supporting evidence to substantiate Peary's claims.

It is not easy to be sympathetic towards a man so egocentric, so dominated by personal ambition, so jealous and so rubhes in his treatment of possible competition as Peary appears to have been and it is all the more important that his achievements should be objectively assessed. No doubt on occasions as in Greenland he was careless or over-hasty. But he was also capable of very accurate work and the Royal Geographical Society, after a close inspection of the log of his polar journey, declared that 'one could not expect in the circumstances a much better set of observations to some that your head here within a few miles observations to prove that a man had been within a few miles of the Pole'. Peary's greatest claim to distinction lay, however, in his mastery of the technique of polar travel which he had perfected over many pears. Peary's great achievement', it has been said, 'was to have travelled over hummocky and often

The secrecy with which Peary, obsessed by his fear of compe titors, had surrounded the expedition did nothing to strengthen stors, has surrounded the expedition did nothing to strengthen his case Preliminary announcements of his intentions had been of the most general kind And no reports of his progress were allowed to be published for, as he said, 'I am not printing any thing until I have got to the Pole'. Nor did the Congressional Investigating Committee set up to examine his claims do justice to them for the men composing it were for the most part quite unfitted to judge the merits of his case, and their ignorance and Peary's somewhat vague and unsatisfactory replies tended rather to increase the superconstant have. Hades were event to increase the suspicion against him Under more expert to increase the subjection against him Linder more experi-scrutny however Peary's case grew in strength. The Royal Geographical Society in London, though it refused to adjudicate as between Cook and Peary, had earlier shown that they favoured Peary by their telegram of congratulation and they now pro-ceeded to dispose of one unportant criticism against him, namely that at the date when Peary claimed to have been at the Pole the although of the unstance in the bacterial the bacterial the unstant altitude of the sun there was too low to be observed by means of the sextant and artificial horizon which he used More telling were the findings of the special sub-committee on research of the National Geographic Society of Washington This panel of experts, meeting on 4th November 1909, reported its unani mous opinion that Peary had reached the North Geographical Pole

Six months later, so convinced were they of the justice of Peary's claims, the Royal Geographical Society presented him with their rerest award, the Special Gold Medal, designed by Mirs Robert Falcon Scott, an award, its President, Major Darwin, took care to point out, made not for the dash to the Pole alone but for Peary's services over the years to Arctic exploration A replica of the medal in ailver was presented to Captain Bob Bartlett These awards, given only after the most carcial con sideration of Peary's case, might have been thought to have settled the matter, but over the next twenty years there were many, and they included one reputable polar historian, who not only continued to doubt Peary's claims, but harshly criticized his conduct as an explorer

In certain respects, these critics were not unjustified On his Greenland expedition of 1892, Peary had claimed to be the first

#### Shackleton Returns

I 1904, the year of Scott's return from the Antarctic, the Eighth International Geographical Congress, meeting in New York, urged that new and greater efforts should be made to advance polar exploration. 'Realizing that the only untouched fields for geographical discovery are the regions immediately surrounding the poles of the Earth', the Congress declared its with 'to place on record its sense of the importance of forthwith completing the systematic exploration of the polar areas.' It stressed, moreover, how important it was 'that the experience glined by men of science and officers In the recent Anarctic expeditions abould be turned to account by following up without delay the successet they have obtained'. The Congress, furthermore, 'recognized that the Arctic regions posses a more immediate interest for the people of America, and expresses the confident hope that the expeditions now being prepared will be so supported as to secure early and complete success'.

In the Arctic, as we have seen, Robert E. Peary of the United States Navy had no need of encouragement from the International Geographical Congress to persuade him to persevere. Nor were his the only major Arctic explorations then in progress for further west Roald Amundsen, even as the Congress met in New York, had almost completed the first navigation of the North-West Passage. These were the major expeditions. But there was also much detailed exploratory and scientific work in progress elsewhere, in Canada's Northwest Territories and in East Green-Land where Danish scientists had been very active.

In the Antarctic, however, exploration—apart from J. B. Charcot's important scientific work on the west side of the Graham Land peninsula—was coming to a halt and there wa no talk of new plans, least of all in England though it had been the centre of the movement to revive Antarctic exploration at the turn of the century. There Scott, honoured not only by his own country but by France, Germany, Sweden and many others, was touring the country on an exhausting lecture tour and receiving from each mayor and corporation a hero's welcome In 1905 The Voyage of the Discovery was published. Soon afterwards Discovery herself, though the had been specially built and should have been retained for polar research, was sold to a commercul firm for a fraction of her cost. The members of the expedition, highly trained and experimenced, were allowed to disperse into the relative obscurity of private or professional life. Scott returned to a new appointment in the Navy And then a lull descended It was as if the public, the Government, and the learned societies, exhausted by the efforts and the tension of the pair few years, had undenly tured of polar exploration But just as suddenly, towards the end of 1906, interest

But just as suddenly, fowards the end of 1906, interest re awakened The cause, however, was not Scott whom Ambasador Choate had foresten sharing with Perry the honour of making 'the two ends of the great world meet', though it was known that he had been turning over un his mind fresh plans for exploration This time the principal actor was E H Shackle ton, the juncor officer on the Discover, the man whom because of his breakdown on the return southern journey, Scott had been forced to tend home. If the news that Shackleton intended to promote and lead an Antarctic expedition was received generally with some astonishment it was received by Clements Markham considered ambition in a subordinate as little less than mutuny and he did not dissemble his opposition to Shackleton's plans'

The man who thus presumed to rval Markham's chosen leader was in background and in character as different from Scott as could be Born of an Irah father and an Irah mother, he had left school at the early age of 16 and had joined the Merchant Navy. Thereafter he had been something of a rolling stone, moving from ship to ship and line to line in the merchant service, preferring always to take a chance rather than wait in tedious security for regular but slow advancement. He was by nature a gambler and an adventurer, a man, it has been said, who would have been as happy seeking burged treasure in the Pacific as he was to be among the bazards and excitements of Antarctic exploration. Shackleton, bronzed and fit, a giant of a man astonishing to those who heard that he had been invalided home, had already made his mark lecturing on the first season's work of the Disorery expedition, for he had an Irishman's command of the English language (made the more attractive by a touch of brogue) and a magnetic platform personality. But marriage was in his mind and money was necessary. He thus embarked upon the first of an extraordinary variety of posts and projects which were gradually to lead him nearer to Antarctica to which he had all along been determined to return. He tried first to obtain a permanent commission in the Navy and when this failed—it was a rebuff Shackleton always remembered—he turned with considerable success to journalism, as sub-editor on Pearson's *Royal Magazine*. But journalism offered no golden prospects and when the post of Secretary to the Royal Scottish Geographical Society became vacant, he applied for it, realizing that while it offered scant hope of financial profit, it might easily lead to better things.

Shackteon had no mind for detail, whether in proof-reading. In the taking of minute scientific observations, or in mattern of administration. But under the stimulus of his abundant vitality, his fertile imagination, and his personal charm, the Society prospered, Within a year, however-a year a little alarming and sometimes stormy for the more conservative members of the Society's Council-Shackteon was looking for fresh conquests and when the chance came to stand as Liberal-Unionist candidate for Dundee, he seized it with alarcity. Though he was immensely popular in the working-class districts he failed to win the seat; but it had not been waste of effort for as a candidate he had met many men of money and influence, one of them the great industralist William Beardmore.

Dabbling in doubtful financial schemes, ingenious but always uusuccessful projects for getting rich quick, was a temptation which Shackleton could never resist and whether it was goldmining in Hungary, a cigarette factory in the United States, or an international news agency, he planged into each new gamble with the same exuberant optimism. Shackleton was about to launch another of these projects, the attraction this time being a lucrative contract for the transport of Russian troops from Vladivostok to the Baltic, when he received an offer of employment in Beardmore's great engineering works at Glasgow. This he accepted and it turned out to be one of the most profitable decisions of his life, for Beardmore was much impressed by Shackleton's drive and personality and after he had heard of the plans which the latter had nurtured all this while for a new Antarctic expedition, he was eventually persuaded (in the autumn of 1906) to guarantee most of the cost

This large guarancee and those from many others, including the Misses Dawson Lambton who had bought the balloon for Scott's expedition, would of course have to be repaid But Shackleton had no great anxieties on this score. The sale of the book, the all of photographs, the lectures he would give, surely these together would yield a fortune. He did not hesitate, therefore, to embark immediately on active preparations, none too scon, he considered, for although he lad no reason to anticipate any British rivals, both from France and Belgium there were rumourd of impending Antarctic expeditions.

This time there was no delay in getting the expedition under way for there were neither sponsors nor supervisory committees to consul: Certainly they would have been valuable in shouldering the heavy burdens of financial responsibility which without them fell on Shackleton above Buth e was determined at all cost to be free The Admirality were invited to provide charts and instruments. The Royal Geographical Society, despite Markham's undiaguised hostility to the enterprise, gave similar help. But that was as far as he was prepared to go towards entanglement with official or learned bodies

His plans were relatively sample From Hut Pont where Scott had wintered, three parties were to operate, one estiwards across the Ross loc Shelf and mto the unexplored King Edward Land, one wetwards across the mountains of Victoria Land to discover the South Giogenphical Pole Little as Shackleton was personally concerned with science-geology, someone remarked, was for hum a matter of precious stones-much scientific work was planned and an excellent scientific staff was recruited. But for Shackleton the Geographical Pole was the hung 'The money', he declared later, 'was given for me to



The Ross Dependency

reach the Pole I had a great public trust 'All his efforts, all his ambitions, sharpened as they were by painful memories of his earlier failure, were focused upon this one single and supreme objective

Since the expedition was due in the Ross Sea in the following February, Shackleton in April 1907 thought the time had come to announce his plans in The Times Then came a wholly unexpected blow, a letter from Scott informing Shackleton that he too was contemplating an Antarctic expedition based on his old winter quarters at Hut Point and asking him therefore to select another winter base Shackleton had no idea that Scott intended to return so soon to Antarctica and this letter, written from Gibraltar where Scott was in command of H M S Albemarle, struck at the root of his plans Seeking an area well beyond the frontiers of Scott's zone of activity, he thought that an alternative base and harbour might be found near the eastern end of the Ross Ice Shelf or in King Edward VII Land But this would not only eliminate the South Magnetic Pole, it would involve much more hazardous ice conditions and mean therefore a larger, stronger and inevit ably a very much more expensive ship These losses to the original plan were serious enough But there was another more serious still, for a change to such a distant and less conveniently situated base, a base from which the approaches to the plateau would have first to be explored would greatly duminish his chances of attaining the geographical Pole

It was a hard, indeed a bitter decision to be forced to take and Shackleton thought deeply about it. In the end, however, he gave way and promised to plan has sittempt on the Pole from near King Edward VII Land and to confine subsidiary explorations to that area.

The choice of ship was greatly complicated for he had now to find a vessel able not only to penetrate the familiar waters of McMurdo Sound but to thrust through the most to canfated area of the Royen shar the Bjørn, of seven hundred tons and quipped with powerful engines would have been ideal, but site or a smaller vessel, a Norwegan scaler of less than two hundred tons with an engine which produced so little speed-ax knows or little more-that he had to convert her from schooner to barquentine rig to give her additional sailing power.

Then came the selection of the men out of the flood of applications which had resulted from his announcement in *The Timet*. Here he cut adrift completely from the strictly naval arrangements at which Markham and Scott had aimed. Joyce and Wild certainly had been ratings and Mackay a surgeon in the Royal Navy. But Roberts had been a cook and Adams an officer in the merchant service, and Marston had been teaching art at the Regent Street Polytechnic, Of the scientists Raymond Priestley (now Sir Raymond Priestley) was a young geologist from Bristol University and the other two were Australians: Douglas Mawson (the late Sir Douglas Mawson) from Adelaide University as physicist and Professor Edgworth David, professor of geology at Sydney University, a man of nearly fifty who was recruited for the summer cruise only. In command of this heterogeneous team was a leader who was an adept at decentralization but was himself un behardet worker and the readiest to lend a band. He imposed no formal code of discipline but those—the idle or the quarrelsome —who took too lightly his genality, his eay banter and his lish ways very swiftly learnt their lesson. Neither on this not indeed on any of his expeditions was there room for doubt that Shackleton was in fact as well as in name. The Boss'.

The equipment which the Nimred carried when she sailed from Cowers on 7th August 1907 was in many ways characteristic of 'The Boss's' new approach. There were light-weight ration boxes, his own invention. There were Norwegian sledges and skis, furs and reindeer sleeping bags, a rare British tribut to Scandinavian expertise. And there was a specially adapted motor-car. This, though in practice it never moved far beyond the base, was to prove for the first time that petrol engines could be used in the exceedingly low temperatures of Aniarctica. This progressive experiment, looking forward to the post-war mechanical age of polar exploration, contrasts oddly with Shackleton's choice of Siberian ponies for his chief means of transport. Nansen and Amundsen had advised dogs and Shackleton, according to his preliminary plans, had apparently decided to rely principally upon them. But British priguidices, stemming from the unhappy experiences of the Discovery expedition, were evidently too strong. and the arguments in favour of ponies put forward by the men of the Jackson-Harmsworth expedition who had been with Scott were too convincing Shackleton seems therefore to have changed his mind and ponies were chosen. Though dogs were also taken, ponies remained the means of transport upon which the British were chiefly to rely not only on Shackleton's but on Scott's attempt on the Pole

The Numred sailed from New Zealand (where Shackleton had been lecturing) on New Year's Day 1908 She was an absurdly small ship for so considerable an expedition, with so little storage space for eoal that she had to be towed the whole way to the Antarctic Circle Her decks were so crowded that several points had to be left behind. The weather was immensely rough, and the pointe plunged about in their wooden stills as the Nimod rose and awyed and fell in the heavy seas. The Rois Ice Shelf, however, was reached through mercifully ce free waters and the Nimod made for the inlet where Borchgrevink had landed and the Discovery had put in But there was no inlet. Since Scott's visit great stretches of ice had calved away from the elifts and there was now left a deep and extensive bay which Shackleton called the Bay of Whales.

But the Bay of Whales was a very different place from the one where, after Scott's intervention, Shackleton had resolved to set up winter quarter: Woold any landing at all be now possible? And if it were, would there not be a great danger of further fills of ice from the Shelf which might preceptite camp and men and equipment into the icy water? Just as Shackleton was weigh and shall any other share the set of the state of the share hands A northerly wind sprang up, draving the ice and with the ice the Ninned, headlong towards the clifts and it was only by a matter of minutes that she escaped from being imprisoned in the bay

Shackleton then moved eastwards along the front of the Ice Shell towards King Edward Land but very soon he again came uncomfortably close to disaster, and was forced to pull back from an easterly lead because of the tightening grap of the ice At this point have faced by a most complex and mind racking Edward The Bay of Whales had proved too dangerous King Edward Land, if Capitan England of the Nimed was right and he was already pleading with Shackleton to retreat to the west before it was too late, was unapproachable. Where then was he to go? To the one safe and obvious anchorage in McMurdo Sound? But this would mean breaking his promise to Scott. For fortyeight hours Shackleton, though the captain of the Nimod was in constant anxiety, delayed the decision hoping always that the next hour might bring some possibility of a break through to the east. The ice, however, proved releates and coal insufficient to allow lengthy manoeurers against it. With ship and men, as Captain England continued to insist, in immediate danger, Shackleton had no choice but to turn westwards and make for McMurdo Sound. He guessed, and guessed correctly how Scott would take the news for it meant that he, Shackleton, would sait for the Pole from a base from which considerable preparatory exploration had already been done. But intensely distateful as it was, what other choice could the have made? He found comfort only in the thought that pangs of conscience and accusations of bad faith were preferable to hazarding the Shackleton Shackleton whip and his men.

The ice was still unbroken in McMurdo Sound when Shackleton arrived so winter quarters were established at Cape Royds at the western end of Ross Island and not at Scott's old site. Hut Point, This was no minor matter for Hut Point was two days journey nearer to the Pole. More serious and more immediately important, however, was the problem of access to the Ross Ice Shelf from Ross Island so that preparatory depots along the line of advance to the Pole could be laid before the Antaretic winter set in. With these already laid, the spring journeys could start at the earliest possible moment. Only the western coast of Ross Island, however, afforded access to the Ice Shelf and then only when the intervening sound was frozen over. But just as the Ninrod was steaming away towards the open sea, the ice west of Ross Island broke up and made depot laying quite impossible. The significance of this new misfortune lies in the require-

The significance of this new misfortune lies in the requirements of time and space which governed a polar journey. For this in any average year only four months between October and March were available, major sledging journeys before the end of October being in those days too severe a test while a return to the main base was essential by early March at the latest if the

relief ship was not to be imprisoned for the approaching winter by the newly forming winter ice. The distance to the Pole and back which had to be covered in these four months of summer travel was 1730 statute miles. And thus in turn meant traveling at an average speed of a little more than 14 statute miles a day, a speed which imposed heavy physical strain on men, man hauling most of the ways in the Britch were, at a high altitude, not and over unknown and dangerous country. In such condutors, weight was a vital consideration if supply depots could be lad before or during the outward march ready for use on the tinning homeward journey, the weight on aledges could be greatly reduced if these depots could be lad measure mould be awed, and time was the scarcest of all commodities on these polar journeys

In these days when fast and powerful mechanized vehicles are the principal Antarctic transport, when aircraft can be summoned by radio to drop supplies, or can fly forward to drop supply dumps far in advance of the land parties, such logistic problems though they persist are less urgent But to Shackleton they were vital and as winter approached and no advance depots could be laid because of the break up of the ice, his mind was busy with such calculations The autumn was not uneventful for in March Professor Edgeworth David, the geologist from Sydney Univer sity whom Shackleton had persuaded to winter despite his fifty years, together with Mawson, his fellow Australian, and Mackay, made a first ascent of Mount Erebus to the edge of its active crater, over 13,000 feet above the level of the sea Standing there on the verge of the abyss, they could see nothing 'on account of the huge mass of steam filling the crater and soaring aloft in a column five hundred to a thousand feet high After a continuous loud hissing sound, lasting for some minutes, there would come from below a big dull boom, and immediately great globular masses of steam would rush upwards ' The fumes of burning sulphur filled the air

Where passed without incident, all being occupied with increasing methods and a second second second second sledges and equipment, and with seemingly endless discussions and calculations of the journeys to be made in the spring Ir witnessed, however, one unusual event, the printing of an illustrated book, Aurara Australis, the first to be printed in Antarctica. But even before the full return of the sun when, above the line of the horizon, only the thinnest rays had begun to pierce the darkness, sledging began, up on to the surface of the Ross lee Shelf and frequently to Hut Point, to lay deposts for the spring journeys. Here, though it was useless in anow, Shackleton's motor car caree into its own and towed sledges over the sea ice at six miles an hour.

The main depot-laying journey started towards the end of September and Depot A was established one hundred miles to the south of flut Point. This was achieved by man-hauling mostly, at a remarkably high average speed of twenty miles a day, and it was a good augury for the southern journey. Then the summer plans had radically to be changed. Of the ten ponies shipped on board the Nimred, six had succumbed either to the violence of the voyage or to the rigours of the Antarctic climate. Since Shackleton's dogs were left for the major explorations and a drastic curtailment of the programme was essential. The journey eastward therefore across the lee Shelf to explore King Edward Land was dropped so that everything could be concentrated on the South Magnetic Fole.

The task which in October 1908 confronted 'The Bos' was no less than the accomplishment of the greatest land journey ever attempted in Antarctic exploration. It involved a long march across the wind-swept Ice Shelf, a long ascent to nine thousand feet and more over a precipitous and labyrinthine glacier surface to the polar plateau, then a long journey over the vast and shelterless plateau to the Pole, ascending to twelve or thirteen thousand feet above the sea. But this was only half the task. There was the return march of nearly eight hundred miles, and if the whole journey was to be accomplished within the four months of summer travel, an average speed would have to be maintained twice, nearly three times, that achieved by the men of Scott's National Antarctic Expedition. This made no allowance for distatest or delays, for unforeseen obstacles, for the unpredictable onslaughts of Antarctic weather. It was a tremendous gamble, a gmble against odds, a gamble which appeared not merely acceptable but immensely exhibitanting to Shackleton and the three men who were about to embark on this extraordinary enterprise

Late in October they started with a supporting party who hauled their own sledges, east south east across the Ross Ice Shelf The supporting party turned back on 6th November Then they were on their own, four men, four ponies, two tents, the men, Lieutenant Adams, RNR, meteorologist, Dr Marshall, cartographer, Frank Wild of the Discovery expedition, and 'The Boss' Twelve days later Wild's keen eye detected against the dazzling whiteness of the sunlit Ice Shelf the fluttering pennant of Depot A and by 19th November, despite heavy going through soft snow, they had exceeded Scott's limit for that date Their first set back occurred just as the western mountains which Shackleton had seen on his earlier, calamitous journey, came into view The pony Chinaman, so weak that it could go no further, had to be killed it saved their preserved foods-though as Shackleton remarked 'Poor old Chinaman was a particularly tough and stringy horse'-and it enabled them to leave an ample supply of meat at Depot B, a hundred miles south of Depot A, but it meant that they were left with three ponies only for the greater part of their seventeen hundred mile journey

Shackleton's diary for the night of 26th November contains a reminder of the personal rivalries between the leading explorers which coloured, and sometimes disfigured, the explorations of the Heroic Age As the great snow clad heights of Mount Longstaff and Mount Markham (as Scott had named them) loomed ahead Ernest Shackleton celebrated-on a minute bottle of curacaothe passing of Scott's southern limit on the Ice Shelf, with more than a month in hand Beyond was new land, untouched, unscen by man, and Shackleton's mind responded instantly to the drama of the moment It was with feelings of keen curiosity, not unmingled with awe, that we watched the new mountains rise from the great unknown that lay ahead of us Mighty peaks they were, the eternal snows at their bases, and their rough hewn forms rising high towards the sky No man could tell what we would discover in our march south, what wonders might not be revealed to us, and our imaginations would take wings until a stumble in the snow, the sharp pangs of bunger, or the duil ache of physical weariness brought back our attention to the needs of the immediate present.

Though men and ponies were now hauling together, the three remaining ponies were weakening fast under their loads of six hundred pounds a sledge. Grisi was the next to be shot. The meat, still bloody, was left at Depot C. On 1st December, at 83° S., Quan, The Boss's favourite, went. With one pony left, the four men marched on across the lee Shelf, on a much more easterly course than Scott to avoid crevassed areas near the foothills, towards an isolated peak, three thousand feet high, which they named Mount Hope.

From Mount Hope, Shackleton could see stretching away in the distance a range of massive mountains, bare and sheer, buttressing an immense table-land of ice. Bisecting this range an enormous glacier swept down, a torrent of ice moving imperceptibly yet with such latent power within its frozen mass that the ice shelf at its foot was deeply cracked and split by its downward pressure. This Shackleton named the Beardmore Glacier after the man whose faith in him had made the expedition possible. It was in many respects the most important of his geographical discoveries in that it gave access to the polar plateau.

On Sub December, having struggled through a zone of pressure ridges and crevasses, they started to climb, two thousand feet in the first two miles, in breathless air and over a smooth and treacherous surface. Then a sudden shout broke the silence as Frank Wild, leading the last remaining pony over an apparently solid mow bridge stepped into space and hung, by his left arm only, above a bottomless chasm. Wild and his sledge were saved. But Socks, the last pony, had gone. 'If we had been able to use Socks for food', Shackleton wrote afterwards, 'I have no doubt that we would have been able to get further south, perhaps even to the Fole itself. ...'

On a ration quite inadequate to sustain such physical effort they rately made more than five miles a day as they climbed in vapid air to a height of 5600 feet on the glacier. The mountains which enclosed them here were of an unparalleled grandeur; one, an Immente yellow sandstone cliff, being stristed by a broad black seam of coal. At 6000 feet another depot was laid containing everything they could spare to lighten the last stage of the journey and by Christmas Day, at 9500 feet, they had climbed to the edge of the plateau From this point, in latitude  $86^\circ$  S, they had two hundred and fifty miles to go Breathing was painful at this alutude A buting wind, plereing their clothing and the thin walls of their one tent, had replaced the stale are of the glacer. There hunger meanwhile was growing Even the pony maize was finished, and their daily ration had to be reduced if their food was to last the journey to the Pole and back to the first depot

'If the Barrier Is a changing sea', wrote Shackleton on 28th December, 'the plateau is a changing sky During the morning march we continued to go up hill steadily, but the surface was constantly changing First there was soft snow in layers, then soft snow so deep that we were well over our ankles, and the temperature being well below zero, our fest were cold from anking in No one can say what we are going to find next, but we can go steadily on 'By the last day of the old year at an altuide which inflicted headaches so severe that it was, Shackleton wrote, as though the nerves were being twisted up by a corkscrew and then pulled out', they were in lastitude 86' 54' S, with only three weeks' food and two weeks' biscut to last five hundred geographi cal mile

On its January 1909 Shackleton, looking across the world to where Peary was preparing for yet another attempt on the North Pole, noted that they had passed Peary's northern record of 87° 6' But Shackleton, 'The Boss' whose leadership had urged them thus far, almost to the limit of their endurance, already knew that they could not safely carry the march south much farther. To a man of such impulsive and ambitious temperament, the temptation to continue, as they could have done, must have been almost irresuitible 'We can now', he declared, 'definitely locate the South Pole on the highest plateau in the world, and our geological work and meteorology will be of the greatest use to science, but all thus is no the Pole 'Nevertheless he decided, and it was one of the great decisions of his life, to turn back 'I must look at the matter sensibly', he wrote, 'and consider the Wies of those who are with me I feel that if we go on too far it will be impossible to get back over this surface, and then all the raults will be lost to the world '

The briefest excerpts from his diaries, extracted from some of

the most vivid and stirring passages in polar literature, tell something of the tale of the next few days: 7th January, 'A blinding, shricking blizzard all day, with the temperature ranging from  $60^{\circ}$  to 70° of frost . . . . 8th January, wind, drift, cold, cramp, 'I feel this march must be our limit. We are so short of food, and at this high altitude, 11 (500 feet, it is hard to keep any warmth in our bodies between the scanty meals.' 9th January, 'Our last day outwards. We have shot our bolt, and the tale is latitude 88° 23' South, longitude 162° [Eat,"

On 9th January, at four o'clock in the morning, with the On 9th January, at four o'clock in the morning, with the Queen's Union Jack, and documents and stamps (including New Zealand stamps) for burial in a brass cylinder, they started for the south 'half' running and half walking over a surface much hardened by the recent blizzard' and, hoisting the flags, Shackle ton took possession of the polar plateau in the name of King Edward VII. 'While the Union Jack blew stilly in the icy gale that cut us to the bone, we looked south with our powerful glasses, but could see nothing but the dead white snow plain. There was no break in the plateau as it extended towards the Pole...?

In appalling conditions, they had sledged to within ninety-seren miles of their objective. But there was still the homeward journey to face; a journey rapid as far as the mountains, being downhill and with the wind behind them, then slowing up as dysentery (due, they thought, to the pony meat) attacked them. On the les Shelf they thought, to the pony meat) attacked them. On the les Shelf how the southerly blizzard proved an unexpected blessing for, following Nansen's example on his Greenland ice sheet journey, they hoisted a sail on the sledge and sped over the surface so fast that by 18th February they were within sight of Mount Erebus and Mount Terror. Two days later they reached Depot A, within a bundred miles from Ht Point.

Assume that the party many states of the process of

seen the flag above Depot B and indeed at one moment in their exhausing and seemingly hopeless search they began to doubt whether it had been laid at all Then Marshall [eff] ill and Slackleton and Wild, leaving Adams to look after him, set off for Hut Point on their own At Hut Point, reached on 28th February, the worst of messages awated them The Magnetic Pole party had achieved their task But the Nimod, prepared to wait only until the 26th, had gone. Signals were frantically hosited Frees were lit. And when in the morning, as if by some miracle, the Nimod appeared, it seemed the ultimate and crowring confirmation of all that had ever been suid about Shackleton's luck

The Northern Party of whose success Shackleton had learnt in the letter left at Hut Point had started, under the leadership of Professor Edgeworth David, on 25th September 1903, using the motor car to carry stores across the fee of MeMurdo Sound to a depot ten miles out. The first two hundred miles of their journey to the Magnetic Pole lay over the coastal ice of South Vietoria Land, a coast of which Mawson made a careful trangulation since until then it had only been roughly charted from the sea The party was strong in geologust and the geology of this stretch of coast they found exceptionally exciting After crossing two great ice tongues, one hundred feet high, which projected far out to sea (the Nordenskjold and Drygshik Ice Tongues). David mide for Terra Nova Bay and then aimed to strike westwards by one of the ggainte glaters which led (like thore which Sout and Shackleton had ascended) up through the mountains to the lofly inner polar plateau Reeves Glaterer was tred but proved too steep for sledges They then tried Larsen Glatert to the south west and by the end of December they were up on the plateau, ready to move westwards over its nec waves to the Magnetic Pole

The Northern Party reached the main position of the Magnetic Pole on 16th January 1909 within a week of the climax of Sinckleton's southern journey and, as Shackleton had done, Professor David took possession of the whole region in the name of the Britsh Crown By 4th February, when they met the Namod on the coast, they had travelled a distance over unexplored country of 1260 miles, more than two thirds of the milesge travelled by Shackleton's party But this Northern Party achieved much lets beside this remarkable gourney for a great deal of new land was mapped for the first time and the complicated geological structure of South Victoria Land was now revealed.

While the Northern Party was engaged in these scientific explorations, other scientific work had been in progress nearer the base. Joyce and other members of Shackleton's supporting party, returning to the coast, explored the rocks on the north side of Mount Erebus. Geological explorations were also carried out to the west of McMurdo Sound and of these Priestley's survey from the Ferrar Glacier was the chief event. These scientific investigations, building upon the work of the *Discorey*'s scientific staff, prepared the way for the scientists on the Northern Party of Scott's last expedition. Yet, important as they were in the systematic unfolding of Antarctic geography, it is not by these that the Nimord expedition will be remembered. To have discovered five hundred miles of new mountain ranges flanking the Ross lee Shell; to have assended the Beardmore Glacier; to have brought his men in such conditions and with such inadequate equipment to within ninety-seven miles of the Pole; these were the historic achievements by which Shackleton's return to Antarctica will be remembered.

## The Race to the South Pole

CONGRATULATE you and your comrades most warmly on the splendid result accomplished by your expedition, and in Lhaving succeeded in hoisting the Union Jack presented you by The Queen within a hundred miles of the South Pole, and the Union Jack on the South Magnetie Pole 1 glidly assent to the new range of mountains in the far south bearing the name of Queen Alexandra '

With this message King Edward VII greeted the returning Antarctic hero When he arrived on Monday, 14th June 1909, at Charing Cross Station, foremost among those in the large erowd which welcomed him was Captain Robert Falcon Scott When Scott first heard of Shackteon's move to Cape Royds, he wrote to a friend 'The result to me is most important for it makes it impossible to do anything till he is heard of again There are far consequences 1 won't discuss them now, but you can guess something of my thoughts 'There was now no sign of jealoury, no word of reproach about Shackteon's use of a base so near Hut Point Yet it can have been no comfortable experience thus to witness the trainiph of this merchant service officer, the one member of the Discorrey expedition who had failed and had then demolished Scott's own southern record by three hundred and sixty six miles

Å fortmght later, Shackleton lectured to the Fellows of the Royal Geographical Society in the Albert Hall in the presence of the Prince of Wales (later George V) The lecture, a tour de dramatus ense of the accomplished lecturer which Shackleton had become The kinematograph, used for the first time to illustrate polar exploration, brought so vividly to the large audience assembled in Kensington that summer evening the white weep of the Ice Shelf, the grain majesty of glaciers and mountains,
the cold and desolation of the polar plateau, that they felt themselves to be part of the great Antarctic drama. The Society, influenced by Markham's hostility towards Shackleton and a little incredulous when they first beard the news, had been cautious in their first messages of congratulation. But that evening the fullest amends were made and Shackleton was presented with the coveted Special Gold Medal to commemorate his new discoveries and his initiation of new methods of polar travel and equipment.

But the most welcome of all rewards came from Mr Asquidt, the Prime Minister, who promised that the Government would pay off all the expedition's debts for which Shackteon was, of course, personally responsible. The cost of the expedition had been extraordinarily low, less indeed than the cost of the Discorer alone. Nevertheless, half the total of £54,000 was still due to William Beardmore and Shackleton's other guaranters. Freed from this debt Shackleton's optimism was again unbounded. The book, the global lecture tour, would after all make his fortune. There was no limit, he was convinced, to the possibilities in store.

While Shackleton was thriving on increasing public admirtion, and looking forward to fortune now that fame had been achieved, there were other less sensational explorations in progress in the Antarctic, led by Dr Jean Baptiste Auguste Charcot, Director of the French Laboratory of Maritime Research, Charcot, the first Frenchman (in 1903-5) to explore Antarctica since the great days of d'Urville, had returned in 1908 on a two-year expetition supported by the Government of M. Brind and the Geographical Society of Paris. He was a scientist with no interest in record-breaking journeys, and was preoccupied only with the systematic exploration of the west coast of Graham Land. This peninsuls, together with South Georgia, the South Orkney Islands, the South Shetland Islands, and the South Sandwich Islands had been defined as the Falkland Islands Dependencies by the British Government in 1908 when they issued Letters Patent consolidating earlier claims during from the late eighteenthe century. These, however, were political matters with which Charcot was not concerned.

matters with which Charcot was not concerned. Charcot wintered in the Pourquoi Par? at Petermann Island off the west coast of Graham Land and then in 1909 continued with his systematic charting of the complicated coasts and archipelagos to the south, combining this survey-the basis of later Bruth charts-with much other scientific work. The insularity of Adelaide Island, discovered by John Biscoe, was proved Marguerite Bay, a familiar name to Antarctic explorers after the Second Ward War and War and the Antarctic explorers after the Second World War, was discovered, together with the adjacent Fallieres Coast and Charcot Land, the latter, which was proved by Hubert Wilkins in 1929 to be an island, was named after the French explorer's father, a famous Paris neurologist Charcot Island lay to the west of Alexander Land But Charcot sailed even farther west, to within sight of Peter 1 Oy seen for the first time since Bellingshausen's ships approached it in 1821, and on through the Bellingshausen Sea as far as Cook's Ne Plus Ultra in longitude 106°54 W Charcot's expedition was not only a land mark in terms of the scope and accuracy of his coastal mapping and the wide range of the expedition's scientific work The French explorer also introduced a number of technical innova tions which in the field of polar exploration were quite revolu tionary for the first decade of the twentieth century His ship, the Pourquoi Pas? carried a searchlight and a De Dion motor boat, and was equipped with telephones And electric light was used to light not only the laboratories on board but the scientific sta tions established on the islands

While these French explorations were in progress in Graham Land the pace of polar exploration elsewhere was steady accelerating towards the clumax of the ambitions of the leading polar explorers of pre War days, the attainment of the Poles in the north, just as Peary was preparing to move over the drifting sea ice towards has final triumph. Roald Amundsen the convergina announced has plans for a drifting expedition in Nansen a famous from across the North Pole Thus expedition which in depriving Nansen of his ship meant the ascriftee of Namenda event and the entities of the state of the search of the actination with some financeal support from Scott's patrons in the Royal Geographical Society

A few months later the message from Peary, following swiftly on the spurious claims of Cook, brought to an end a great phase of Arctic exploration. The public, when the messages from Cook and Peary broke upon the world, had barely recovered from the news that Shackleton had been within one hundred miles of victory. Now all eyes were turned to the south again. The Arctic race was over. Who would be first at the South Poler At sea in the Fram Roald Amundsen, the whole incentive for his expedition removed by Peary's sudden announcement, was planning secretly his descent upon the Antarctic. At home, in Britain, Captain Robert Falcon Scott speeded up his plans for his last South Poler expedition.

For two years and more Scott had been contemplating another expedition. In March 1903 when he first heard the deeply disturbing news of Shackleton's landing in McMurdo Sound he had been on his way to south-eastern France to try out, with Charcot's help, a newly invented motor sledge with flexible tracks, the forerunner of the tanks of the First World War. Throughout that year and again in 1909 when Scott, out of touch and urgently needing more time for preparation, managed to get himself transferred to the Admirally, experiments and planning went on and in September 1910 three months after Peary had so dramatically described his North Polar journey to the audience in the Albert Hall in London, Scott judged the moment most favourable for an announcement of his plans. These were centred for an attempt to reach the South Geographical Pole. But combined with this there was, he insisted, to be an extensive programme of scientific exploration in the region east of the Ross Sea, mainly in South Victoria Land.

Organization this time followed the lines of Shackleon's Organization this time followed the lines of Shackleon's expedition rather than those of Scott's first polar venture. There were no official sponsors, no administering committees; a public appeal for funds was launched but the financial responsibility for the whole expedition was, as it had been with Shackleon, the leader's and the leader's alone. Large grants were obtained from the United Kingdom and the Dominion governments. The Admiralty gave leave to all officers and men selected. The Royal Geographical Society also made a generous donation from its funds. Its President, however, took care at the same time to make quite clear the Society's traditional attitude towards these races for the geographical poles. 'So far as the attainment of the Pole is concerned, he declared, 'it is well known that only about a hundred miles remain to be covered This spot may not exhibit any features of exceptional scientific interest, and the Royal Geographical Society could hardly advocate an expedition with the South Pole as its sole objective '

wim inc south fole as its sole objective The Pole, however, was what the public wanted and it was the public who were principally providing the fundi. For Scott too, though he had all the interest in scientific work which Shackleton privately and so disarringly deasowed, the Pole had become an overwhelmingly powerful incentive After Peary's feat, national and professional prestige were both involved and as Scott's biographer, Stephen Gwynn, has said, Antarctic exploration for Scott was 'one chapter in the romance of England on the scas . He was called from the routine of his profession to a new adventure, and has thought from the first was not so much to make the adventure part of his profession as to make his profession part of the adventure ' Added to this there was the latent, but nonche less deep feit and inharpening spur of rivalry with Shackleton which was to have a profound influence on the conduct of Scott's hat expedition

It is impossible in this context not to compare, on the basis of their published biographies, the characters of these two gallant and ambituous men. The one, the dedicated naval officer, an anxious man always "scrutinizing", a biographer asserts, "his own performance to see if it could be bettered, and how, and for what reason, it had fallen abort of the standard which might be reached by proper strength and judgement. The other, Shackleton, the extrovert and the unconventional, the irrepressibly optimustic gambler, endowed with both audacity and luck, whose exuberant attitude to polar exploration reminded his companions of the buccaneting sea captions of Elizabethan days

It would be superfluous to attempt to retell in any detail the story of Scott's last expedition The ship selected was the Terra Nors, an old Scottish whaler which had been one of the ships on the second Discovery relief expedition, and Leutenant E G R. Svans, R N, who had been south in the Moring, was appointed second in command There was a strong scientific staff which included Dr E A Willon, Scott's chief of staff and the expedition's artist, as zoologist, Dr George Simpson, meterologist; and as geologist and surveyor R. Priestley and F. Debenham. Two members of the expedition, Captain Oates, an Army officer, and A. Cherry-Garrard, made generous donations to the expedition's funds. On 1st June 1910, three weeks after the death of King Edward VII, the *Terre Nore* sailed from London, with Scott a little tirted and harassed by all the work of preparation to which had been added the (to him) new, exhausting and distastful tak of stumping the country to raits (maks. The Royal Geographical Society organized an official farewell luncheno before the *Terra Nore* left. And at this, as H. R. Mill the Society's historian recalls, 'Sir Clements Markham pronounced a moving eulogy on his chosen explorer.

The expedition reached Melbourne on 12th October and there at Melbourne Scott received the terse cable from Madeira which read: 'Beg leave to inform you proceeding Antarctica. Amundsen'. Forestalled at the North Pole by the American Peary, Amundsen had resolved to forestall Scott in Antarctica, and until that moment had with remarkable skill kept secret this private intention, informing the press that he was going north, by way of Bering Strait, on a strictly scientific expedition. When therefore the news reached the men of the Tera Nora the effect was all the more staggering and Scott had a hard task controlling their indignation and their anger. But he himself determined to put aside all thought of this unexpected and very formidable competitor and

continued, with every appearance of screnity, on his way. On 2nd January 1911, Mount Erebus was sighted and at Cape Evans in McMurdo Sound seventeen ponies, thirty dogs and two of the new tracked motor sledges (the third having dropped through the ice) were disembarked in delightfully sumry weather. As Shackleton had hoped but failed to do, the autumn months were spent depot-laying, the most important depot being One Ton Camp in approximately 79°26'S, and near the 170th meridian east of Greenwich, a geographical position of some significance in the unfolding of the expedition's story (see map. p. 271).

These automang or use expectation a test, if the a heavy toll of the ponies upon which Scott like Shackleton was relying for the polar journey and especially for hauling stores to the foot of the glacier leading to the plateau. One died, one had to be shot. Six more were lost when the ice of the Sound broke under them. There were, of course, the motor sledges and the dogs, but the former were experimental, useful auxiliaries perhaps, but never intended for lengthy journeys, while the dogs, five loss before the journeys stated, two rescued by Scott from a crevasse on one of the depot journeys at great personal risk to himself, proved as instructible as ever Scott once again was disheartened by their performance and on 12th March wrote, 'Bit by bit I am losing all faith in the dogs I am afraid they will never go the pace we look for 'Yet both Nansen and Amundsen out of their great experience had urged him to take only dogs on the expedition

Something of Scott's attitude to the use of dogs in polar explor-ation was described by Sir Clements Markham in The Lands of Silence 'With regard to the use of dogs', he wrote, 'there were summe "With regard to the use of dogs", he wrote, 'there were two ways of treating them There was the idea of bringing them all back sale and well, which was McClintock's way, and there was the way of getting the greatest amount of work possible out of them, regardless of everyching else, and using them as food, which was Naisen'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 scood way: Bac Scott's evering employment of them in the second way ' But Scott's aversion was not wholly on humanitarian grounds In his Voyage of the Discovery, in a passage which Markham regarded as one of the noblest he had written, Scott describes other feelings, symbolic one might think of the spirit of Antarctica's Heroic Age 'To my mind,' he declares, 'no journey ever made with dogs can approach the height of the fine conception which is realized when a party of men go forth to face hardships, dangers, and difficulties with be to the order characteristic and grant and an entropy of the provided states of the state of t won

While the depot laying was in progress the Terra Nora had carried a party eastwards to explore King Edward VII Land and, off the sparty eastwards to the Bay of Whales which Shackleton had rejected as too dangerous to use as a base and starting point for his southern journey, they found securely anchored Anumdent ship, the *Fram* To Scott's men, it was a most disturbing discovery he was nearer to the Pole than they by sixty miles this dog transport—he had no other—was safely on the Ross Ice Shelf and in excellent condition. And with these dogs (Greenland dogs used to ice conditions and not Siberian dogs as Scott's were). Anundsen could start earlier, for the ponies had already shown how vulnerable they were to bad weather so early in the season.

As soon as the Antarctic winter of 1911 was over, Scott hastened on with preparations for his journey which was to be across the Ice Shelf, up the Beardmore Glacier which Shackleton had already ascended, and thence across the polar plateau. There were to be three support parties, of four men each, who would sledge across the Ice Shelf for the Beardmore Glacier. One would then return and two, one of them including a Russian boy who was in charge of the Siberian dogs and ponies, would accompany Scott's main party to within striking distance of the Pole. All the parties made unexpectedly good progress across the Ice Shelf. Then on 4th December a great summer blizzard struck. For four days they were held up and this was bad enough with a time-table so finely balanced between the limits of the chatractic travelling season. But much worse was the effect on their route over the lower slopes of the Beardmore glacier which they found to be utterly transformed by thunderous avalanches and deep and cavernous movements of the ice.

Up the Bardmore Glader, harassed by this maddening delay and without ponies now for the last had been shot, not Amundsen but Shackleton haunted Scott's mind for he carried with him the diary of Frank Wild who had been with Shackleton on his southern march. 'Throughout the outward journey', wrote Raymond Priestley, geologist on the expedition, some years later, 'Shackleton's team naturally played the part of a ghostly pacemaker in the race. Urged on by a leader of tremendous phylique, of impatient temperament, and for the time being obscsted with one dominating idea, the sledge parties toiled early and late until at last Scott was able to record in his diary that the loss of time on Shackleton's schedule had been made good.' But, the added, 'at what cost this had been accompliand was not realized until later, on the return journey, the polar party itself began to fail'.

The loss in fact was more than made good for the plateau was reached in three days less than Shackleton had taken. The first supporting party was sent back from the Upper Glacier Depot at a height of eight thousand feet and the two remaining parties, led by Scott and Evans, now went forward with Dr Wilson, Captain Oates and the seaman Edgar Evans accompanying Scott while Lieutenant Bowers and two seamen Lashly and Crean were with Evans At an altitude of nine thousand feet and over the worst surface they had struck, they had now to man haul all the way

On 30th December, Scott wrote, 'A very trying tiring march We have caught up Shackleton's dates' Five days later, on 4th January 1912, Bowers, a man of immense strength and powers of endurance, was at the last moment told by Scott to join the polar party He took no skis His addition meant overcrowding ther one tent and disorganizing a carefully prepared routine And has selection involved, as Prestley has pointed out, the man with shortset legs in the party having to trudge on food for over two hundred railes over the deep soft snow of the plateau Houseward there. However, with four officers instead of three and with one seaman, Edgar Evans, living, Priestley commented, 'in a thought tight compartment by himself', Scott set out for the Pole one hundred and seventy eight miles due south Evans meanwhile led the supporting party back down the Beardmore Glacier Suffering from snow blindness on the return journey, he developed an acute and nearly fatal attack of scurvy on the Ice Shelf and was obly heauth acute and the state of scurvy on the Ice Shelf and was only brought to safety after a record journey (without dog teams) of over fifteen hundred miles by the gallant efforts of the seaman Crean

Such are the bare facts of Scott's approach to the Pole The rest of the story, the exhausting march across the plateau, manhauling all the way, the sight of Amunden's black flag tied to a sledge bearer at the Pole, the tell tale marks of sledge tracks. skis, dogs' paws, the death of Evans, Oates' self sacrifice, the utter dejection and tragic end of the homeward journey, these deeply moving events are part of our heritage In January 1912 Shackleton had written to a friend in New Zealand, 'I suppose that we shall soon hear of Scott I am inclined to think that we will hear from Amundsen first 'Five days later, on 17th January, Scott reached the Pole And on 30th October of that same year a search party from the Terra Nova led by Dr Atkinson found the bodies, Ahead were the mountains and the ascent of these to the level of the plateau was to prove far the hardest stretch of the journey There was no means of direct ascent auch as Shackleton and Scott found in the Beardmore Glacuer farther to the east Instead there was a tangle of ice streams, the largest the Axel Heiberg Glacuer curving away at right angles to Amundhem's course, all of them rent by chaims or barred by towering ice blocks which time and again forced the parties reconnoisting ahead of the aledges to turn back and start afresh. The heat within these ice falls was almost torrid and the Norwegans chimbing roped together, Amundsen asys, 'sweated as if running races in the tropics'. By 4th December, however, they had reached the level of the polar plateau

There, at the Butcher's Shop as the Norwegians called it, the slaughter of redundant dogs began Out of the double teams which had been employed for the ten thousand foot ascent, forty dogs were shot, providing food for the remaining dogs and for the men in accordance with Nansen's system (for saving weight on the remaining crucial part of the journey) which Markham and Scott found so savage and repellent, though the shooting of pones and the eating of pony meat appeared to the British quite tolerable On this same day, 4th December, ten thousand feet up on the lip of the plateau, the aummer blizzard which was holding up Scott and his men for four days on the Ice Shelf below, struck the Norwegian party But Amundsen would not wait And three days later Shackleton's southern record was surpassed That night Amundsen wrote in his diary, 'Sir Ernest Shackleton's name will always be written in the annals of exploration in letters of fire Pluck and grit can work wonders, and I know of no better example of this than what that man has accomplished' On 14th December 1911, in perfect weather, the Norwegian flag was unfurled at the Pole fluttering above, as Amundsen named it, King Haakon VII's Plateau' Messages were left for Scott Then the return journey, even more speedily accomplished, began The Pole had been conquered, but what else was achieved?

The Pole had been computered, but what else was achieved? In the south Queen Maud Range had been discovered and Amundsen reported also the discovery of Carmen Land' though its existence was subsequently disproved by the late Admiral Richard E Byrd's United States Antaretic Expedition of 1928-30 during which Byrd made the first flight over the South Pole While Amundsen was crossing the polar plateau, however, K. Prestrud made other geographical discoveries to the east of the Ross lee Shelf. Travelling over the ice from the Bay of Whales, where unexpectedly a Japanese expedition led by Choku Shirase had appeared, Prestrud reached King Edward VII Land (where the Japanese also landed) and after some exploration claimed it on 7th December 1911 in the name of King Haakon VII. But little scientific work was done by this or by Amundsen's party. A shrewd and infinitely careful planner, a master like Peary of the technique of polar travel, Amundsen, like Peary, was wholly preoccupied by his one ambition, the attainment of the Pole; an ambition the more intense and pressing because of the forestalled. Trom this main task no diversion was permissible. No more attention was paid to science therefore than on Peary's North Polar expedition.

The situation on Scott's expedition was very different. Its work indeed-in biology, geology, glaciology, meteorology, and geophysics-which was published in several volumes at the expense of the Scott Memorial Fund, formed a new landmark in Antarctic science. Many of the scientific investigations covered by this mammoth publication were carried out by Scott's Northern Party which, under the command of Lieutenant Campbell, the Chief Officer of the Terra Nora, set off in mid-February 1911 to explore South Victoria Land, as Shackleton's northern party under Mawson had done. The first winter was spent at Cape Adare and Borchgrevink's huts there were found to be in good enough condition to be used as workshops and storehouses. After a winter of gales and hurricanes which broke with great violence upon their hut on the open shore, the party of six-Campbell for magnetic observations, Murray Levick, surgeon and zoologist, Priestley, geologist and meteorologist, two petty officers and a seaman-embarked in January on the Terra Nova for Terra Nova Buy, where they were due to conduct a six weeks' sledging reconmaissance from which they were later to be picked up by the ship.

By mid-February, when the men were already on half rations, no ship had arrived, and indeed none could have reached them for ice stretched as far as the eye could see and even by mid-March there was still ice stretching twenty-fave miles from the coast. They were forced to winter, therefore, in an ice eave, hind with snow and insulated with gravel and dried sea-weed, and in this the six men passed the months of the winter night, bombarded incessnity by gales which swept in from the sea. In September, painfully after so long a spell of immobility, they begin their march southwards to Cape Evans and were lucky to pick up old food depots on the way to relieve their hunger. They reached Hut Point on 12th November 1912, and there heard the first news of the expediation's great disaster.

The explorations of this northern scientific party, and those carried out from the Main Base over the glaciers and coast to the west of Ross Island do not complete the list of geographical discoveries. In 1911, on her way home to New Zealand, the Terro Nova turned, as Shaekleton in the Nimrod had done, northestivarda at Cape Adare and discovered the coast of Oates Land, now on the border between New Zealand's and Australia's Antaretic errotory Despite the wast distances travelled by the land parties, this was the most extensive new discovery made on Captain Section 1 has the coast of the coast of the coast of the coast of the land parties, this was the most extensive new discovery made on

### XXII

### Coast and Continent

THE attainment of the Poles, Arctic and Antarctic in succession, seemed to many to be the end of polar exploration. But a glance at the map would have shown how much remained to be done before even the geographical outline of the polar regions was complete. The Poles had attracted a multitude of expeditions. They had drawn support for polar exploration which would never have been forthcoming for some less dramatic and exciting objective. Nevertheless, the constant prooccupation with their attinment and the great effort this demanded, had inertiably restricted the scope and range of polar exploration. In the Antarctic thousands of miles of costline were still undicovered. Even the broad arrangement of the continent—was it divided to the east and west perhaps by a great channel linking the Weidell and the Ross Sea2-was still unknown.

In the Arctic too, though exploration had been in progress long before a Southern Continent had been as much as sighted, large gyps remained to be filled. One gap was in the coastline of northeast Greenland where a stretch of four hundred miles or more awaited discovery and charting before Peary's work could be completed and the insularity of Greenland proved. But more important, as being the last great zone of the Arctic still to be explored, was the north-western sector of the archipelago now known as the Queen Elizabeth Islands. The discovery of lands there and the exploration of the adjacent Beaufort Sea remained to complete the work begun in the south by Parry and the many British naval expeditions of the nineteenth century and continued in the north and east by Captain Otto Sverdrup, the Norwegian, at the beginning of the twentieth.

The discovery and charting of the north-east corner of Greenland was the achievement of an audacious band of Danish explorers, Mylius-Erichsen, J. P. Koch, Ejnar Mikkelsen, and

Knud Rasmussen between 1906 and 1912 Mylius Erichsen, leader of the Danmark Expedition of 1906-08, was the promoter and inspiration of this enterprise but he and Lieutenant Hagen and an Eskimo, Bronlund, perished on the inland ice during the winter darkness and it fell to Ejnar Mikkelsen, leader of the Alabama Expedition of 1909-12, to reveal and confirm his findings Some maps and a dary describing Myhus Erichsen's discoveries had been recovered by J P Koch of the Danmark Expedition when, searching for Erichsen, he found the body of Evolution when, searching for Linken, to come work of the search of the restrict other dames were found by Mikkelen and these and Mikkelsen's own remarkable journeys, and those of Knud Rammsen who led a relief expedition to north east Greenland in 1912 (when Mikkelsen was overdue), showed how wrong Peary s maps of north east Greenland had been Peary's 'Navy Chiff', far from overlooking the Greenland Sea, was well mland, at the western end of the long and deep 'Independence Fjord' Peary's 'Channel' which he had supposed divided Greenland from Peary Land was proved to be a myth South of Independence Fjord, far from the coast receding, a gaunt and formidable headland was discovered, 'North East Foreland, projecting a broad and menacing front far out into the Arctic Sea

In addition to their coastal explorations, Danish explorers wandered widely over the inland ice in the years before the First World War and crossed and recrossed the ice sheet by routes farther north than Nansen. Rasmissen, on his First Thule Expedition of 1912 (cent to search for Mikkelsen), crossed from Kane Baun to the north east coast. The following year J P. Koch and Alfred Wegener crossed the northerm ice abeet from east to west, starting from Dronning Louise Land This, a peculiar ice free nunatak region Jyng mland from the east coast, had been dis covered by Wegener drumg the Damanck Expedition while Mylus Erichsen was following in Peary's tracks, and from it Wegener and Koch set out in April 1913 to make the 700 mile journey to Upernarik on the west coast. In one respect this was a particularly remarkable journey in the history of Scandinavan exploration for their five sledges were dawn not by dogs but by pomes. The last had to be killed just as the Danes reached the western edge of the Ice sheet early in July These Greenland discoveries, however, were dwarfed in extent by the far ranging explorations of the Canadian anthropologist Vilhjalmur Stelfansson, leader of the Canadian Arctic Expedition of 1913-18. Stefansson, who was to become in the tradition of Rae and Hall and Schwarka the exponent and the protagonist of Eskino methods of travel and survival, had spent screat years living with Eskimo tribes. He had with him, as captain of his principal ship the Karkot, Bob Bartlett whose Antarctic ambitions had been abruptly ended by Amundsen's attainment of the South Pole; Dr R. M. Anderson as chief scientist; and Hubert Wilkins, a daring and imaginative man who was to emerge after the First World War as a pioneer of Arctic aviation and submarine navigation. They were the principal participants in a six-year expedition which in boldness?

Stefansson's plan until the moment when he and a few companions were to strike north-eastwards over the ice of the Beaufort Sea was, on paper, simple, with one group of scientists established near the mouth of the Coppermine River, the other including Stefansson himself being on board the Katluk which was to sail eastwards round Point Barrow and join them. Off the Point, however, the Karlak was beset and while Stefansson and Wilkins were hunting she was swept amid the ice far out to sea and after a drift of four months and a thousand miles sank sixty miles to the north-east of Wrangel Island, Only Bob Bartlett and a few survivors were rescued. Stefansson, meanwhile, had reached the Coppermine and from there in March 1914 set off north-eastwards over the frozen Beaufort Sea. He had two companions, Storkerson and Andreasen, one sledge and six dogs. After a journey of three months, advancing first across the drifting pack-ice and then from floe to floe as the pack dissolved with the warmth of spring, they reached an island outlier off the north-west corner of Banks Island; a coast sighted

sixty years before from the saling ships of the Royal Navy. Between 1914 and 1917, while Europe was plunged in the choos of the First World War. Stefansson and his med netessed in caribou kins and living in tents made of muckox skins roamed widely over the lee of the Beaufort Sea, visiting Banks Island, exploring Prince Patrick Island and linking up with the explorations of Otto Sverdrup in the north east of the archipelago by their discovery of Brock and Borden Islands They linked up also with the voyages of an American explorer Donald MacMillan, one of Peary's men, who had between 1913 and 1917 been searching for Peary's quite mythical 'Croker Land' which Peary thought he had seen to the north west of Ellesmere Island during his expedition of 1906 In the course of these great sledging journeys, made against the contrary drift of the ice or through the thick and bewildering log of the Arctic spring, Stefansson found many relics of the British naval explorers of the nineteenth century, of McClure and McClintock, and one year he visited Winter Harbour where Parry's ships had lain at anchor during the first wintering of a naval ship in the Arctic Stefansson had little use for the rigidly conventional methods of Arctic exploration which the British were so loath to abandon and nothing was more characteristic of his refreshingly progressive approach than the last act of the Canadian Arctic expedition, the establishment of a scientific station on an ice floe Stefansson himself was ill with typhoid fever at the time so the party was led by Storkerson With four companions he set up a camp on an ice floe seven miles in diameter and fifteen miles or more in length and for six months drifted north westwards for over four hundred miles, making regular oceanographical and glacological observations it was a very daring and very profitable experiment, a technique which was adopted by the Russian explorer Paparin in his North Polar drift of 1937-38 It was the prototype, moreover, of the scientific stations set up by both Russians and Americans on drifung ice islands in the Arctic after the Second World War

Stefasson's explorations, the turning of the last corner of Greenland and, for the Arctic record, the first east to west navigation of the North East Passage by Commander Vilkitski of the Imperial Russian Navy in 1913-15, almost closed the list of the few great Arctic enterprises which remained to be completed after Peary's attainment of the Pole. But in the Antarctic the prospects and possibilities of pioneer discovery when the polar race was over were mentably on a much greater scale 'The discovery of the South Pole', wrote Shackleton in March 1912 when he heard the news of Amundken's victory, 'will not exploration of that 'steady, continuous, laborious, and systematic kind' advocated by Sir John Murray in his famous address of 1893 to the Royal Geographical Society To this end, to save tume and ensure as complete a coverage as possible, exploration was planned from four bases simultaneously, three on the mainland, contact between the bases and with the outer world being maintained by wireless telegraphy for the first time in Antarctica Mawson's ship was the Aurone, an old sealer which had gone to the relief of Greeley's Arctic expedition in 1884 She was com manded by one of the most distinguished of Antarctic navigators, Captan John King Daws

Dogi, for the first time on a British Antaretic expedition, were to be the principal means of transport, a motor boat such as Chatcot, the French explorer of western Graham Land, had used a year or two before, was taken, and Maswon also planned to take an acroplane, a bold experiment in 1911 only two years after Blenot had made the first aeroplane crossing of the English Channel This, however, crashed on a trail flight near Adelaide and was converted into, but never used as, an air tractor sledge

After discmbarking a party of scientist to map Macquirie land, since permanently occupied by Australia, the Anora steamed southwards along the 159th merdian east of Greenwich in the direction of Oates Land. In January 1912 the ice cliffs of the continent, scienty to a hundred feet high, were seen The Anora then turned wettwards and followed the ice coast of a new land which Mawson called King George V Land until they hit upon a site for their main winter base, on Cape Denison in Commonwealth Bay

By contrast with 'Victoria Land away to the east with its noble mountains, its curving and glistering glaciers and turnultuous ice falls, this was a monotonous scene, a vast and flat expanse of loss shelf rising towards the south, broken only by the shadowed scars of crevases or the black shapes of a few bare and solitary rocks Winds unceasing and more furious than any in Antarctica weep this melancholy land in September 1912, as the Northern Party of Scott s expediation were leaving Terra Nova Bay, the Australians embarked on their explorations There were four parties, led by C T Madagan, F L Sullwell, F H Bickerton and Douglas Mawson himself, all except Mawson's party manhauling their sledges because of a shortage of dogs. While these were engaged in exploring King George V Land, a fifth party concentrating on magnetic research advanced under Lieutenant Bage south-eastwards towards the Magnetic Pole.

Between September 1912 and February 1913 King George V Land was systematically explored. Coast and coastal highlands and the slopes of the inland ice sheet were mapped, the movement, depth, temperature and composition of the ice was investigated and the rocks of the snow-free outcrops were examined. From these rocks and from the cliffs, lichens, algae and mosses were collected and in some beacons of white sandstone fossilized plant remains were found, relics of a tropical Antarctica. Apart from this sparse and anaemic vegetation and a few exceptionally hardy microscopic insects which had survived the deadly cold, there was no sign of land life. But seals and penguins, skuas, Cape pigeons, and other petrels abounded and the rocky islets off the coast especially were the haunts of countless birds. In the course of these journeys, not only King George V Land but the adjacent Terre Adélie, claimed by Dumont d'Urville for France in 1840, was explored and Bage reached within 175 miles of Edgeworth David's turning point in 1909 in the vicinity of the South Magnetic Pole.

Mawson, a reserved and modest scientist, had not the least ambition to star as an Antarctic hero but one of his journeys nevertheless, a journey from Cape Denison towards Oates Land belongs, like the land journeys of Peary, Scott and Shackleton, to the literature of the Heroic Age. His companions were B. E. S. Ninnis, a young Royal Fusilier, and Dr Xavier Mertz, a young Swiss mountaineer and ski champion whose father had been surgeon with Nares' Arctic expedition of 1875. Their way led over two of the most gigantic of Antarctic glaciers, the Mertz and Ninnis glaciers, which poured 'a solid ocean rising and falling in billows two hundred and fifty feet in beight' down through deep valleys from the continental plateau and far out into the sea. In the midst of this ice shambles Ninnis, with sledge and dogs and most of the food, fell beyond the reach of any rope into the echoing darkness of a seemingly bottomless crevasse. A few days later, Mertz, who had been weakening fast, died in his sleep one

night as he and Mawson lay close together sheltering in their makeshift tent Mawson was then left to struggle on alone, his feet gashed and blustered, his sey sight dimmed and confused by his exhaustion. Man hauling ahalf sledge, more than ample for the remnants of his food and gear, he survived bluzzards, he secaped death in a crevase only by the narrowest of margins, and arrived at Cape Denson after a solitary journey of one hundred and axity miles over some of the most treacherous and wind lashed ice country in Antarctica, only to see the Auroro sailing out of Commonwealth Bay

The Autora under her captain, John K Davis, had been exceedingly active during Mawson's long and alarming absence After he had disembarked the wintering party at Cape Denison, Davis had sailed westwards, anti clockwise round the continent, aiming to explore the coast between King George V Land and Drygalski's Kaiser Wilhelm II Land, and then to land a party under Shackleton's former right hand man, Frank Wild, near the region of the earlier German explorations To Davis, this linking voyage proved most instructive for it showed how the ice front had receded, just as the Ross Ice Shelf had receded, since the cursory explorations in the first half of the nineteenth century by Dumont d'Urville, John Balleny and Wilkes Dumont d Urville's Côte Clarie, much of Wilkes's coast, and John Balleny's Sabrina Land were in turn sailed over and as the Autoro reached longitude 106° East where Wilkes's Knox Land (now Knox Coast) should have been, pack ice held them fifty miles from the shore Beyond Knox Coast lay 200 miles of ice free sea-the Davis Sea-washing the shores of new land, Queen Mary Land, later claimed for the Crown Projecting 180 miles from this new coast was an immense ice shelf, 150 miles wide On this, the Shackleton Ice Shelf, Frank Wild and his party of seven men established their winter base

The Aurora sailed northwards on 12th February 1912, Davis promising to return in Junuary 1913 to pick up the whole expedition, and Wild and his men set about their three main tasks These were to travel asouth as far as the ran of the continental plateau—a journey they completed before the onset of winter and to travel east and west from Shackleton Ice Shelf, 200 miles to the cast to reach Drgaback's cann at a Gaussberg and a similar distance to the west to reach the presumed position of Wilker's Knox Coast, These journeys, begun in October and November 1912 over country riven and distorted by giant crevases, where avalanches thundered and glaciers cracked like gun-fire, were completed by Fehruary 1913 when the *Aurora* once again appeared off the Shackleton Ice Shelf. Queen Mary Land, like Terre Addile, proved to be a region of constant winds, gales and blizzards which hurled down the wireless masts during the winter and on one occasion held up a sledging party led by Dr Jones for a record period of seventeen days. But for the naturalists of Wild'spartyithad many compensations. Nearone of the numerous rocky islets off the coast they came upon an Emperor penguin rookery of 7500 birds covering nearly five arcs of fast lice. Addile penguia rookeries were numerous. A rookery of 300 pettels was the first that had been found in Antaretica.

The Autora arrived, a month overdue, on 23rd February and her captain, John K. Davis, had a story to tell no less eventful than that of Frank Wild and his men. Planning to relieve Mawson's base first before going on to relieve Wild, he had anchored off Cape Denison on 13th January and one by one the sledging parties -Madigan and Stillwell, Bage and Bickerton-had come in. But of Mawson there was no sign. Davis waited until, indeed until after, 15th January when Mawson had told him that if by chance he was missing he was to take over leadership of the expedition. But there was still no news. He had therefore to decide what to do. The relief of Wild's party on the Shackleton lce Shelf-they had expected him on 30th January-was obviously an immediate duty, so he placed Madigan in charge of the search for Mawson and sailed for Queen Mary Land. On the way, however, a wireless message told him of Mawson's safe return and of the death of Ninnis and Mertz, Madigan asked him to turn back to Cape Denison and he tried, despite dense mist followed by heavy seas. But he could not possibly have landed. He turned back again therefore to the Shackleton Ice Shelf to bring off Wild and his men. But it was now far too late in the season to risk another journey to Cape Denison to take off Manson and the rest of the Australasian Antarctic Expedition and the Aurora sailed for Australia. There and in England, meanwhile, a Mawson Relief Fund had been launched and Davis was able to return to Cape

Denison in December 1913 to rescue Mawson and his men after their third winter in Antarctica

It was characteristic of Mawson that even after so long and so harrowing a campaign he refused to turn north until the whole coastline between the Mertz Glacier and Gaussberg had been charted from the sea. This survey of a great are of Antaretic coast was the last link in the chain which Mawson had forged and by it the discoveries of Wilkes and Durnont d'Urville, Scott and Drygalski, were joined At each end were the newly discovered regions of King George V Land and Queen Mary Land, the first lands to be acquired there by the Britsh Crown

Shaekleton had placed next in importance to such coastal discoveries as these, a trans continental journey from the Weddell Sea to the Ross Sea crossing the Pole It was no new idea for in 1910 William Spiers Bruce, the discoverer of Coats Land in the Weddell Sea, had circulated a printed prospectus appealing for funds for just such an expedition, but without result More over, the idea of a trans continental crossing had also been taken up by a German explorer Wilhelm Filchner who was attracted like Bruce by the possibility that it might settle a problem of absorbing interest to Antarctic explorers and geographers, whether a channel divided the central Antarctic land mass between the two great embayments of the Weddell and the Ross Seas But for Filchner too a trans continental expedition, involving two widely separated ships and land bases, proved far beyond the resources he could raise Rather than abandon the scheme altogether however he decided to restrict himself to a landing on the Weddell Sea coast, since this, if it succeeded, would at least establish a starting point for an attempt to cross the contment and would be a landing on a coast which, apart from the stretch cursorily examined from the sea by Bruce, was totally unexplored

Fichner's ship, the *Deutschland*, a Norwegian sailing ship with auxiliary engines, left Hamburg harbour on her way to Buenos Aires in May 1911 And from Buenos Aires, where Fichner talked with Amundsen on board the *Fram*, she sailed, her decks alive with Manchuran pomes and Greenland dogs (and oxen, sheep and pigs presented by Argentine admirers), for South Georgia Her captan was Ruchard Vahrel and she carried two doctors and a scientific staff of five, equipped for special research both on land and at sea. On 14th December, the pack was sighted and entered well to the east as Bruce had recommended. The ice increased in density as they moved southwards but by 24th January they were through it and off Bruce's Coats Land in a relatively open sea. As they moved weatwards they saw projecting towards the north and west the long monotonous line of an ice front, the frontal edge of a vastice shelf whose limits couldnowhere be seen. Filchner was now well beyond the range of Bruce's explorations and in a region never explored. He therefore named the new territory 'Pirnz Regent Luitypol Land' (Luitypol Coast) and the ice-shelf the 'Kaiser Wilhelm Barrier'. This name, at the Kaiser's command, was subsequently changed to Filchner Ice Shelf, the name which is retained today.

As the Deutschland edged her way cautiously along the ice front a bay appeared and was named after the Deutschland's captain Vahsel Bay. This desolate stretch of ice shelf Filchner chose as the site for his winter hase, 'Stationseisberg', the base from which he proposed to explore both westwards and southwards as far as the junction with the continental land. By dawn on Sunday, 18th February, the hut was almost ready when, with a crash and a rumble like the sound, Filchner said, of a hundred guns, the ice front to the south fell away into the sea. The men of Stationseisberg were in immediate danger for the ocean swell and the high spring tide created a chaos of floating ice blocks round the berg and set it slowly drifting out to sea. Men and stores, ponies and dogs, were rushed on board the Deutschland which then moved out into the open water. But when she returned Vahsel Bay as first seen by Filchner and his men had disappeared.

The collapse of the ice front, however, had left a landing place and from this early in March the German sledged southwards as far as the inland ice. This first landing on the cost of the Weddell Sea so late in the season allowed no time whatever for extensive exploration. As it was, the Germans had left their departure too late and the *Deutschland* was beset and compelled to drift for nine months north and west with the ice. It was a high ritbute to her builders that the Norwegian ship should have survived an experience which three years hart was to crush and oblitestate another exploring vessel The long draft through the lugubrious winter darkness was angularly uneventful Health was excellent, dogs and points were comfortably housed in stables built on the drifting pack, and Filchner was even able to hunch a number of isdeing expeditions. These at least made one valuable contribution to Antarctic geography for they disproved the existence of 'New South Greenland', had reported by the integrative American scaling captain Benjamin Morrell in 1823. On 26th November 1912 the Deutschlaud moved genity through decaying pack into open water in the direction of South Georgia after a drift of six hundred geographical miles of latitude. The only loss was the death of her captain who was buried at sea near the Antarctite Circle

Fulchner's landing place, Valsel Bay, had--as he realized--one great advantage from the point of view of a trans Antarctic crossing it was the point on the Weddell Sea coast nearest the Geographical Pole. The German landings there had indeed placed the whole trans Antarctic project in a far more favourable light than at the time of Bruce s original proposals. The coast at both the start and the finith of the crossing was now known, the Ross Sea side with all the intimate, detailed, knowledge which had accumulated during the Scott and Shackleton expeditions. All that now remained was to originate the trans Antarctic expedition, starting on the least familiar and terminating on the best known coast in accordance with Bruce's plan.

In Germany Filchner set about the promotion of an Austro Hungaran trains Antarcine expedition In England Shackleton at Bruce a suggestion took over his plana and used the threat of foreign competition with excellent effect in his campaign to why up support This was a good deal easier to win now than in Bruce s day when the attention of the world had been wholly concentrated on the Pole Except by a few captions critics, the great hazards of a trans continental expedition—in a pre sur and pre Sincer age—were forgotten. The narrow encage of the Deutschland from the twee most dangerous of Antarctic seas, the lack of provincin for any recommission of the wholly in known threth between Weddell Sea and the Pole, the narrow time limits within which a sledging journey of over two thousand miles would lave to be accompliahed, these risks and dangerts, like the cost and complications of so elaborate an expedition, were submerged in the rising tide of public enthusiasm.

Filchner's schemes for an Austro-Hungarian expedition met no such encouragement, the resources of Germany and her allies, on the eve of the First World War, not being allowed to be diminished by even the cost of an Antarctic expedition. In England it was otherwise. The early days of the Imperial Trans-Antarctic Expedition admittedly were anxious, with Shackleton in debt to the extent of £50,000. But, to his astonishment and relief, a wealthy but dour and cutions Scot, the jute manufacturer Sir James Caird, came to the rescue with a donation equal to half this sum. With this support, with a grant of £10,000 from the Government, generous donations from two of his most faithful admirers, Mits Elizabeth Dawson Lambton and Dame Stancomb Wills, and substantial assistance firom the Royal Geographical Society, the Imperial Trans-Antarctic Expedition was firmly established.

In its essentials Shackleton's plan was just what Bruce had proposed, namely the landing of a crossing party on the Weddell Sea coast and the landing of a support party in the Ross Sea. The latter would lay depots across the les Shell up to the Beardmore Glacier for the use of the crossing party descending from the Pole. There was, however, one difference. Shackleton did not intend that any scientific work should be done by the crossing party. Sclence was to be the function of two subsidiary parties, one (geological) moving westwards towards Graham Land, the other travelling eastwards towards theoreby Land.

The ships of the Trans-Antarctic Expedition were the Polarit, a new Norwegian vessel renamed the Endurance after Shackleton's family moto, and the Anova from Sir Dooglas Mawson's expedition. The Endurance, destined for the Weddell Sea, was equipped with a primitive wireless receiver, but not with a transmitter; a means of contact with the outer world very successfully used on Mawson's expedition. This equipment (which never worked) was accepted by Shackleton with the greatest reluctance. Wireless might mean the intervention of sponsors, or tiresome directions, or remindersof those problems and complexities of civilized life by which he found himself so constantly builted at home. In the Antarctic at least the was at peace and master of his destiny. He did not welcome means, however valuable from a safety point of view, whereby this peace could be disturbed

No sconer were the two shaps prepared, the *Aurora* in Australia, the *Endurance* in England, when the Erst World War broke out Shackleton was quick to as the Without even consulting the donors, Sir James Caird and others, who had made the expedition possible to offered it, ships, men, dogs and equipment to the Govern ment as a single unit. Mr Winston Churchill, then at the Admirally, thanked hum for the offer Bur he instructed hum nevertheless to carry on with his Antaretic plans and on Saturday. 8th August 194, four days after Brann's declaration of war on Germany, the *Endurance* sailed from Plymouth Harbour, bound for the Weddell Sea Shackleton could not have done more than offer his entire expedition to the Government. Nevertheless, the departure of the men of the *Endurance* at so entical a moment in British history duit not fail to arouse comment and this shapened considerably two years later when urgent demands for a relife expedition arrived

In South Georgus Shackleton heard from the whalers that it was an exceptionally bad ice year in the Weddell Sea He decided nevertheless to try and reach Vahiel Bay but to postpone the start of the crossing journey until the Antarctic summer (October-March) of 1915-16 As Bruce and Filchner and the whalers at South Georgus advised, Shackleton entered the Weddell Sea as far east as possible, as far indeed as the fifteenth meridian of west longitude, and by New Year's Day 1915 the Endurance had seamed through nearly five hundred miles of pack into the clear blue water which washed the flat and featureless ice front of Coats Land By the middle of January 1915, Bruce's farthest south was exceeded, then a new coastine, no less flat, no less monotonous appeared, presenting an ice front rising forty feet above the water. This new coast apparently linked Coats Land with Filchner's 'Lumpid Land' and Shackleton named it after his principal benefactor, Bir James Carit A guar glacer to ngue projecting from it—it has since disintegrated—he named after Dame Stancomb Wills

Shackleton had no intention of landing north of Filchner's Vahsel Bay on Luitpold Coast if he could possibly avoid it for to do so would mean adding two hundred miles to the journey to the Pole. Nevertheless, as a precautionary measure he looked for landing places and found one in a bay sheltered from the southeasterity winds by a glacier towering four hundred feet high. There in 'Glacier Bay', as he called it, he could have landed; it was a chance which, if (with aircraft) he could have seen what lay ahead, he would perhaps have taken. But he rejected it. 'I had reason later, 'Shackleton wrote, 'to remember it with regret.'

From this point on Caird Coast Vahsel Bay was a hundred miles away. But the Endurance had covered little more than half this distance when she was beset, on 19th January 1915, in the ice. Then the long and ultimately disastrous drift, longer even than the drift of the Deutschland, began. South-west, north-west, once within forty miles of the Filchner Ice Shelf, then away to the north-west again, for nine months the Endurance, her timbers cracking and groaning in the tightening grip of the ice, drifted towards her inevitable doom. Then the climax came, the death of a ship destroyed by the pack. 'At last,' wrote Shackleton, the twisting, grinding floes were working their will on the ship. It was a sickening sensation to feel the decks breaking up under one's feet, the great beams bending then snapping with a noise like heavy gunfire. . . Just before leaving I looked down the engine room skylight as I stood on the quivering deck, and saw the engines dropping sideways as the stays and bod-plates gave way. I cannot describe the impression of relentless destruction which was forced upon me as I looked down and around. The floes, with the force of millions of tons of moving ice behind them were simply annihilating the ship."

Shuckleton had his plans well prepared and the disembarksiton of men and dogs and equipment went without a hitch. But where should they now make for? For Nordenskjöld's hut three humdred and twelve miles to the north? For Robertson island, the nearest had to broken for sledges, yet with too little open water to easile them to hunch the **bosts**? From Ocean Camp, near the spot where the ice had closed over the shattered top masts of the *Endvance*, they moved to Patience Camp and from there they tried to sledge to the nearest had to the west. But in seven days, with dogs and sledges pulling only two out of the three cumbrous ship's boast hey made co more than seven miles; a rate at which they would have taken three hundred days to reach the nearest land All they could do was to wait for the ice to break up so that they could aunch the bosts Meanwhile they could east and sleep, sleep and eat, meals mostly of seals and penguns though varied on one memorable occasuon by some undigested fish from the stomach of a leopard seal. The weather over the Weddell Sea was astonishing in its variety. In the first half of January it had been warm and ealm, with their ice floe almost stationary. Then a succession of south westerly gales rising to bhizards awen's them across the Antarcine Circle to within one hundred and fity miles of land. March 1916 was a month of constant and extraordinary change, continuous gales and blizards, days when the air was still but intensely cold, then sumshne, then the strangest of Antarctic sights, hours of rain By March, they had drifted far to the north, beyond the northern extremity of the Graham Land pennisula Clarence tsland and Elephant Island, outliers of the South Shetland group, were only a hundred miles away.

Shackleton and hu men sighted Clarence Island in the early days of April 1916 Nevertheless, though land was in sight and a barely perceptible swell beneath the iee told them that the open sea was near, those days were more dangerous than any they had so patiently endured because the pack, due to the action of wind and swell, was slowly disintegrating. Yet they hesitated to launch the boats for the swell, lengtheming as they approached the open sea, had begun to dirve the floes together in great confusion Past Clarence Island, however, with the edge of the pack in sight, they dared was no longer and as they launched the boats they were met by 'a rush of foam clad water and tossing ice' which swept towards them like a tudal bore

Shackleton's objective was Elephan Island By day they rowed and sailed through a maze of drifting and colliding floes and bergs, uncomfortably conscious all the time that the killer whales which wallowed and blew around them with a hissing noise like the jets of a steam engine might mistake the white bottoms of the boats for their familiar ice By night they camped on the floes. But rest was not easy for at any moment the floes without warning might open up beneath their tents indiced on one occasion Shackleton, warned by some sixth sense of danger, was only just in time to snatch a man in his sleeping-bag out of the sea before the two halves of a floe, as suddenly as they had opened, crashed together again.

Shackleton had not been long on Elephant Island before he decided that the health and mental condition of his men and the shortage of food made it essential that he should try somehow to reach South Georgia for help before winter froze the sea around them. Leaving the men on Elephant Island in charge of the everreliable Frank Wild he set off across 800 miles of ocean in one of the ship's boats the James Caird. The story of this voyage, comparable only with the wonderful open boat journey of Barents's men in the Arctic in the sixteenth century, is an epic of maritime adventure retold in one of the most stirring of all books of adventure, Shackleton's South. The James Caird had only a makeshift decking of canvas. Often the whale boat was half-full of water and shuddering under the blows of gigantic waves. But by superb seamanship and navigation, fortified by the dauntless, invincible spirit of a man who remained unshaken by even such mountainous and destructive seas, they made a landfall and after crossing (for the first time in history) the mountains of South Georgia they reached the safety of a whaling station.

The year 1916, the year of the massacres at Verdun and on the Somme, was not a time when the people of Britian were readily inclined to turn their thoughts to the Antarctic, and Shackleton's urgent appeals that an immediate relief expedition be launched fell in some quarters on unsympathetic cars. In the end, however, not one but four relief expeditions were organized—two British, one Uruguyan and one Chilean—and these between May and August 1916 attempted in turn to reach the men on Elephant Island. On 30th August 1916 the fourth and last of the relief expeditions on the Chilean ship Yeldos got through with Shackleton, of course, on board, as he had been on all the previous but unsuccessful attempts.

The 800-mile boat journey, the desperate scramble over the mountains, and these four successive voyages were not the end of Shackleton's successing efforts to rescue the men of the Imperial Trans-Antarctic Expedition. At the other side of the continent the Ross Sea party had been in scarredy less desperate straits. They at least had carried out their allotted task, that of laying depots southwards to the Beardmore Glacser But in May 1915 as the Enduance was drifting towards disaster in the Weddell Sea, the ice moorings of the Ross Sea ship, the old Aurora, parted in a blizzard leaving stranded the ten men who had wintered at Cape Evans on Ross Island For inne months, the Aurora under her first officer Leutenant J R Stenhouse drifted in the ice of the Ross Sea, battered, rudderless and with little coal But she escaped and established wireless contact with New Zealand Shackleton reached New Zealand in December 1916 Within three weeks the Aurora, chartered by the British, Australian and New Zealand governments, was refitted and sailed under her former commander John K Davis, with Shackleton again on board, to rescue the Ross Sea survivors

Shackleton's Imperal Trans Antarctic Expedition was a failure But it was a failure distinguished by a display of courses and endurance and, on Shackleton s part once again, of powers of leadership unparalleled in polar exploration Geographically it had addel little to the discoveries of Bruce and Filchmer beyond the short southern stretch of the Card Coast but even so, seen in the perspective of history, the expedition made a contribution, and possibly a decuive one, to future Antarctic achievement Throughout the ten month drift of the Endurance and during the long sojourn on the drifting pack, a young Seottub geologist from Cambridge, J M Wordie (now Sir James Wordie), Stackleton's shiel of scientific staff, had made careful and con tunuous observations of the movement and nature of the sea ice more than forty years later when the ships of the British International Geophysical Year expedition and of Sir Vivian Fuchs' trans Antarctic expedition entered the Weddell Sea the course they took, the course which brought through the pack to the clear blue waters off the ice bound cost, was dictated very largely by the unimate knowledge of sea ice conditions gained by Wordie during the drift of the Imperal Trans Antarctic Expedition

For the historian of the Antarctic, the year 1916, the year of the Shackkton relief expeditions, is memorable also because during it Sir Clements Markham, to whom more than anyone the reveal of Antarctic exploration at the turn of the century had been due, died at the age of eighty six Emmin 1830 be had lived long enough to remember the great days of sail when the ships of the British Navy had battled in Arctic seas and by his death the link with the Franklin Search, with the dramas and the tensions which had so stirred the mid-Victorian emotions, was broken. Of recent years, he had been a little out of touch, uncomfortably aware of new trends, of the new language and pervasive influence of science which he instinctively distrusted and because of this perhaps had clung with even greater obduracy to his reactionary ways. It was so even at the moment of his death, from injuries due to burning in his house in Eccleston Square, As a midshipman he used to read in his hammock, holding a candle in one hand and a book in the other. He was reading like this in bed one night when the candle dropped and the bed caught fire. Above the bed an electric light bulb hung unlit.

## PART FIVE POSTSCRIPT TO POLAR HISTORY

#### XXIII

# Between the Two World Wars

HE polar events of the forty years which divide Shackleton's Trans-Antarctic Expedition from the great concentration Trans-Antarctic Expedition from the gradient on polar science during the International Geophysical Year on polar science during the International Department of the science of 1957-58 are too close to be seen in historical perspective. However, the briefest survey shows how the end of the War marked the closing of an old, the opening of a new, era marked by certain distinctive trends, developments and influences. Indeed almost at once the dividing line, the break with the past, was symbolized by a calamitous event. This was the death in the Antarctic of Ernest Shackleton, on board his ship the Quest, on S January 1922, off the island of South Georgia during a voyage to discover new coast-lands in the region of Enderby Land. By his death the world was deprived of the greatest individual leader in polar exploration, a man whose spirit, brave and generous, gay and adventurous, had illuminated a great era of Antarctic exploration.

In the technical field, the most important new development after the War, more important by far than the introduction of steam powered ships in the nineteenth century, was the entry of the polar regions into the Air Age; not only in the sense of the use of air power in exploration, for reconnaissance, for transport and supply, for communication, but in providing (in the Arctic) motives for research—especially in meteorology—which would directly benefit polar aviation. There were, too, important developments in the political field leading in the years between the two world wars to the partitioning among the interested powers of almost all the discovered polar areas. Governments claiming sovereignty over polar territories became enthusiastic patrons of polar exploration, seeking to consolidate their claims by establishing land bases or by fostering research and development projects. Occupation, administration, plans for research leading to the development of natural resources, mapping, these were all

evidence of state activity supporting claims to sovereignty, evidence which an international court would be very likely to require in cases of disputed or overlapping claims as in the Antarctic These new incentives to exploration, like the old incentive, rivalry for the Poles, were valuable-even if they were an autochlated antarctic the source and they were a source and they were a source and the source and and particularly attractive—to the explorers and scientists con cerned because, even though only incidentally, they aided the advancement of exploration and research

Parallel with these technical and political developments were important developments in the scientific field, brought about by the demand for a greater co ordination and exchange of informa tion about polar exploration, scientific discovery, and techniques In the national field this led to the establishment of polar centres or institutes, such as the Scott Polar Research Institute founded in 1920 out of the proceeds of the Scott Memorial Fund, or, among government organizations, the 'Chief Administration of the Northern Sea Route' set up by the Soviet Government in 1932 In the international field this same need for greater integration of effort, the more urgent as exploring expeditions multiplied and specialization increased, led to the launching of the Second International Polar Year of 1932-33 The First international Polar Year, of 1882-83, too often remembered only by the calamity which befeil the Greeley expedition, had added substantially to knowledge of geomagnetism and meteoro logy The Second International Year, which was concentrated bits its precessor in the Arctes, made further advances in these branches of geophysics and in addition embarked upon studies of the ionosphere, the ionized region of the upper atmosphere responsible for the reflection of radio waves This was research for which the polar regions are particularly important because of the long alternating period of daylight and darkness It of the long atternating period of daying tand darked as became increasingly important as radio communication deve loped rapidly after the First World War The most important advances during the Second International Polar Year were made, however, in meteorology, vitally amportant to the progress of polar avaiton in peace and in war During the Second Inter-national Polar Year, namety four meteorological stations were manned in the davies of the tables were dear the Ever Polar manned in the Arctic (as against thirteen during the First Polar Year) and for the first time reliable information was provided about Arctic weather and the relation between ice drift and movement and the behaviour of the winds.

The realization that commercial aircraft, if they could be safely navigated across the Arctic by Great Circle routes, could greatly shorten the flying time between the great centres of population in the eastern and western hemispheres led many exploring expeditions between the wars to study the meteorology of the Greenland ice sheet not only because it by in the track of future air routes but because its great mass of ice, like the even greater mass covering the Antarctic continent, had a profound influence on weather. Studies of Arctic weather and Arctic ice were no less important to sea navigation, particularly for the new Soviet Government of Russia whose northern coast is especially vulnerable to the circular and branching ice movements of the Arctic Ocean. Thus the beginning of an organized effort by Russia to promote and expand Arctic research was a development of the first importance to setween the wars.

The impact of air power did not greatly affect the pattern of polar travel until after the Second World War. This remained, in the classic tradition established by the North American and Scandinavian travellers, as firmly based as ever on the dog and aledge. Even the British, opposed as their leading explorers had for so long been to the use of dogs in exploration, had learnt their lesson and not only adopted but now strove hard to improve upon the sledging techniques which had won for America and Norway the Foles. won by Canadian trappers and traders and British naval officers during the nineteenth century

There was, however, little scope left in the Arctic in the second quarter of the twentieth century for record breaking journeys of such magnitude indeed only within the great ice sheet covering Greenland was there scope for exploration on anything like the grand scale. For this reason and because of its great agnificance in ice and weather research, namermost Greenland in the nuncteen thirties attracted a succession of expeditions, German, British and American, the most important between the wars in each case, as the earlier Dansh explorers had advised, a central weather station in the heart of the ice sheet for continuous observations was the core of the scientific programme

Between 1926 and 1931 three expeditions established stations of this kind the University of Michigan Expedition led by a rigorous controversials in Antaretic history, Professor William H Hobbs, the German Greenland Expedition led by the fify one year old Professor Alfred Wegener who had been with Myluie Erichten in Greenland, and the Brutish Arcine Air Route Expedition led by an adventurous and volatile young Cambridge Arctic traveller, H G (Gino) Watkus Of these Wegener's was scientifically the most productive and in the use of motor sledges and new instruments for measuring the thackness of the ice cover by echo sounding (seismic) methods, was technologically the roost advanced A central weather station was built on the 71st parallel, some 250 miles from the west coast, but in November 1930 the expediution had its tragedy for on a journey, a necessary but dangerous journey at the onset of winter, from this station to the coast, Wegener and a companion, Willemsen, died of exhaution and exposure

The Bruth Archic Air Ronte Expedition, led by Gino Watkins was the most ambituous Archic expedition sent out from Britan sunce the Scott and Shackleton days Its motive was meteorological research and survey against the day when commercial aircraft flying over Greeniand would accomplish a North West Passage by air. The most promising air routie from England to Canada and the Pacific coast which lay accoss Greenland, Bflin Island and Hudson Bay, crossed the least known part of Greenland. The coast, moreover, for two hundred miles north of Angmagaslik was unsurveyed and the interior was unknown. To survey this coast, to explore the interior, looking especially for high mountains, and to make observations of weather conditions from a central station as both the Germans and Americans had done were the aims of the expedition.

Its members were for the most part young men from Cambridge which had since the War become Britain's chief centre of polar activity and the breeding ground for her polar leaders of the future. This was no accident. Living there were no less than three polar veterans, men who had served with Scott and Shackleton, men who had personally shared in the adventures, the dramas, the tragedies and disappointments of British polar exploration in the pre-war Heroic Age; all of them in an excellent position to stimulate, advise and instruct the younger generation. Two, Raymond Priestley and Frank Debenham, had been largely responsible for the foundation in Cambridge of the Scott Polar Institute. A third, J. M. Wordie, chief of scientific staff to Shackleton on the Trans-Antarctic Expedition (he was to play a leading part in the promotion of polar exploration in Britain after the Second World War), organized and led a number of summer expeditions of young men from Cambridge and elsewhere during the thirties; to Greenland, to Baffin Island, to Ellesmere Island. The value of such training was clear from those who gained distinction later in the nineteen-thirties and became the leaders after the Second World War when Britain once again took a foremost part in polar exploration. The release from the long isolation and restrictions of war has always been a spur to travel and adventure. Of the young men who thus emerged after the First World War none seemed to his elders to personify more completely the spirit of youthful adventure, none seemed to show greater promise of being the leader of the future than the twentythree-year-old Gino Watkins.

three-year-old Gino Watkins. The British Arctic Air Route Expedition sailed in July 1930 in Shackleton's old ship, the Ogert. Watkins had become a passionate advocate of Eskimo methods of travel, which had indeed been the secret of American and Scandinavian success, and dogs and sledges were to be the chief means of transport as well as Eskimo skin cances (kayaks) in the handling of which Watkins had learnt to display extraordinary skill. Two motor boats were also carried in the Quer and two De Havilland air craft for reconnaissance and air photography to aid the land surveyors This was a sign of the times But it was not the first use of aircraft by a British Arctic expedition. Six years earlier a party of young men led by George Binney (now Sr George Binney) from Oxford had been pioneers in this respect and had made a number of successful flights in a seaplane over Spitsbergen and Nordaustland

The expedition's most important contribution was probably their very careful survey of the eastern coastal strip Two long sledging trips were also made westwards across the ice sheet, one carrying kayaks for use in the fjords and streams between the ice edge and the coast But the most adventurous journey was one in open boats (also carrying kayaks) made by Watkins, Augustine Courtauld, and Captain Lemon of the Signals along the ice infested east coast from Angmagssalik southwards to Prins Christians Sund, a distance of seven hundred miles. One episode at the inland station was reminiscent of the feats of endurance and fortitude of the Scott and Shackleton days Watkins's plan, based on absurdly optimistic meteorological forecasts, had been to relieve the central weather station on the ice sheet every month But the blizzards, blandly prophesied as infrequent by the weather experts, blew weekly during October at over a hundred miles an hour in such conditions repeated journeys to the heart of the ice sheet were impracticable and Courtauld volunteered to remain at the station alone, to maintain observa tions throughout the winter On 6th December he began his soli tary watch On 5th May the following year he was relieved Snowed up towards the end of this lonely sojourn, his submerged hut swept by blizzards which roared across the ice and snow above his head, without fuel for either heating or cooking for weeks before relief arrived, Courtauld survived and returned in perfect health after a physical and psychological experience unique in polar history

While in Greenland Watkins talked much of a great Antarctic project he had in mand, a trans Antarctic expedition in the form of a stedging journey from the head of the Weddell Sea to the Bay of Whales However, he failed to raise funds for this and returned to Creenland but there was drowned while hunting, as
the Eskimoes hunted, in one of the kayaks in whose use he had shown such skill.

Allied to the meteorological studies which had been the central purpose of all these Greenland expeditions was the study of ice, its thickness, its composition, its movement and drift in relation to climatic factors. The study of ice drift and ice movement over the sea was an urgent matter for Russia's Administration for the Northern Sea Route and in May 1937 Soviet scientists led by Ivan Papanin embarked on an expedition which in its use as a scientific base of an ice floe drifting with the Arctic currents looked back to Stefansson's pioneer drift over the Beaufort Sea and forward to the air-supported Russian and American ice-drifting stations after the Second World War. In May 1937 Papanin's expedition was landed by aircraft on an Ice floe near the Pole and on this Papanin and three companions began a drift of nine months, southward with the cold currents flowing down past the north-east coast of Greenland. More than once, as when their floe collided with some grounded Ice and was split spart, they were in great jeopardy but their slowly diminishing base lasted long enough to bring them to 70° 54' S., midway between Scoresby Sund on the Greenland coast and Jan Mayen Island. There they were picked up by Soviet Ice-breakers on 19th February 1938. Soundings near the Pole revealed an ocean depth of 14,000 feet and, throughout the drift, ice and weather observations were made, the latter enabling Russian pilots in 1937 to fly non-stop across the Pole to the North American Pacific coast.

American racine coast. Courtauld's five months of self-imposed imprisonment in the fee and this adventurous Russian enterprise greatly stimulated public excitement about polar exploration. But it was in the air rather than at sea or on land that the most spectacular, the moit ambitious, and the most costly, Arctic undertakings took place, though many of them contributed more to the progress of aviation than to geography. The Scandinavians, Slomon Andrée aviation than to geography. The Scandinavians, Slomon Andrée of trans-Arctic aviation and the first planeer after the War was Namen, had all along been enthunstatic about the possibilities of trans-Arctic aviation and the first planeer after the War was Namen's protégé Roald Amundsen, the conqueror by sea of the North-West Passage and the first man to reach the South Pole overland In May 1925 Amundsen and the American aviator Lincoln Ellsworth, who was later to gain distinction in Antarctic flying, left Kongofjorden, Spitsbergen, in two Dornier flying boats and landed amidst high and hummocky ice 120 miles from the North Pole They managed to get only one of their aircraft airborne again and in this returned to Spitsbergen, having made soundings of the Arctic Ocean near the Pole and accomplished a reconnaissance of over 12,000 square miles of the polar basin

The following year Commander R E Byrd of the United States Navy, who was to be first since Wilkes to lead an American States Navy, who was to be first since wilkes to lead an America Antarctic expedition, joined in these Arctic flights He had already gamed experience of Arctic avaation with MacMillan's 1925 expedition to Peary's mythical 'Croker Land', and on 9th May 1926 he flew from Spitsbergen to the North Pole The next flight, the same year and again by Amundsen and Ellsworth, was indirectly to lead to one of the earliest disasters in Arctic avaation The automic matter with Mark States and Lange Lange The aircraft was an airship, the Norgs, designed by an Italian designer, Colonel Umberto Nobile, and in this, the first flight by airship over the Arctic, Amundsen, Ellsworth, and Nobile tried to fly from Spitsbergen to Alaska The first stage of the flight was remarkably successful and three flags, American, Norwegian and Italian, were thrown down on the tumbled sea ice around the Pole But during the flight onwards to Alaska they were con stantly in imminent danger Ice thickly encrusting the sides of the ship was torn loose by the whirling propellers and flung against the gas bags Ice heavily encrusted the bows of the Norge Their radio equipment had long ceased to function, and even their sun compass was heavily coated in ice Nevertheless, navigating almost blind and without contact with the ground, they made an exceedingly fortunate landfall in Alaska on 14th May They had flown non stop from Europe to America over a distance of 3400 miles

The year 1928 was a notable year in the history of Arctic aviation both for the flights of the Australian airman Hubert Wilkins and for the disaster which befell the airship *lala* launched by the Italian North Polar Expedition Wilkins had learnt to fly in the carly experimental days of 1910-12 when aircraft seemed little more than a transportent pattern of fragile wires and struts. He was also an experienced Arctic traveller having been second-in-command to Stefansson on his Canadian Arctic Expedition during the First World War. He had all along been convinced of the value of aircraft in polar reconnaissance but more important from the point of view of his backers, a group of Detroit business men, was his conviction that the day was not far off when commercial airways would fly on schedule across the Pole, Wilkins's trans-Arctie flight of 1928 was the climax to numerous earlier efforts, as costly as they were discouraging. On one of these, in 1927, he and his co-pilot Carl Ben Eielson crashed five hundred miles from Point Barrow, their starting point, and marched for fourteen days over the ice; an experience they would never have survived had it not been for the lessons Wilkins had learnt from Stefansson on their long journeys over the sea-lee of the Beaufort Sea. The flight in 1928, in a Lockheed Vega, began on 16th April from Point Barrow and Wilkins nearing Soitsbergen was almost within sight of victory when he was forced, after a continuous flight of 20 hours 20 minutes, to land on Likholmen-'Dead Man's Island'-off the west coast of the archipelago. It took both men a week to become airborne again, with Eielson in the cockpit and Wilkins pushing with one foot on the ice. But they succeeded and within half an hour landed at Gronfjorden, Spitsbergen.

The Arctie flight of the Italian airship, the Italia, was in many ways a senseless affair which had arisen out of a quarrel between Umberto Nobile and Roald Amundsen about the technical qualities of Amundsen's trans-Arctic airship Norge, built to Nobile's design. Determined to prove his point, Nobile persuaded the Italian Government to Jaunch an Italian North Polar Expedition and in order to give some semblance of serious purpose to the flight declared that he would not only land and moor three weeks at the Pole but would also survey from the air islands off the north Russian coast and in the Canadian archipelago. The Russian part of the programme was completed successfully. Then Nobile set out across the Arctic Ocean for the Pole. The Italia was forced down one hundred and eighty miles north-east of Spitsbergen and the subsequent search for Nobile and his men lying with their wrecked airship, no one knew where, in the heart of the Arctie Ocean was the sensation of the year. At first there seemed no hope that they would ever be found Then a Russian wireless amateur near Archangel, on the basis of a garbled and puzzing message, tracked them down and the search started Norwegan scalers, Sweduh scalers, Italian, Norwegan and Swedish arcraft all joined in, and at Amundsen's personal request a French scaplane was put at his disposal to search for the man whose quarrel with him had been at the root of this unfortunate enterprise After many failed attempts, Noble at length was rescued by one of the Swedish plots and the remander of the party were picked up by the Russian icebreaker Known after they had been sighted by the ship's light ancraft But of Amundian no trace was ever found, except a float from the arerais picked up off the Norwegan coast in September 1928 It was evidence enough that yet another link with the Herole Age had finally and trageally been broken One more but quite different attempt at a trans polar crossing must be mentioned because it is the antecedent of a remarkable

achievement still fresh in the memory This was the attempt by Sir Hubert Wilkins in 1931 to cross the Arctic Ocean, as far as the Pole, by submarine Wilkins's vessel, the submarine O 12 renamed the Noutilus, was lent to him by the United States Navy and he crossed the Atlantic In her to his starting base at Longyearbyen, Spitsbergen In August Wilkins set out He had no luck He encountered violent storms, his dising gear was dam-aged, and after a voyage of three weeks he returned to Spitsbergen Nevertheless, he managed to reach 82° 15' N during this first voyage, a voyage which contributed more to Arctie science than his aeronautical expeditions, for his chief scientist was a distinguished Norwegian oceanographer, Professor Harald Sverdrup, whose observations of ice movement and currents were to prove of lasting value Despite this failure Wilkins remained optimistic about the prospects for under-ice navigation and about the commercial possibilities of a Northern Passage route for cargocarrying submarines But almost thirty years were to pass before Commander W R Anderson of the United States Navy in another Nautilus, this time atomic powered, achieved in 1958 the first submarine trans polar crossing These flights and land explorations added no new lands to the

Arctic map indeed, it was little changed from that of the end of

the First World War. But in the Arctic as in the Antaretic there was some consolidation of political geography as this phase of primary, pioneer exploration drew to a close; notably in the case of Greenland whose north-eastern coast had been the last major Arctic coastline to be explored. For some years the United States and claimed certain parts of north-west Greenland. These rights, however, she surrendered to Denmark in 1916 when the Danish West Indies were ceded to the United States ship of east Greenland gave rise to more complicated problems. The Danish title to east Greenland, challenged by Norway in 1921, appeared to be confirmed in 1924 when a trasty between the two powers was signed, reserving for Norway (and subsequently also for Britain and France) certain hunting and scientific rights. In 1931, however, Norway occupied parts of east Greenland and Danish sovereignty over the whole country was only finally recognized alter the dispute had been submitted in 1932 to the Intermational Court at The Hague.

Sovereignty over the territories known as Svalbard-Spitsbergen with Bear Island (Bjornoya)-and over Jan Mayen Island was also settled at this time, the former being awarded to Norway in 1920 by international agreement, the latter annexed by Norway in 1929 after she had maintained a weather station there for several years. All signatories of the Svalbard Treaty, nine nations in all, were awarded equal economic rights and the Soviet Union (which now has extensive coal mines in Spitsbergen) adhered to the Treaty in 1924. Curiously enough, entangled though their strategic situation was to be in the Aretic after the Second World War, there were no political disputes about Arctic sovereignty between the North American and Russian powers. The United States purchased Alaska outright from Russia in 1867, and since that time the boundary between Russia and Alaska has never been in question. Nor has the Canadian elaim to ownership of the Arctie mainland and islands between Greenland and 141° W. longitude ever been disputed. Even the so-called Sector Principle (with all its possibilities of elash), whereby Canada in 1925 and Russia in the following year officially deelared that their Arctic elaims extended (and therefore converged) at the Pole, was tacitly accepted by both sides.

Relatively soon after the First World War, the Arcue under these various responsible powers began to move out of the realm of primary exploration into that of exploitation and development, notably of mineral resources which were to replace the fur trade as the key to Arctic economy Durng this second phase projects for mapping on a far ranging and intensive scale, geological prospecting, weather and many other detailed scientific investigations replaced the journeys and voyages of reconnaissance and discovery characteristic of the exploring days. In these movements towards the exploitation of national territories in the Arctic the new aircraft greatly speeded progress. The day when the Arctic would be mapped from the air, when long journey would be by air and not by dog idedge, when indeed not only dog teams and leidges but snow vehicles would be carried great distances by air to key points for local use, was already approaching fast

This was the position in the Arctic between the Wari The Antarctic was in a very different stuation. At the end of the First World War at least half of the costline of a continent between five and six million square miles in total area was still, part from some uncertain sightings in the first half of the singtemport of the second World War, the whole of the nume teemth century, undiscovered As for the interior, only the spaces linking the well worn track from the Ross Sea to the Pole could be described as known Yet, with so much to be done, by the first years of the Second World War, the whole of the remaining cossitue had been recommotived and often mapped and deep reconnaissances made an many directions into the interior. This was an achievement in twenty years which would never have been possible had it not been for the new air power.

Though during this period great advances were made not only in Antarctic geography but in many other sciences, the motives behind these great exploring efforts, motives which secured the funds which made them possible, were basically political rather than scientific. It was the same in the Antarctic as in the Arctic With the advance of exploration the partition of dis covered territories began

An early example of the way in which science was to reap much benefit from the entry of Antarctica into the realm of international politics was seen in the programme of sustained oceano graphical research and exploration undertaken by the British Discovery Committee. This was set up by the Colonial Office in 1923 (on a recommendation of 1917) to inquire into the prospects of research and development in Britain's new Antarctic Dependencies of the Falkland Islands. The establishment of this Committee, and of the reastand Biands. Ine establishment of this Committee, and of the research it promoted, followed logically enough the issue of letters patent in 1917 proclaiming for the first time sovereignty over a whole sector of Antarctica (following Canada's example in the Artic). This sector included not only the various island groups specified in the letters patent of 1908—the Scuth Chatter that the Catter Librate South of 1908-the South Shetlands, the South Orkney islands, South Georgia and the South Sandwich Islands-but also the Antarctic mainland between longitude 20° and 80° W. Between 1925 and the outbreak of war 'Discovery Investigations', as the Discovery Committee's expeditions were called, made thirteen separate voyages to the Antarctic, lasting one or two seasons each, including several circumnavigations of the continent; one, of 1931-32, being the first to be made during the winter. These voyages, the first real efforts at sustained research in the Antarctic, were mainly concerned with oceanography, marine biology and whale-marking. But on the land side, numerous island groups in the Dependencies were scientifically charted for the inst time and surveys and hadings were also carried out on Bouretoya (Bouvet Island), the Balleny Islands, and Australian Antarctic Territory.

sustances territory. In 1925-27, but more extensively In 1937, a rival to Britain In Antaretica appeared, Argentina, chiming first the South Orkney Islands, then South Georgiu, then in 1937 extending her claims Islands, then South Georgiu, then in 1937 extending her claims to all of the territories in the British Falkland Islands Dependencies. These rival claims gave a new urgency to British activity in the Antaretic. A further development which in providing a pur and incentive directly or indirectly benefited exploration spur and incentive directly or indirectly benefited exploration world shortage of fats after the War. In this Norway, as she had done before the First War, played a leading role. New Norwegian inventions, the whaling factory ship and the stern silpway which enabled whales to be hauled on board and rendered down, made land bases for whalter unnecessary. This greatly extended the range of whaling ships after 1925 and led, in the search for new and distant whaling grounds, to new geographical discoveries, notably by Norwegian whalers in 1930–31

These were some of the trends and developments in the Antarctic between the Wars What, briefly, was the sequence of events? After the Shackleton-Rowett Expedition of 1921-22 on which Shackleton died and on which Frank Wild, the new leader, failed to discover new coast in the Enderby Land region, there was a luil major voygee of exploration for five years. There was however, as already described, much whaling and oceanographical activity and geological and other scientific work, especially in the Fakkland Islands Dependencies and one notable event, the first landing by a Norwegnan expedition in 1928-29 on Peter I by in the Bellingshusten Sea This siland (like Bouvetsay on which Norwegnais had landed in 1927-28) was surveyed and claumed for Norway in 1929. Meanwhile, France moved nearer to the Antarctuc continent in a programme of research and development in certain sub Antarctic islands, notably the lies de Kerguelen to which in 1924 she consolidated earlier clauma

In 1928, the year of the Arctic search for the Italia, the Antarctic too entered the Air Age with the first use, by the Arctie aviator Sir Hubert Wilkins, of the aeroplane on his joint British and United States Wilkins-Hearst Expedition Wilkins's original intention had been to make a trans Antarctic flight from Graham Land to the Ross Sea But bad weather preventing this, the flight was limited to the east coast of Graham Land as far as 71° S The flight was a warning of the errors which might be made by aviators often in the obscure and deceptive conditions of Antarctic flying for Wilkins returned with the news that Graham Land, far from being a peninsula of the mainland, was an archipelago separated from the maniland by 'Crane, Casey and Lurabee Channels' and by 'Stefansson Strait' If this were true, then all the claims by explorers in the nimeteenth century that in Graham Lard Archive Graham Land they had discovered the Antarctic Continent were nullified Five years passed before Wilkins's assertions were disproved That they were, was due to the British Graham Land expedition of 1934-37 led by John Rymill, an expedition which carried out by land and air one of the most comprehensive exploring and scientific programmes (in geology, meteorology, glaciology and biology) of any mainland expedition between the

332

Wars. Rymill's survey of the coast and islands off the peninsula as far as Alexander Land not only showed Wilkins's channels to be glacier streams and his strait not to exist but also went some way towards showing on a series of long sledging journeys that Bellingshausen's Alexander Land was in reality an island. The one new discovery of land made by Wilkins, Hearst Land, was also proved to be an island. In 1929–30 Wilkins made another attempt to fly across to the Ross Sea. Again he did not succeed but in a number of flights over Graham Land and over the adjacent pack as far as 73° S., he proved the insularity of Charcot Land discovered by the French explorer J. B. Charcot in 1908–10.

These first events of Antarctica's Air Age however did not touch upon the three great unexplored areas of coast: those between the Bellinghausen Sea and the Ross Sea, between the Weddell Sea and Enderby Land, and between Enderby Land and Kaiser Wilhelm Land, adjoining the coast explored by Mawson in 1911-14. These three great stretches of coastline in the ten years between 1928 and 1938 were explored by United States, Norwegian and British expeditions, led respectively by the American aviator Richard E. Byrd; the Norwegian Lars Christensen, Hjalmar Ritiser-Larsen and Gumar Isacheen; and by Stir Douglas Mawson and John K. Davis for the British Commonwealth. In all of them, the new air power made it possible to recommotive and often to photograph vast expanses of Antarcties and thus to prepare the way for detailed exploration on the pround.

The United States expedition of 1928-30, led by Richard E. Byrd, was the first American expedition (though on this occasion privately sponsored) since the stormy days of the irate and insubordinate Charles Wilkes eighty years before. It was, moreover, the first of a long line of American expeditions to Antarctica, predominantly transported and manned by the United States Navy, increasing yearly in size and in the mass and complexity of their equipment, which culminated in the largest Antarctic enterprise ever undertaken by one nation, the United States contribution to the International Geophysical Year. The part played by Byrd in all these expeditions (antil his death in 1957) was not only that of a leader who became, like Wilkes, the American Antarctic hero of his day; he was also the instigator and promoter, the man who more than any other was responsible for the return of the United States to Antarctica and for focusing the attention of the American people for nearly thirty years on the geographical exploration of the Antarctic continent

Though his aircraft carried him well beyond this region, Byrd s attention was centred for the most part on the unknown Pacific sector of Antarctica, between the Bellingshausen and the Ross Sea On his first expedition, 1928-30, he discovered the western coast and hinterland of this region, Marie Byrd Land, and claimed it for the United States Then in 1929, in the still hazardous conditions of polar aviation of those days, he made the first flight over the South Pole Byrd's next expedition was in 1933-35 Wintering as before on the Ross Ice Shelf in the Bay of Whales, where more than a dozen buildings were erected, Byrd on this occasion by sledging journeys and flights proved beyond doubt the continental nature of Marie Byrd Land and in consequence settled a problem which had preoccupied both Bruce and Filchner, namely whether any sea connection existed between the Weddell and the Ross Seas Byrd's third expedition, 'The United States Service Expedition', took place during the first two years of the Second World War and again extensive additions were made to the geography of the continent New coast (the Walgreen Coast) was added, overlooking the Amundsen Sea, Ford Ranges found in 1928-29, were greatly enlarged, and explorations, both land and air, were extended for the first time to the Graham Land peninsula There, continuing the work of the British Graham Land Expedition, American sledging journeys far to the south proved for the first time the insularity of Bellings hausen's Alexander Land

At intervals over these same ten years another great segment of Antarctic coasthne was being explored by the Norvegans This lay between the Weddell Sea and Enderby Land, a coast first sighted by the same Carbon and the same start in the nineteenth century. These expeditions, promoted since 1927 by Consul Larr Claristensen with resources incomparably more modest that Claristensen with resources incomparably more less extensive than those of the Americans though unlike them the Norvegans made lattle attempt to penetrate the hinterland

334

either by land or air. In 1929-30 the castward and westward limits of this long coastline were defined when Hjalmar Rijser-Larsen discovered and roughly charted Kronprins Olav Kyst and Kronprinsesse Martha Kyst from the air. In 1930-31 Isachsen and Rijser-Larsen attacked the central portion of the coast and discovered and charted, again only roughly. Prinsesse Ragnhild Kyst. In the season 1936-37, yet another expedition, led this time by Lars Christensen himself, the promoter of all these Norwegian enterprises, filled the intermediate gaps by the discovery of Prins Handk Kyst.

The third and last stretch of undiscovered coast to be explored, only slightly less extensive than those discovered by these American and Norwegian expeditions, was the stretch between Drygalski's Kaiser Wilhelm II Land, discovered early in the twentieth century, and Enderby Land and Kemp Land, sighted by the British sealers, Biscoe and Kemp, early in the nineteenth. This gap was filled by the British-Australian-New Zealand Antarctic Research Expedition (B.A.N.Z.A.R.E.) in a matter of two years, 1929-31, under the leadership of Australia's greatest explorer, the late Sir Douglas Mawson. Enderby and Kemp Land to the east were shown to be joined. MacRobertson Land was discovered, and between it and Kaiser Wilhelm II Land, Princess Elizabeth Land. No trace of Balleny's landfall was found but between King George V Land and Kaiser Wilhelm 11 Land two new stretches of coast emerged and were named Sabrina Coast (in honour of Balleny) and Banzare Coast after the initials of the title of the expedition. Much charting and surveying from ship and aircraft was accomplished but perhaps the most important act of the expedition following these discoveries was to agree on a boundary, longitude 45° E., as the dividing line between British and Norwegian activities and between Enderby Land and Prins Olav Kyst. Mawson then proclaimed British sovereignty over the whole region, and in 1938 named it Australian Antarctic Territory. Yet another stretch of new coast was added to Australian Antarctic Territory in 1933-34. This was the work of aviators of yet another Lars Christensen expedition. They discovered Prinsesse Astrid Land', now known as King Leopold and Queen Astrid Coast, adjoining Kaiser Wilhelm II Land to the east. They also flew over part of the coast of MacRobertson Land where the

name of the Norwegian leader is commemorated in Lars Christen sen Coast

Like the Arctic, the Antarctic (following the lead given by Wilkins in 1928) was the scene of numerous attempts to fly across itonce the Pole had been reached by air The first attempt, by Lincoln Ellsworth who had flown across the Arctic with Amundsen, was from the Ross Sea to Graham Land, the reverse direction to Wilkins, but Ellsworth's plane was wreeked on the sea ice of the Bay of Whales The was in 1933-34 The following year Ellsworth tried again starting this time from Graham Land, but he was fould by increasant bad weather in 1935, however, he succeeded, with H Hollick-Kenyon as plot, and made in November of that year the first light acrois the continuous (there were four landings), nor was it by way of the Pole The first continuous and trans polar flight in a single engined arcraft of the Commonwealth Trans Antarctic Expedition In the course of his flight Ellsworth discovered james W Ellsworth Land, re named Ellsworth discovered james W Ellsworth Land, re

As already described, a powerful motive inducing governments to provide funds for Antarctic exploration was their anxiety to consolidate or establish claims to Antarctic territory and indeed by the beginning of the Second World War, only one sector, the Pacific sector, the focus especially of American activity, remained formally unclaimed The British had given the lead in this parti tion of Antarctica when in 1908 and 1917 they issued letters patent claiming and defining the territory of the Falkland Islands Dependencies These were followed in 1923 by the establishment of the Ross Dependency (between longitudes 160° E and 150° W ) which was placed under New Zealand administration The French followed suit, and although no French expedition had been active in the neighbourhood of Terre Adelie since Dumont d Urville, and indeed was not active until after the Second World War, they nevertheless included Terre Adélie in the decree of 1924 claiming the sub Antarctic islands and it was accepted by the British and Australian Governments in 1933 as an enclave of Australian Antarctic Territory

The next stage in the partition of Antarctica was the claiming

336



The Furtition of the Antarctic

337

by Norway of the sector between the Weddell Sea and Enderby Land, the sector which had been discovered by the expediation of Consul Lars Christensen Norwegan sovereignty had been proclaimed over Peter 1 Øy in 1931 but no comparable proclama toon was made about this wast mainland territory, later named Dronning Maud Land, until 1939 The Norwegan Government was then spurred to action by the activities of a German expedition under Captain Alfred Rutcher which arrived in 1938 off the shores of Prinsesse Astrid Kyst and Kronprinsesse Märthä Kyst Personally sponsored by Field Marshal Goering, plentfully staffed by German Air Force and Naval personnel more inter ested perhaps in obtaining hydrographical and meteorological information valuable to Antarctic based radiers in wartime dhan in geographical exploration, the expedition's two aircraft in a three week visit filew over and photographed 350,000 square kilometres of territory This was named by the Germans 'Neu Schwabenland' and was formally Charned by Germany in January 1939, three day after tike Norwegun Gowernment in Olo had registreed its claim The position of the Pacific sector at the beginning of the Second

The pontion of the Pacific sector at the beginning of the section World War remained (and indeed still remains) unclarified Numerous personal claims had been made by Byrd and other reembers of his expeditions, and by Luncoln Ellsworth Byrd's expedition of 1939-41, the United States Antarche Service Expedition, had indeed been instructed to establish permanent bases in Antarche territory as evidence to support hater formal claims However, since Congress failed to provide funds, this expedition was withdrawn After the War (in 1946), while Byrd's fourth expedition was still in the field, the United States nor recognized the claims of others over the territories which one hundred and fifty years of Antarche exploration had revealed

This rapid survey of events and trends leads directly to the period of the Second World War and after Nevertheless the two periods were in one respect markedly distinct. Between the wars, individual enterprise in exploration was still characteristic, as it had been of the decades before the First World War. After the Second World War, there was a change with individual enter prise very largely going way to government explorations on the mid initient century pattern.

### XXIV

## The Second World War and After: The Significance of the Polar Regions

T is remarkable how often, in Britain at all events, the Arctic is still thought to be the realm primarily of the dog team and the sledge. Yet the aircraft and the helicopter are more appropriately the symbols and the instruments of Arctic progress today. Commercial airways navigating along or near Great Circle routes fly regularly across the Arctic, spanning in hours the stark mountains, the tumbled and hummocky sea ice, the vast and empty surface of the Greenland ice sheet over which Nansen and Peary and so many others painfully trudged. Air power, too, is the key to the economic and industrial expansion upon which Canada is now embarking in her Arctic territory. It is the key, moreover, to the strategic significance of a region where potentially hostile powers, in North America and the Soviet Union, confront each other across an Arctic 'Mediterranean' and prepare elaborate and costly defences against the possibility of air attack; defences in Canada's case more than anything responsible for the widespread opening up of her Arctic regions since the last war. Greenland also, since 1954 no longer regarded as a colony but as part of Denmark, has been brought through air power into closer contact with the outer world and has moved, in the west and south at least, out of a hunting into a fishing and monetary economy in which her mineral resources, of cryolite especially, play an important part. No doubt comparable developments have also taken place in the Soviet Arctic. The secrecy which surrounds Russia's Arctic possessions, however, allows little information to escape.

It is impossible here, for these are contemporary events, to

give more than a rapid sketch of the broad trends and develop ments which have led to this Arctic transformation The period opens with an exploit in the old style, the traversing of the North West Passage by one of the outstanding pioneers in Arctic Canada today, Sergeant (now Inspector) Henry Larsen, R C M P in a little ship, the 52 Rech, one hundred and four feet long, he made (see map facing p. 86) the North West Passage twice, pass ing on his voyage in 1940-42 through the swirling ice of Bellot Strait, then on his second voyage in the summer of 1944 along Primee of Wales Strait and along Melville and Lancatter Sounds Stopping at Winter Harbour in Melville Sound, he saw, carved on a high rock, the names of Parry's scamen and of Her Majety's subs field and Griper which had wintered there in 1819 Larsen's was a truly audacious schevement, one indeed which Parry humself would have been the first to admire

Larsen's voyages in the St Roch stand out in romantic contrast to the network of air, land and sea operations, economic and strategic, which since the War have covered Canada's Arctic sector Those directed to the exploitation of the Canadian North have been based first and foremost on an extensive programme of air survey, supplemented by ground parties working mostly, not with dogs and sledges (though on occasion these too have been flown to key points for local use), but with aircraft, includ ing helicopters The aim has been to exploit the rich mineral resources of the Canadian Arctic, petroleum, graphite, coal, iron, nickel, copper and gold, and, just south of the Arctic Circle, radium and uranium at Great Bear Lake Geological prospecting in Canada's northwest territory, greatly speeded by the use of devices such as the airborne magnetometer, has been so wide spread-as indeed have other scientific investigations basic to economic, industrial, and strategie development-that a Canadian geographer has lately remarked, 'It is probably true that no single part of the Canadian Arctic, even including remote islands not visited since they were first placed on the map long ago, has escaped the recent attention of the geologist, geographer or other scientist

An even more important factor in this transformation of the Canadian Arctic and in the opening up of many territories explored but unvisited for generations has been the Air Defence Programme focused on the so-called D.E.W. Line (Distant Early Waning Line), once known under the Orwellian name, 'Project 572'. This rafe fence, with more than forty manned stations stretching from east Greenland to Alaska, has meant the making of innumerable alrifields, the building of small townships of scientists and technicians, the building of Arctic highways, and the employment of around twenty thousand men. The names of some of these prefabriated, alr-conditioned, electronic stations—Frobisher, for example, in Frobisher Bay on Baffin Island—recall the debt which those responsible for this spectrular if gloomy project owe to the early explorers. All this rapid development of course has inevitably brought in its train sociological problems concerning the Eakimoes who have been brought into contact with the diseases and the temptations as well as the benefits of civilization. They are at the same time fast losing the native skills which have enabled them for so long to survive.

Greenland too, mainly along its west and south-west coast, the site of the earliest settlements and European explorations, has been brought into the stream of world affairs; largely because of its importance as a landing stage and weather observatory along a polar air route. Greenland's key role in the future of polar aviation had been foreseen as far back as the early thirties by the British Arctie Air Route Expedition sent out to test possibilities by the Royal Geographical Society. But the British were not the first to be so far-sighted. In the nineteen-twenties, the Norwegian Aretic explorer Bernt Balchen, who flew with Amundsen and Wilkins in the Arctic and piloted Admiral Byrd to the South Pole, forecast the role of Greenland as 'the great aircraftcarrier of the Arctic'. The urgent needs of war saw this forecast realized. In 1941 an agreement was signed between the United States and Denmark. This, while reaffirming Danish sovereignty over Greenland, granted the United States the temporary use of certain bases in west and south-west Greenland for defensive purposes, but in particular as staging points for the ferrying of aircraft to Britain. The first airports, planned by Balchen himself as Arctic adviser to the U.S. Air Force, were at Julianehaab, in southern Greenland, and at Sondre Strømfjord in the south-west. After the War, following an agreement in 1951 between the United States and Denmark covering the use of N.A.T.O. bases in Greenland, the greatest of these Arctic airports was estav lished at Thule, far up the west coast near the entrance to Smith Sound, the 'Sir Thomas Smith s Sound' discovered in 1616 by the Englishman William Baffin Thule, with its airfields, its aluminium buildings, its radio and radar tower lower only than the television mast on the Empire State Building in New York, is now a pulsating modern Arctie town The pioneer days of trans Arctic flying belong, as we have seen, to the period be tween the Wars when the flights of Amundsen, Byrd and Wilkins were succeeded by the survey flights of von Gronau of Germany and of the US avator Lumbergh, and by one of the most coursecous flights of those early days, the British pilot John Grierson's solo single engined light to Ottawa by way of the Farces, Iceland and the Greenland ice sheet. But it was not until the airfields in south west Greenland had been built that the first commercial air service between Europe and the west coast of North America could begin This took place in November 1954 when the Scandinavian Airlines System, true to their national tradition of Aretic pioneering made the first commercial flight from Copenhagen to Los Angeles by way of the airfield at Sondre Stromford

While west Greenland was thus fast developing under the impact of war and air power and the energetic measures of the Danish Government to develop the settlements north and routh of the capital, Godthaab, Greenland s ice sheet and its northern and eastem coasts (where the musk ox and the kayke could still be seen) continued to attract exploring expeditions. First among these after the Second World War were the expeditions Known as the Missions Polaires Françaises, launched by the French exparachistist and anthropologist Paul Emile Victor who, more than anyone has been responsible for the remarkable revised french polar exploration, both Artict and Antarctic, ance the last war These French expeditions, working between 1948-57 and supplied very largely by air direct from France, have been concerned chelly with the sessme investigation of the central and southem parts of the ice sheet Seismic and other glaciological investigations diso preocupied the British North Greenland Expedition of 1952-54, working m Dronning Louise Land Link, led by a naval officier, Commander C J D Simpson, has aspecial place in the history of recent British exploration. Like the French expeditions, it relied greatly on supply by air, using aircraft of the Royal Air Force, but one of its aims was to bring about the re-entry of the Nary into polar exploration. This was a reminder that in Britain belief in the traditional role of the Nary in polar enterprise, so staundhy held by Clements Markham in the nineties, still survived. Another large expedition working in Greenland since the Second World War was the Danish Peary Land expedition, led by Count Eigil Knuth. This too, working in the extreme north-west of Greenland, relied considerably upon air support and was involved in survey and in investigations of the ice sheet. The latest of these large Greenland expeditions to study the conditions and history of the ice sheet is the International Expedition to Greenland of 1959, organized and led by M. Paul-Emile Victor.

and led by M. Paul-Emite vector. Before turning to different forms of Arctic exploration since the Second World War one other aspect of Arctic activity must be mentioned because it is so characteristic, in Britisn especially, of this period. That is the annual flow of undergraduate expeditions to the Arctic, which have greatly increased in number since the first of their kind, from Oxiord, in the early twenties. Easily and cheaply accessible, with a climate at its best during the outshot of the summer vacation, lecland, Spitulerger and Nordsouth and Greenland, Jan Mayen island, have all been targets of such undergraduate parties combining adventurous travel with scientific work. The Svalbard archipelago has been especially popular and a more or less continuous series of small expeditions from Cambridge have, in proportion to their size and resources, added considerably to the detailed geological mapping of three

Islands. Since the war, however, not land expeditions but those travelling on or even under the ice, particularly the floating ice which overs almost throughout the year the central polar basin, have made the most important and exciting geographical discoveries in the Arctic. Until the year 1937-38, the year of Papanin's Russian drift expedition, knowledge of this region was still based upon the work of Nansen in the *Frame* and upon evidence from the drifting *feanetic* (both of the late nineteenth century) as well as upon Amundsen's drift in the *Alsad* in 1922-24. Following in Greenland, the greatest of these Arctic airports was estab lished at Thule, far up the west coast near the entrance to Smith Sound, the 'Sir Thomas Smith's Sound' discovered in 1616 by the Englishman William Baffin Thule, with its airfields, its aluminium buildings, its radio and radar tower lower only than the television mast on the Empire State Building in New York, is now a pulsating modern Arctie town. The pioneer days of trans-Arctic flying belong, as we have seen, to the period be-tween the Wars when the flights of Amundsen, Byrd and Wikins were succeeded by the survey flights of von Gronau of Germany and of the US aviator Lindbergh, and by one of the most courageous flights of those early days, the British pilot John Grierson's solo single engined flight to Ottawa by way of the Faroes, Iceland and the Greenland see sheet But it was not until the airfields in south-west Greenland had been built that the first commercial air service between Europe and the west coast of North America could begin This took place in November 1934 when the Scandinavan Airlines System, true to their national tradition of Arctic pioncering, made the first commercial light from Copenhagen to Los Angeles by way of the airfield at Sondre Stromfoord

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Much else has been discovered by these post war expeditions about the relations between wind and ice drift and about the history, the growth, and the decay of saice, that in the Atlantic sector, for example, the ice drifts much faster than in Nansen's time whereas it is slower in the Pacific sector, that ice floes in the course of a three year period, while retaining the same over all thickness, dimunsition top but increase below. The Russians obtained clear proof of this steady process of growth and decay in 1954 when they rediscovered a camp site on their drifting station S P-2, abandmed three years earlier. Their old tents were still standing but they were standing isolated on pillars of ice, 1.6 metres high, pillars which the presence of the tents had prevented from melting

Submarme discoveries almost comparable, it appears, with that of the Lomonosov Rudge were made more recently by Commander W R Anderson of the United States Navy when in August 1958, following the lead given by Sir Hubert Wilkins twenty seven years before, he margated the nuclear powered submarne Avaulus under the ace of the central polar basin and under the North Pole This was the first submarine navigation of

the North-West Passage. Submerging under the ice off Point Barrow, Alaska, the Nautilus travelled 1830 miles in 96 hours, surfacing at a point (79° N.) between Greenland and Spitsbergen. Watching the ice overhead through the periscope and on a tele-vision screen but navigating 'blind' and with no certainty that some lofty mountain range might not suddenly loom up from the sea-bed to meet the ice above, Anderson by this exploit achieved one of the great voyages of polar history. Off Point Barrow, a deep and narrow sea valley was discovered leading into the deep waters of the central polar basin. There, below the Pole, a depth of 13,410 feet was recorded, two thousand feet deeper than expected. The voyage of the Nautilus did more than illuminate the submarine geography of the Arctic. It showed that nuclearpowered, freight-carrying, submarines could by using this Arctic route cut almost by half the sea voyage between London and Tokyo. An even faster trans-polar voyage was made in March 1959 by the nuclear-powered submarine U.S.S. Skote, the first submarine to surface (breaking through thin Ice) at the Pole.

The Antarctic during and after the Second World War followed much more closely the pattern of pre-war exploration, a pattern coloured in the United Kingdom's sector of Antarctica by the wrangles which broke out during the War between Britain and both Argentina and Chile about the ownership of these scattered lands. Argentina, having in 1937 extended her claims to all the United Kingdom's Antarctic territory, in 1940 set up a national commission to handle her polar interests. That same year, Chile, in a belated display of nationalism, claimed Territorio Antirctico Chileno (between long. 53º and 90° W.), thereby, as the map on p. 337 shows, over-lapping the claims of Argentina. Then, Britain being occupied with more vital issues elsewhere, the battle for the frozen wasteland, the cold war in its most literal sense, began and is still being waged. Cold but courteous memoranda exchanged between London, Buenos Aires and Santiago have been accompanied by a spate of expeditions, British and Argentine, with the Chileans later joining in, asserting and counterclaiming sovereignty by means of notes delivered, mostly in peaceful fashion, by explorers across the intervening ice. National emblems painted on lonely huts or on the few rock faces free from the perennial cover of snow

345

346

and ice have been obliterated and repainted by the rival Antarctic powers in turn Science, however, has benefited from this peculiar tussle over the rocks and ice and snow of Antarctica, for in 1943 the British Admiralty launched Operation Tabarin under which permanets methodological and the perturbative perturbative and the permanets and the perdenses in the following year a programme of scientific research and exploration, in geology, biology and survey, was tainted and was continued and widered in 1945 when the whole project was taken over by the Colonial Office under the name 'falkland Island's Dependencies Survey' Thus began a scientific enterprise (placed three years later under the Governor of the Falkland Island's which, however political Its origin and basis, has through its yearly expeditions rendered The origin and beam, has intrough in yearly expendious reductive great services to Antarctic science, an enterprise indeed in terms of years of continuous effort probably unique in Antarctic history inevitably these exploring activities have had their political slant, leaders of the various bases, numbering a dozen or more, being enrolled as magnitudes using of years exturity, clear evidence of which would be required if this Antarctic formation of the variance of the second second second second second the second s dispute, at British or South American instigation, ever came before an international court of law

While the United Kingdom was thus striving to consolidate her position in the Dependencies and British and South American expeditions were manoeuvring for bases there, the United States reappeared on the Antarctic scene with Operation 'Highjump' commanded by the veteran explorer Richard E Byrd Comprising a Task Force of thirteen ships and four thousand men, this was then the lingest exploratory venture attempted in Antarctica Byrd divided his fleet into three groups, two concentrating on the coastal waters of the Ross Dependency and adjoining Pacific sector, the third steaming wetwards from Oates Land round to Prinatese Astrid Kyst During these Antarctic eircumnavigations, photographic and reconnaisance flights were made deep inland and in February 1947 Byrd made his second flight over the South Pole Science played a relatively small part in this elaborate naval expedition and no wintering parties remained in Antarctica its chief object indeed was not science at all but, by photographic reconnaissance, to create a basis for subsequent United States claims to a large sector of Antarctica, and—having in mind no doubt the strategic situation vis-A-vis the Soviet Union in the Arctic—to give polar experience to a large number of men. As already noted, the United States has not yet made claims to Antarctic territory. Instead she has adopted the paradoxical attitude that while neither making claims nor recognizing those of others, she reserves any rights arising out of claims made by her own explorers. In contrast to this, however, she proposed In 1948 that the whole region be placed under United Nations Trusteeship. This was the first effort to rationalize the political position of Antarctica. But it came to nothing partly because the Soviet Union, which had not been consulted, made it plain in 1950 that she would recognize no decisions about the future of Antarctica in which the Soviet Union had had no part.

The turn of the half-century saw some striking developmenta in the evolution of Antarctic exploration. It saw the Australian Government in 1949 signify its intention to take a practical and a permanent interest in its Antarctic territory by the setting up of an Antarctic division of the Department of External Affairs. This was followed five years later by the establishment of Australia's first permanent base on the mainland, at Mawson in MacRobertson Land; an achievement of the Australian National Antarctic Research Expedition which had since the War been active in the scientific exploration of the sub-Antaretic islands, Heard Island, Maequarie Island and Kerguelen. Since then these Australian expeditions, advised by the veteran explorer Sir Douglas Mawson and energetically promoted and led by the physicist Philip Law, have been annual events, comparable in terms of cost and continuous effort only with the United Kingdom's programme of research and development in the Falkland Islands Dependencies.

Falkland Islands Dependencies. The turn of the half-century saw also, as the result of Paul-Emile Victor's efforts, the return of France to the Antarctic Continent; to France's traditional sector, Dumont d'Utrillé's Terre Adélie. It also saw (in 1947-45) yet another United States texpedition, the Ronne Antarctic Research Expedition, at work from Byrd's old base of 1939-41, Stonington Island, west Graham Land. This marked a new departure in Antarctic exploration in that it included two women, the first to winter in Antartica.

347

In 1949 a venture was launched which presaged a new attitude and a new outlook towards Antarctic exploration, the Norwegian Briths-Swedish expedition to Norway's Dronning Maid Land, he first international expedition to Norway's Dronning Maid Land, the first international expedition to Antarctica The man at the back of this idea, which was refreshingly free from political or strategic motives, was the Swedish geographer, Professor Hans W, Ahlmann He had for several years been investigating method was the several series of the series of the several series of the several series of the series of t possible causes for the recent recession of ice cover in the Arctic, and he argued that if this recession was due to some global climatic change and not merely to a local fluctuation, confirmation should be forthcoming from the Antarctic, as reports of icefree areas from Alfred Ritscher's brief German expedition to Dronning Maud Land in 1939 had indeed already suggested that it might Norway bore the brunt of the cost and organization of the expedition, but both Sweden and Britain (through the Royal Geographical Society and the Scott Polar Institute at Cam-bridge) played considerable parts Due largely to the genus of its principal organizer, the late Harald Sverdrup, director of the Norwegian Polar Institute at Oslo, it was, in the range and Intensity of its scientific work, probably the most productive scientific expedition to Antarcuca until the greatest international venture in science ever undertaken, the International Geophysical Year of 1957-58

In 1905, the hurtorian of Antarctica, the late Dr Hugh Robert Mill, pleaded in his book Stege of the South Pole for the establishment of an international committee which 'should plan, not an expedition, but a system of research by means of simultaneous and consecutive expeditions wild fixed observatories'. This was precisely the idea behind the Antarctic operations of the International Geophysical Year, the successor on a global rather than a polar scale to the International Polar Years of 1882–83 and 1932–33 Unlike these earlier Years, which concentrated almost entirely on the Arctic, the Antarctic this time was to receive the greatest attention. The influence of its great ice mass on weather; and on occanographical and atmospheric dynamics, the problems posed by the relatively unstudied Antarctic aurors where brillance had smarged as ormany generations of explorers, the possibility of conducting research from the South Polar plateau into the ionosphere during the unless hours of the long THE SECOND WORLD WAR AND AFTER 349

winter night; these were some of the scientific advantages of concentration on Antarctica.

The I.G.Y., involving a dozen nations and fifty scientific bases, was concerned less with exploration than with research, of a kind largely outside the geographical scope of this book. Nevertheless, because of the new techniques employed, new departures in transport and supply which seemed to forecast a new future for polar travel, certain events must be included. Of these, the most dramatic were the first direct air flights from New Zealand to the Antaretic Continent in 1955-56, and the establishment in 1956-57, entirely by air, of the United States 'Amundsen-Scott' Station at the South Geographical Pole. The establishment and the supply by air of this station, which housed the first wintering party at the South Pole, involved the airmen of the United States in many remarkable and courageous feats of aviation in conditions relatively little known, and seemed to point the way to a new pattern of Antarctic exploration. This appears likely to be based on the swift transport of men and dogs, vehicles and supplies, by air to selected strategic points from which inten-sive local ground explorations can be conducted as has already been done in the Arctic.

been done in the Arctic. The year 1953 may be regarded as the dawn of the third and in some respects the greatest of the main periods of Antarctic endeavour; the first being the mid-nineteenth century, the days of James Clark Ross, of Dumont d'Urville, of Wilkes; the second, the opening years of the twentieth century when Sir elements Markham and the Royal Geographical Society led the litermational revival of Antarctic exploration to which the American, Matthew Fontaine Maury, had forty years earlier pointed the way. It was not only the year when the intermational mominities of the I.G.Y. were laying plans for their great combined scientific onshught on Antarctica. It was also the year in bined scientific onshught on Antarctica. It was also the year in Society and a former shipmate of Shackleton's, provided a link Society and a former shipmate of Shackleton's, or worked the with the past by reviving the idea, in striking contrast to there international and largely static operations, of a wholly British international intervention.

trans-Antarctic expedition. The idea of a trans-Antarctic expedition on the lines of Shackleton's from the Weddell Sea to the Ross Sea via the Pole had been brewing for some time in the minds of British explorers, among them the future leader of the expedition Dr (now Sir Vivian) Fuchs But 1953 seemed a most appropriate time at which to ventilate the scheme The British Commonwealth in the per to ventulate the scheme The Britsh Commonwealth in the per son of Sir Edmund Hillary had only that summer shared in the first ascent of Mount Everest, and the public seemed very likely to welcome no less enthusiastically an attempt at the first land crossing of the Antarctuc contunent by a Britsh expedition. The expedition itself is too recent, its story too well known, to need detailed description. After receiving the initial support of the Royal Geographical Society in 1954, the project hung first, then it linted Kingdom Government made a considerable grant towards is cost and the following year saw the departure of a reconnais same exceedition which, though be a subsension margin. sance expedition which, though by a rather narrow margin, penctrated the Weddell Sea and established 'Shackleton' Base This was not the first base to be set up in this part of the United Kingdom's sector of Antarctica, for an Argentine expedition, using for the first time the ice breaker the General San Marita, thad already established a meteorological station on the Filchner Ice Shelf in 1984-SS

The first land crossing of the Antarctic continent by Fuchs and his men, Sir Edmund Hillary having previously laid depots and reconnoitred the route from the Ross Sea to the Pole, was achieved between 24th November 1957 and 2nd March 1958, the United States South Pole station being visited on the way Despite great difficulties near the Weddell Sea coast where the expedition's 'Sno cats' were caught in a maze of deep, concealed crevasues of unparalleled extent, the crossing was completed with an almost military precision within a day of the planned date But this first crossing overland, so ably and so resolutely con ducted, was not the only, or even perhaps the most important, of the expedition's achievements The unknown stretch between the Weddell Sea to the Pole was for the first time explored Furthermore, within the limits imposed by the Antarctic season upon a motorized catavan engaged in a journey of over two thousand miles, much scientific work was done, in particular, a seismic traverse across the continent This revealed ice depths of 9000 feet, with many high mountain peaks rising up below the ice, and a deep valley underlying the South Geographical Pole. Before and during this mammoth polar journey aircraft were available for reconnaissance and support, including the laying of advance dumps, and on 6th January 1958 an Otter aircraft piloted by J. H. Lewis flew nonstop across the continent. Multi-engined aircraft of the United States I.G.Y. Operation Deepfrezez had previously made a number of trans-continental flights, but this was the first single-engined aircraft to do so.

flights, but this was the first single-engines aircraft to do the Sir Vivian Fuchs' trans-Antarctic journey has sometimes been described as 'the last great journey in the world'. But already as this book goes to press another, even longer, trans-Antarctic journey is being planned by the Soviet Linion which, as a participant in the I.G.Y., entered Antarctic exploration in 1955 for the first time since the days of the great Russian explore Bellingshausen. This will be a journey of 3700 miles through the South Pole, the South Magnetic Pole and the Pole of Relative South Pole, the South Magnetic Pole and the Pole of Relative from the coast. And no doubt there will be more to follow. The Arctic, as we have seen, has already passed from exploration to the phase of exploitation. But it will be mory sets before the six million square miles of the Antarctic continent can be said to have been completely explored.

to have been completely explored. What meanwhile is to be the future of Antarctica? In terms of the contemporary struggle for power, it seems likely to be of slight importance. It may be useful as a military training ground in polar techniques, a training ground remote from prying cyes. The ice-free water of Drake Passage, north of the South Shetland Atlantic and Pacific to the ice-bound North-West Passage, should ensure action close the Panama Ganal. But by comparison with the vial strategic importance of the Arctic, bounded by great and natsonistic powers, these are minor matters. Though the commercial advantages steem doubful a present, in thenear future the Antarctic may, like the Arctic, be the scene of trans-polar lights by commercial airways linking the cities of Australia and lights by commercial airways linking the cities of Australia and lights and permanent meteorological stations on the continent.

continent. Economically, the wealth of Antarctics at present lies in its seas, in the highly profitable and highly competitive whaling industry But the Antarctic continent too, still only partially explored, may yet produce surprises Coal tin ore, lead, copper, iron, even gold and silver have been found Oil and nuclear ores are still a possibility in a continent of such tremendous size But economic exploitation in the harshest of all environments, over economic exploration in the harshest of all environments, over distances so great and with relatively few rock faces easily accessible and free from i.e., is unlikely to prove profitable, or even possible, unless world abortages elsewhere drive men to invent new and startling techniques. It has been suggested that the Antarctue might be useful for storage of the world's food surpluses, that atomic powered settlements might be used to transform the order are might be used to transform the cold as well as the hot deserts of the world, that the Antarctic blizzards and gales which have menaced so many generations of explorers might be harnessed as a source of power it has even been suggested that man may in time find the means to harness the latent heat of the enormous mass of Antarctic ice But these are Wellsian ideas One day perhaps they may be translated into fact Meanwhile science rather than strategy or economics is the key to the future of Antarctica, scientific research and scientific exploration in the greatest geophysical laboratory in the world The Antarctic, like the Arctic, may even have its place in the new Space Age, for radiation, so perilous to man, is thinnest over the Poles and there is said to be a strong case for making the first manned space launchings from high latitudes

With the Antarctic at present offering such meagre maternal rewards, one wonders why it should eaue so much inter national rivality, and why the problems of soveregity over this wateland seem so impossible to solve As we have seen, an effort to do so was made by the United States in 1948 with her suggestion of a United Nations Trusteeship In 1956, inspired it seems by New Zealand, India made a similar proposal in 1958 the President of the United States made a fresh attempt to settle the Annarctic problem Addressing a memorandum to eleven countries, including this time the Soviet Union, he drew atten international Geophysical Year and proposed in extension of it an international tracty to cover freedom of scientific investiga tion in Antractica, and unded us free use for any peaceful purposes. This proposal, however, contained a suggestion of cretain provisos upon which the Soviet Union was quick to jump. Not only would the United States, it appeared, reserve all their own rights over Antarctica, including the right to assert territorial claims; they also suggested that other nations might maintain their historic rights and claims to sovercignty. In reply the Soviet Union, while drawing attention, as indeed the United States had done, to the discoveries of her earlier explorers, and discovertes, rejected any such suggestion of provisions safeguardling existing claims. And there the situation stands. Even the disposite between Britain and Argentina and Chile, which has bedevilled all political discussions about the future of Antarctica, has yet to be settled, for the South American countries, basing the highly doubful grounds of geographical contiguity and rights inherited from Spain, have (unlike the United Kingdom) consistently refused to submit their case to the jurisdiction of the International Court at The Hayee.

International Court at the rague. These international frictions, far from impeding the progress of exploration, have tended rather to advance it, for there are few Antarctie expeditions these days which do not depend heavily on government subsidies, and these are probably seldom interval of sovereignty, can be seen. Indeed, with distances so great, with the cost of chartering ships so high, with aids to spedier exploration such as alreaft so costly, an Antarctie expedition on modern lines is well beyond the means of any unsubsidized private organization, even with Industrial and commercial backing. In the Artic there is still much valuable field research awaiting, in glaciology, biology, geology for example, which can be done by small parties at low cost. On rare occasions, as in the strain explorer Duncan Carse's South Georgia Survey of 1951-57 which remapped the island, there have been expeditions of this kind in Antarctica. But, generally speaking, the day of the purely private Antarctic expedition is over. the world's lowest surface temperature of  $-125^{\circ}$  F har recently been recorded, the enveloping ice sheet is known in places to be three miles deep. Nevertheless both Arctic and Antarctic, it seems, are slowly, almost imperceptibly changing, for their ice cover is melting and adding muniedly to the volume of the oceans in the remote future perhaps, in terms of geological time, when low bying shorts have crumbled and have been submerged under new levels of the sea, the Arctic may return to the Mediterrantan climate it empode before the lce Age, while luxurant segetation may floursh once again within the Antarctic circle But until then they white road will remain the chillenge it has always been to those who seek knowledge and adventure

# Select Bibliography

(WITH NOTES)

The list which follows contains a selection of the books, papers, etc., which have been chiefly used, and references to original documents. Where permission has kindly been given by publishers to reproduce substantial extracts, acknowledgement of this is indicated by the asterisk after their names. For the last two summary chapters, I have referred mainly to a few secondary works and to works on the politics, economics, and future of the Antaretic. (Abbreviations of periodicals are in accordance with the World Last of Scientific Periodicals, Third Edition, London, 1952.)

GENERAL

Jeanette Mirsky, To the Arctic, Allan Wingate, London, 1949. (Arctic

Hugh Robert Mill, The Slege of the South Pole. Alston Rivers, London,

Brian Roberts, 'Chronological List of Antarctic Expeditions', Polar 1905. (Antarctic exploration to 1905.) Rec. 59 (May 1958), pp. 97-134, and 60 (Sept. 1958), pp. 191-239. (A very valuable annotated list, based on recent research, to 1957-1958.5

## POLAR GEOGRAPHY

Rudmose Brown, The Polar Regions; a physical and economic geography of the Arctic and Antarctic. Methuen, London, 1927. George H. T. Kimble and Dorothy Good, Geography of the Northlands.

- American Geographical Society of New York and Chapman and
- W. H. C. Knapp, Antarctico, Harlem, 1958. (A conspectus of the geography, geology, botany, etc., of the Antaretie; in Dutch.) J. K. Charlesworth, The Quaternary Ero, 1957. (For the history of
- Terence Armstrong, 'The lee of the central polar basin', J. Gladol.

Terence Armstrong and Brian Roberts, 'Illustrated Ice Glossary',

Polar Rec. 52 (Jan. 1956), pp. 4-12.

#### ANTHOLOGIES

- George Murray, Antaretic Manual Royal Geographical Society, 1901 (With valuable bibliography of early works )
- V Stefansson, Great Adventures and Explorations Robert Hale, London, 1947 (With stimulating comments linking polar passages )
- Augustine Courtauld, From the Ends of the Earth University Press, Oxford, 1901 (An uneven selection but with some unusual passages )

The Palar Record of the Scott Polar Research Institute and the Proceedings and the Journal of the Royal Geographical Society, and the Geographical Journal of the same Society, are mines of information

Chapter 1

- E G R Taylor, The Hoven Funding Art, 1957
- M Cary and E H Warmington, The Ancient Explorers, 1929
- J Oliver Thomson, History of Ancient Geography, 1948
- Strabo, Geography, 1, 233, 399, 441 and 519 Loeb ed, trans H L Jones, 1932 (For the voyage of Pytheas)
- T D Kendrick, A History of the Vikings, 1930
- P Norlund, 'Buried Norsemen at Herjolfnes', Meddelelser om Grenland 67 (1924) pp 1-267
- Hans Ahlmann, Glocaloguel Research on the North Atlanuc Coasts Royal Geographical Society, 1948 (For climatic changes affecting mediaeval Greenland, see pp 25-76) G G R Taylor, The Northern Passages', in A P Newton (ed ),
- E G R Taylor, 'The Northern Passages', in A P Newton (ed ), The Great Age of Discovery, 1932

Chapter II

- E G R Taylor, Tudar Geography 1485-1583, 1930
- R Hakluyt, The Principal Navigations Voyages, Traffiques and Discoveries of the English Nation Hakluyt Soc , 1903–5
- Hakluyt Society, The Voyages and Works of Davis, 1880

Chapter III

- Gerrit de Veer, The three royages of Willem Barents to the Arctic Regions Hakluyt Soc , 1876
- Llewelyn Powys, Henry Hudson, 1927
- Hakluyt Society, Yoyages of William Baffin, 1881

Chapter IV

A L Rowse, 'Sir Richard Grenville's place in English history', Proc But Acad 43 (1958), pp 79-95 (Raleigh Lecture )

- R. T. Gould, 'The charting of the South Shetlands, 1819-1828', Moriner's Mirror 27 (1941), pp. 206-242. (For Dirck Gerritz and
- E. W. H. Christie, 'The supposed discovery of South Georgia by Amerigo Vespucci', Polor Rec. 40 (July 1950), pp. 560-564.
- Edward Lynam (ed.), Richard Hoblurt and his successors, Hakluyt Society, 1946. (For trends and public taste in travel literature.) E. E. Rich, The History of the Hudson's Bay Company, 1670-1870, Vol. 1:
- 1670-1763. Hudson's Bay Record Soc., 1958.
- Carola Oman, Nelson, 1947. Also the journals of Thomas Floyd, R.N. (in the possession of Brigadier Sir Henry Floyd) published in A. H. Markham, Northward Hol, London, 1879.
- B. H. Summer, Survey of Russian History, 1944.
- J. Mirsky, To the Arctic, pp. 68-85.

J. C. Bezglehole (ed.), The Journals of Coptain James Cook. Vol. 1. Chapter V

- J. C. Beaglehole, 'On the Character of Captain James Cook', Geogr. J.
- 122 (Dec. 1956), pp. 417-429.
- J. C. Beaglehole, The Exploration of the Pacific, 1947. J. Cook, A Voyage towards the South Pole and round the World, 1777.
- J. Cook and J. King, Voyage to the Pacific Ocean . . . , 1784.
- H. C. Cameron, 'The Failure of the Philosophers to sail with Cook in the Resolution', Geogr. J. 116 (July-Sept. 1950), pp. 49-54.
- Charles de Brosses, Histoire des Norigotions aux Terres Austroles, 1751.

Alexander Dalrymple, An historical collection of the Several Voyages and

Discoveries in the South Pacifie Ocean, 1770-1771.

H. G. Schenk, The Aftermath of the Nopoleonie Wors, 1947. F. A. Kirkpatrick, History of the Argentine Republie, 1931. Michael Lewis, History of the British Nory, 1957.

Sir John Barrow, An Autobiographical Memoir . . . , 1847. Chapter VII Brian Roberts, 'Notes on the Barrow Collection of Arctic Equipment' Geogr. J. 95 (May 1940), pp. 368-380. (Sir John Barrow's second son John-1803-1898-with whom he is often confined, followed his father to the Admiralty, became Keeper of the Records, and also contributed greatly to Arctic exploration.)

- John Ross, A Voyoge of Discovery in H M Ships Alexander and Isabella,
- Sir Edward Parry, Journal of a Voyage for the Discovery of the North West Passoge in 1819-1820, 1821 in 1821-1823
- Sir Edward Parry, Journol of a Second Voyoge 1824 in 1825-1825 .
- Sir Edward Parry, Journal of a Third Voyage 1826 îп
- Sir Edward Parry, Norrotive of an Attempt to reach the North Pole
- Sir John Franklin, Norrative of a Journey to the Shores of the Polar Sea, in 1819-22, 1823 in 1824-27.
- Sir John Franklin, Narrative of a Second Expedition 1828
- Sir John Ross, Narrative of a Second Voyage in Search of a North West Passage, 1835
- Sir George Back, Nortaure of the Arcus land Expedition to the Mouth of the Great Fish River, 1836
- Thomas Simpson, Natrative of Discoveries on the North Coast of America, 1843
- Dr John Rae, Narrotire of an Expedition to the Shores of the Arcue Sea in 1846-47, 1850
- E, E Rich and A M Johnson (ed ), Rae's Arcue Correspondence, 1844-1855 Hudson's Bay Record Society, London, 1953 (See also review of above by V Stefansson in Geoge J 120 (Dec 1954), PP 486-493 )
- Chapter VIII
- A Howard Clark, 'The Antavctic fur seal and sea elephant industries', in George Brown Goode, The Fisheries and Fishery Industries of the United States Vol II, part 18 Washington, 1887
- S E Morison, Maritime History of Massachussetts Boston, 1941
- 'John Miers Account of the Discovery of the South Shetland Islands', Polar Rec 40 (July 1950), pp 565-575 (Reprinted from Edinburgh Philosophical Journal, Vol 3, No 6, 1820)
- R T Gould, op est , Chapter IV above
- 'Edward Bransheld's Antarctic Voyage, 1819-20, and the discovery of the Antarctic Continent', Polar Rec 32 (July 1946), pp 385-393 (Text of original documents ) Lawrence Martin, 'Antarctica Discovered by a Connecticut Yankee,
- Captain Nathaniel Brown Palmer', Geogr Rev 20 (Oct 1940), pp 529-552 American Geographical Society of New York

358
W. H. Hobbs, 'The Discoveries of Antarctica within the American Sector . . . , Trans. Amer. Phil. Soc. 31 (jan. 1939), Part I. A. H(inks), 'On some Misrepresentations of Antarctic History' (Review of Hobbs op. cit., in Geogr. J. 94 (Oct. 1939), pp. 309-330.)

F. Debenham (ed.), The Voyage of Captain Bellingshousen to the Antarctic Seat, 1819-1821. Trans. from the Russian. Hakhayt Soc.,\* 1945.

- Terence Armstrong, 'Recent Soviet interest in Bellingshausen's Antarctic Voyage of 1819-21', Polor Rec. 39 (July 1950), pp. 475-478.
- Terence Armstrong, 'Four Eye-witness accounts of Bellingshausen's Antarctie voyage of 1819-21', Pelar Rec. 41 (Jan. 1951), pp. N. Nozikov, Russian Voyoges round the World. Trans. E. and M. Lesser,
- 1945.
  - George Murray, Antarctic Manual. (For voyages of Biscoe and Balleny). Chapter X
  - Childre Papers in R.G.S. Archives.
    Charles Enderby, 'Discoveries in the Antarctic Ocean, in February 1839', Journal of the Royal Geographical Society 9 (1839), p. 517.
    H.R. Mill, Storge of the South Pale, 1905.
    B. Roberts, 'Chronological List...,' Polor Rec. 59 (May 1958), PP. 00. 115

    - 99-112. (The most complete list of sealing expeditions.)
    - Charles Wilkes, Narratire of the U.S. Exploring Expedition, 1838-1842.
    - Daniel C. Haskell, The United States Exploring Expedition and its Publicetions, 1844-1874. New York Public Library, 1942.
      - A.Z., A letter to the President and Council of the Poyal Geographical Society on Anteretic Discovery. Privately printed, 1836. (In R.G.S. archives.) M. J. Durnont d'Urville, Porage au Pole Sud . . . , 1846. James Clark Ross, A igrage of Discovery and Resorch in the Southern and Anteretic Region, 1839-1843. John Murray\*, London, 1847. (For Hooker's description of the third voyage, see Geogr. J. 3 (Jan .-June 1894), p. 29.)

Chapter XIII

- E M Gell, John Franklin's Bride, 1930
- Frances J Woodward, Portrait of Jane, 1951 (Biography of Franklin's second wife )
- The Franklin Papers in the Scott Polar Research Institute, Cambridge, England
- R | Cyrux, Sir John Franklin s last Arctic Expedition, 1939
- R J Cyriax and J M Wordhe, 'Centenary of the Suling of Sir John Franklin with the Erebut and Terror', Geogr J 106 (Nov -Dec 1945), pp 169-197 (References to Command Papers, etc.)
- Memoir of Lieutenant John Iering, R N (ed ) Benjamin Hall, Edinburgh, 1881
- Sir John Barrow, Voyages of Discovery and Research within the Arctic Regions, 1846
- Captain Leopold McClintock, The royage of the Fox in the Arctic Seas Sh Edution, 1881 (The acquisition from Ireland of the McClintock papers by the National Maritime Museum Greenwich, was too recent for use )
- ] R Bellot, Journal & un voyage aux mers palaires, 1851
- Charles Frances Hall, Arcue Researches, 1864

Chopter XIV

- John Wright, Geography in the moking the American Geographical Society, 1851-1951 A G 5, New York, 1952
- Elisha Kent Kane, Arctic Explorations Philadelphia, 1856
- Charles Frances Hall, Life with the Esquimous, 1864
- Charles Frances Hall, Narrouve of the North Polar Expedition Washington, 1876
- Sir George Nates, Narrative of a voyage to the Palar Sea during 1875-1876, 1878
- Emma de Long, Voyage of the Jeanette Boston, 1883
- A W Greeley, Three Years of Arctic Service New York, 1886
- Julius von Payer, New Lands within the Arctic Circle London 1876

Chapter XV

- A E Nordenskield, The royage of the Vega round Asia and Europe Trans Alexander Leslie Macinillan and Co \*, London, 1881
- Terence Armstrong, The Northern Sea Route, Sorret exploitation of the North East Passage, 1952
- F Nansen The First Crossing of Greenland Trans Hubert Majendie Gepp Longmans Green and Co \*, London, 1890

- Jon Sörensen, The Saga of Fridrigf Nansen, Trans. J. B. C. Watkins, 1932. (See H. R. Mill's review article 'The Life of Nansen' in Geogr. J. 71
- (March 1933), pp. 260-262.) F. Nansen, Forthest North. Constable\*, London, 1897.
- Frederick Jackson, A thousand days in the Arctic, 1889. The Jackson Diaries, etc. (In Scott Polar Research Institute, Cambridge;

formerly in R.G.S.)

Gordon Hayes, Robert Edwin Peary; a record of his explorations, 1886-1909, 1929. (An unbalanced, biased book, hostile to Peary, but with

useful source material.)

MSS in R.G.S. archives relating to Young's recall from North-West Passage attempt. (See also R. J. Cyriax and J. M. Wordie, op. cst.,

Roald Amundsen, The Northwest Possage. Constable\*, London, 1908,

The Andrée Diaries. English edition. John Lane\*, London, 1931. (See analytical review by A. R. H(inks) in Geogr. J. 77 (April 1931),

pp. 362-366.)

- M. F. Maury, 'The Physical Geography of the Sea, In connection with the Antarctic Regions', Proc. Royal Geographical Society 5 (1860-61),
- Charles Darwin, 'Note on a Rock seen on an leeberg in 61°S. Lat.'. John Murray, 'The Renewal of Antarctic Exploration', Geogr. J. 3

- (Jan.-June 1894), pp. 1-42 (with discussion). H. R. Mill, The Record of the Royal Geographical Society, 1830-1930.
- Sir Clements Markham, The Lands of Silence; a history of Aretic and
- Admiral Sir Albert H. Markham, The Life of Sir Clements R. Markham,
- Adrien de Gerlache (de Gomery), Vayage de la Belgica. 2nd edition,
- C. E. Borchgrevink, 'The Southern Cross Expedition to the Antarctic, 1899-1900', Geogr. J. 16 (1900), pp. 331-414. (For an assessment of Borchgrevink and for his relations with Markham, see Geogr. J. 83 (June 1934), p. 534-537.) Also, First on the Antoretic Continent, 1901.

Chapter XVIII

- Stephen Gwynn, Captain Scatt, 1929
- Sir Clements Markham, op cit , above
- Robert F Scott, The Yoyage of the Discovery, 1929 (With preface by Dr F Nansen )
- Erich von Drygalski, Zum Continent des Elsigen Stidens, Deutsche Südpolar Expedition 1901-3 Berlin, 1904
- N Otto G Nordenskyold and J G Andersson, Antarctica London, 1905
- ] B Charcot, Journal de l'Espédition Antarctique Française, 1903-5 Paris, 1906
- The Voyoge of the Scotta By Three of the Staff, 1906
- Sir Clements Markham, Intrepid Souls Words by Sir Clement Markham, KCB, President RGS Music by Herbert Schartau Privately printed R G S archives
- Chapter XIX
- Robert E Peary, Northward over the Great Ice, 1898
- Duke of Abruzzi, On the Polar Star in the Arctic Sea, 1903
- Robert E Peary, Nearest the Pole, 1907
- Robert E Peary, The North Pole Hodder and Stoughton", London, 1910
- Bradley Robinson, Dark Companion, 1943 (The biography of Matthew Henson )
- Dr Frederick Cook, My attainment of the Pole, being a record of the Expedition which first reached the Boreal Center 1907-1909 1911 (For Cook's probable route, see J Mursky, To the Arctic, pp 301-2 )
- W H Hobbs, Peary London, 1936 (For an evaluation of Peary's claims, see review of above by A R H(inks) and J M W(ordie). 'Peary's Journey to the Pole', Geoge / 89 (March 1937), pp 255-259 j

Chapter XX

- H R Mill, The Life of Sur Ernest Shockleton, 1923
- Margery and James Fisher, Shackleton, 1957 (With review of this by L P Kirwan, 'The Rise of the Polar Hero' in Geogr J 124 (March 1958), pp 90-92 )
- E H Shackleton, The Heart of the Antarctic Heinemann\*, London, 1911

Chapter XXI

J B Charcot, The Voyage of the Why Not? in the Antarctic, 1908-10, London, 1911

- L. Huxley, Scott's Lost Expedition, 1913.
- A. Cherry-Garrard, The Worst Journey in the World, 1922.
- R. E. Priestley, 'The Scott Tragedy', Geogr. J. 68 (Oct. 1926), pp. 340-342. (A review of G. C. Simpson, Scort's polar journey and the weather. Halley Lecture, 1925. Clarendon Press, Oxford.)
- Roald Amundsen, The South Pole, London, 1912.
- Chapter XXII
- Ejnar Mikkelsen, Lost in the Arctic, London, 1913.
- Knud Rasmussen, Greenland by the Polar Sta, London, 1921. V. Stefansson, The Friendly Arene. The story of five years in polar regions.
- London, 1921.
- 'Bob' Bartlett, The Log of 'Bab' Bartlett, London, 1928.
- Sir Douglas Mawson, The Home of the Blizzard; the story of the Australian Antarctic Expedition, 1911-14, 1915. W. Filchner, Zum Sechsten Erdtheil. Die zweite Deutsche Südpolar-
- Expedition, Berlin, 1922.
- E. H. Shackleton, South. Heinemann\*, London, 1919.
- A. W. Greeley, The Polar Regions in the Twentseth Century ; their discovery
- Gordon Hayes, The Conquest of the North Pole; recent Arctic Exploration.
- Gordon Hayes, The Conquest of the South Pole; Antarcus exploration,
- Andrew Croft, Polar Exploration, 1939. (An account of mainly twentieth-century exploration reprinted with some additions in 1947.) G. R. Crone, Royal Geographical Society. A Record 1931-55, 1955.
- Henry Larsen, The North-West Passage, 1940-1942 and 1944. City Archives, Vancouver, Canada, 1954. (Also Gregr. J. 110 (Jan. 1948),
  - pp. 1-16.)
- L. P. Kirwan, 'The Partition of Antarctica' and Trevor Lloyd, 'The
- Political Geography of the Arctic'. (Chapters on political and economic geography in W. Gordon East and A. E. Moodie, The

C. H. M. Waldock, "Disputed Sovereignty in the Falkland Islands Dependencies', Year Book of International Law, 1948. (Indispensable for a proper understanding of the legal background. Many official documents on this and other Antarctic political issues have been

published in recent issues of the Polar Record.)

- J F da Costa, Souveraineté sur l'Antarctiqué Expéditions polaires françaises Paris, 1958 (The international Antarctic conference of October 1959, inspired by President Eisenhower's 1958 proposals and the first to be attended by all the interested nations, will take place too late for inclusion in this book )
- Sir Raymond Priestly, 'Twentieth Century Man against Antarctica' Presidential Address to the British Association for the Advancement of Science Advance Set 13 (1956)
- C G L Bertram, Antarctic Prospect International Affairs 33 (April 1957), pp 143-153

Aberdeen, 172 Abruzzi, Duke of, 255 Acadêmie des Sciences, 45 Academic des Sciences, 126-7 Adams, John Quincey, 126-7 Adams, Licutenant, 273, 278, 282 Adare, Viscount, 149 Adare, Viscount, 149 Adetaide, 302 Adetaide Island, 123, 285 Administration of the Northern Sca Route, Chiel, 320 Advance, 180 Adventure, 65-8 Africa, 10, 12, 137, 224 African Association, 47, 73 Ablmann, Hans W., 348 Augure, 35 Alabamo Expedition, 298 Alaska, 55, 57, 71, 77, 84, 97, 105, 326, 329, 341, 345 Albuma 33 341, 343 Albany, 33 Albernarle, 272 Albert, Prince Consort, 131, 172 Albert, Hall, 246, 233, 284, 237 Alfred the Great, 7, 21 Anere, 199 Alexandre Liozda, 109, 173 Alexandre Lioz, 100-13, 134 Alexandre Victory, 119 Anereck, 1997 America Land, 147 Alexandre Victory, 119 Alexandre Victor Alert, 184 Aleutuan Islands, 109, 170 Anager, Littler of, 33 Anager, Phonose, 51 Anager, Phonose, 54 Anager, Phonose, 54 Anager, Bar, 24 Anager, 19, Arctic, passion Arctic Circle, 4 41, 51, 340 Arctic Circle, 4 41, 51, 340 Arctic Ocean, 53, 54, 108, 111, 185, 194, 326-7 Arctic Seaa, 2, 4, 14, 53, 83, 91, 169-70, 172, 208 Aratoloc, 2(4.-9, 3)1, 345, 353 Aratoloc, 3, 11, 23 Armoda, 16, 27, 20, 217, 273-40, 242, 244, 246 Armoda, 16, 271, 277, 273-40, 242, 244, 246 Arbolnon, Barraud, 113 Ashbunon, Lored, 213 Ashbuno, Lored, 214 Ashbuno, 214 As

Arguents, 59 (ar. 723 Austrant, 143-3 Austrant, 144-3 Austrant, 144-4 Austrant Australian Association for the Advancement of Science, 301 Asel Heiberg Glacker, 294 Asel Heiberg Island, 208, 262-3 Bache Penintula, 208 Back, Commander, 95-7, 162 Back, Rever, see Great Fish River Baffee, William, 33, 37-8, 41, 76, 82-3, 179, 247 342 Baffin Bar, 25, 41, 83-4, 89-90, 162, 168, 172, 182, 322 Baffin Izland, 6, 22-5, 27, 37, 41, 84, 188, 323, Barry Hands, 6, 27-3, 27, 7, 4, 18, 189, 24-9, 1947, Lawren M., 2017, 77, 4, 18, 189, 24-9, Barry, Lawren M., 2017, 2017, 2017, 2017, 2017, Barry, Barry, 194, 2017, 2017, 2017, 2017, 2017, Barry, 194, 2017, 527 Testing and State elingshausen Sen, 116, 117, 123, 296, 3 eliot, 171 eliot, 171 eliot, 171, 20, 167, 171, 2, 379, 340 error, 1, James Gordon, 179, 187, 235 error, Museom, 195 error, Museom, 195 error, Museom, 195 error, San, 36

# 366

#### INDEX

Berna Sirais 29 44 53-7 78 82, 84 86 96 157 165 168 170 185 187 891 3 199 289 321 Bering V tus 54-7 71 Betin 74 Bernacchi Louis, 228-9 238 Bessels Dr 183 B ckerton F H 30" 305 Bunney Sir George, 324 Buscoe John 120-4 128 131 144 211 248 286 315 B infacts Sine 122 Rows 212 Black Sea 112 Bloom 120 B smatck Stra t 232 Borchenewinds C. 27 157 2 1 2 225-6, 228 31 238-61 247 274 301 Borden Lilendy 300 Borough, Stephen, 18 21 24 Borup 259 Borug 239 Borug 239 Boruet Hakac 21 FO 331 Boruet Hakac 21 FO 331 Boruet Hakac 20 Boruet Allande 20 Boruet B sigh Arctic Air Roy e Expediton (1930) 322 J 341 Brith Arctic Air Roy e Expediton (1930) 322 J 341 Brith Arctic Alion for the Advencement of Scince 74 140-41 151 220 So mae 74 140-41 151 220 Bhi th-Actività an-New Zok and Antancias Re-search Expedit on (1927 311 333 Bhi th Eveteri Espedit on 258 261 265 Bhi sh Graham Land Expedit on 332 314 British Laserna antal Geophysical Year Espe-d on 212 d on 315 80 sh North Greenland Exped tion (1932-4) 342 Bentons 3 B tiany 3 Brock Islands 303 Room Care An<sup>-113</sup> Brown Dr. Robert 241 Brown Dr. Robert 241 Druce W Harn Sorn, 220 218 247 9 306-9 Jonet 14 14 124 Botton, W Lan 45 Botton, W Lan 45 Botton, CW Can 45 Botton, Sr Thomas 35 Botton, St Chomas 45 Bot Brown Can an 113 y ot mate, 38 yrd Richard E. 294 326 333-4 338 344 2 Byr Byron Charles 58.9 Byron Lord 180 Caboi John, 10 17 Caboi Sebast an 17 25 Caso Locatemant 255 Caute Coast 311 Ji4

Cand Sr James 309-11 Calais, 93 Cambridge 16 343 348 Cambridga Bay 169 210 Cameron S mon 138 Lameron 5 mon 138 Campe Ridley, 229 Campbell John 48 59 Canabell Lieutrant 295 Canabell 7 33 41 2 45 57 76 71 322 329 JBI 339-40 Canada 17 33 41 2 45 57 76 71 322 329 Canad an Arctic 7 24 35 37-8, 44 48, 77 93 93 97 163 166 263 268 299-302 327 330 141 Canadian Aret & Arch pelego are D struct of Frenklus Canadian Northwest Terr tones, 206 Candlemas lulande 114 Canang, George 78 Cane Adare 149 153, 221 225 229 239 247 295-6 301 Cape Ann 122 Cape Bowles, 104 Construction, 194 Construction, 194 Construction, 195 Construction Ce ente 52 Carmen Land 204 Carntene Lelande 42 Care Duncan 353 Catherina tha Oreat 57 190 Cartarel 7h up 55 Cartarel Jacquett 17 21 Cartarel Jacquett 17 21 Cartarel 7h 11 14 18 20 22 24-5 27 9 32-3 Cathay 9 1 42 47 75 Cathar Company 23-4 Chairaster 184 213 19 222 233 Charotion K thard 15 17 20-21 29 Charoti Jean Baptille Auguste 247-8 267 Charoot Jean Saoute 283-6 301 2 333 Charoot Land 286 J33 Chariton is and 36 Charot 8 Chelyusk n Pen neula, 193 Cherry-Garrard Aos ey 289 Cherry-Garrard Aos ey 289 Chesaptaka Bay 35 Chesterfield In et 52 Cheiterfield In et 52 Ch e 345 353 Ch na. 9 29 33, 53 64-5 77 81 128 Ch rikter Capta n 37 Choate 233 259 258 Christensen Cars 333 335 338 Christensen Cars 333 335 338 Chrost ane Harbour 209 Christians Hitkbour 2017 Deukch Sea 166 Deukchi Pen anula, 54 Deukchi Tribes 54-5 Ohabracier, Polyon 1907 see Chukch Paninsu a Cherriali Iown, 36-7 Churchill River, 37, 49 Churchill, Winston, 310 Cicero, 12 Certo 12 Contrastit, 133 Charnes bland, 140, 312 Costs, Andrew and James, 130 Costs, Andrew and James, 130 Costs, Jandew and James, 130 Costs, Carlow and James, 130 Costs, Carlow and James, 130 Columbus, Christopher, 150, 138 Commonweilth Bay, 25, 264 Congressional Investigating Committee, 264 Connectual, 99, 182 Contad, J., 226 Congression 183, 262, 142 Contrabuter, 112, 262, 342 Contrabuter, 112, 262, 343 Cook, Froetmak A., 227, 362, 4, 236 Cook, James B., 347, 32, 34, 75, 78-9, Corrello, Iac River, 59-7, 299 Correctal, Neuro, 10, 100 Correctal, Neuro, 104, 56, 103 Contractal, Neuro, 104, 569 Contractal, Neuro, 104, 509 Covinan Island, 230 Courtauld, Augustine, 324-5 Cowley, Ambrose, 43 Cowley, 233, 273 "Crane Channel", 332 Conrol Chainel', 332 Orean, seama, 292 'Croker Land', 303, 326 'Croker Mountaint', 83-6, 93 'Croker Mountaint', 83-6, 93 Croxer, Francu Rawdon Moira, 91, 145, 134, 136, 164-4, 172-3 Crozer Scrut, 163 Cumberland Sound, 25 Da Gama, Vasco, 10, 12 Da Gana, Vasos, 10, 12 Danima, Vasos, 17, 12 Dalington, Astandor, 17 Januari, Vasos, 17 Januari, 19 Januari, 17 Januari, Dabes, 49 Dallmann, Edward, 219

Derwitzt River, 133 Dentrchland, 306-9, 311 Devon Island, 84, 86 Derhner, Smon, 54-5, 71 Duz, Bartholomew, 10, 12 Dickens, Clarics, 161 Dickenson, Mishlon, 129 Dickerson, Mahlon, 129 Dickerson, Stahlon, 129 Dickson, Baron Oscar, 190, 192 Dickson Island, 192 Digges, Sir Diolley, 36 Digges Island, 36 Dipon, 45 Discovery (Mediam Baffin), 35 Discovery (Menry Hudson), 36, 38 Discovery (Charge S. Narce), 184 Discovery (Coverge S. Narce), 184 Discovery (Coverge S. Narce), 184 Discovery (Coverge S. Narce), 182, 218–40, Discovery (Coverge S. Narce), 285 242–42, 208, 213–42, 283–5, 288 Discovery Committee, 331 Dennet of Franklin, 163, 327 Dobbs, Arthur, 51 Desition, 62 Deserver, 83 Device, 83 Device, 83 Device, 83 (Francik, 24, 43) Device Teasonic Land, 107, 208, 342 Deserver, 84 (San 14, 119, 338, 342 Device), 108 Tougat, 242 Device, 108 Tougat, 242 Device, 108 (San 14, 119, 338, 348 Device), 108 Tougat, 242 Device, 108, 509 Dahlen, 140 Dander, 233, 269 Dander, 235, 216 Dander, 235, 216 Dander, 235, 216 Dander, 236, 217, 217, 218, 217, 217, 218, 316-7, 314-316, 247, 259 Julie, 218, 146, 247, 259 Dath, San Hoard, 247, 259 Dath, San Hoard, 250-21 Dath, 250-21 Early, 210-13 Earl Care, 34, 596, 286, 329, 341 East Greenland, 196, 286, 329, 341 East Greenland, 5a, 197, 255, 227 East Greenland, 5a, 23, 86 East India, 33-3 East Green, 344 Edward VIII, 284 Edsel Ford Ranet, 334 Edward VII, 284 Fdward Boursweiter, 17, 20-21 Forton, Lord France, 165 Ection, Carl Ben, 327 Foreins, Level France, 183 Foreins, Level M. 199, 312-14 For

Berning Strait 29 44 53-7, 71, 82 84 86 96 157 165 168 170 185 187 191 3 199 289 321 Bering V tus, 54-7 71 Berlin 74 Bernacch Louis 228-9 238 Bessels Dr 183 Bickerion P H 30" 305 B nney Sr George 324 Bacos John 120-4 123 131 144 218 248 286 315 B smarck Stre 1 232 Biorn 272 Bick Sea, 112 Bostom 157 Bona Confidentia 18 Boda Confidential 18 Boda Esperarea 17 20 Bont Thomas Main 102 3 Booth Feix 93-4 Bootha, Guil of 90 Bootha, Guil of 90 Bootha, Guil of 90 Bootha, Peningula are Boo has Feix Bootha 18 Bourboo 63 Borchgrev nk C. E 132 221 2 225-6 2'8 31 215-41 247 274 301 215-41 247 274 301 Borden 15 ands 300 Borough Stephen 18 21 24 Borup 237 Bouvet de Loz er 58 70 Bouvet de Loz er 58 70 Bouvet de Loz er 58 70 Bouvet Jana 38 70 531 Bouvet Jana 38 70 531 Bove Légutanint 273 Bra nard Streant 138 7 Bra and Sergeant 152 Branife & Eward 101 2 (04-6 114 142 Branifed S rat 104 Branifed S rat 104 Brandord Say ere Bellou Stret Brandor Mons for 231 Bradman HL 237 Bradman HL 237 Brador 167 Brith Artis Aut Roule Expedition (1920) 9212 3341 J22 3 J41 Brit an Astoc a on for the Advancement of Beince 74 140-41 131 220 Brit sh Aystrat an Riow Zealand Anteret & Re-search Essod ton (1979-31) 335 Brit sh Everest Esped uson 337 291 295 Brit sh Ciraham Land Exped tion 332 314 Brit sh Ciraham Land Exped tion 332 314 d tion 315 sh North Greenland Esped 1 on (1952-4) in. 142 Britien 3 Britien 3 Brotek 19 ands, 200 Brown Cases A 11 Brown Are Robert, 241 Rouse Will am Stress 220 238 247 9 306-9 Rouse Will am Stress 220 238 247 9 306-9 Br tons 3 Brown og Robert, 24 Brown og Robert, 24 Brown, 11 in må ster 220 Brown, 11 in må ster 220 Brown, 10 ster 22-3 Burdan, Atsamfør 32 Byton, Charles 58-9 Byton, Lord, 180 Cabot, John 10 17 Cabot Sebastuan 17 21 Cagn L entemant 255 258 Card Coast 311 314

Card Sir Jamos 309-11 Calass 93 Cambridge, 16 343 348 Cambridge Bay 169 210 Cameron S mon 138 Langeron 5 mon 138 Campbel John 45 59 Campbel John 45 59 Cambbel Lieutenant 295 Canada, 17 3J 41 2 45 57 76 78 322, 329 Canada, 17 3J 41 2 45 57 76 78 322, 329 331 339-40 Canadam Arct c 7 24 33 37-8 44 43 77 93 93 97 163 156 263 268 299 302 327 330, 140 Canad an Arctic Arch pelego see D strict of Franklen Canad an Northwest Territor at 206 Candlemas Islands, 114 Canning George 78 Cape Adam 149 151 221 223 229 239 247 295-6, 30 293-6, 301 Cape Ann 122 Cape Bowles 104 Cape Bowles 104 Cape Colbourne 210 Cape Colbourne 210 Cape Col 33 Cape Columb a 185 257 259 261 Cape Crot er 219 Area percent and 204-7 Gene Denter, 12, 196, 314 Gene Denter, 12, 196, 314 Gene Denter, 12, 196, 314 Gene Terra, 12, 196, 314 Gene Herne, 11, 1 Gene Herne, 12, Cape Den son 302 304-7 Cape Denhew 194 Cape Dechnew 194 Carnen Land 294 Carol no Istends, 42 Carol no Istends, 42 Carbe Duncan 353 Cathering the Organ 37 190 Carlierton (ne Creat 37 370 Carliert Ph 19 35 Carlier Licolot 17 21 Casey Charles J JJ Ca bay 9 11 14 13 20 22 24-3 27 9 32-3 43 47 7 42 47 76 Cather Company 23-4 Challenger 184 215 19 222 233 Chancellor R chard 15 17 20-21 20 Charoot Jean Bani she Auguste 247-8 267 285-6 301 2 233 Charoot Land 286 333 Charlton Island 36 Chaucer 8 Chelyuzk n Pen nsula 193 Cherry Garrard, Apiley 289 Chesapeake Bay 35 Chesta field Inlet 52 Ches. 8 43 353 Ches. 9 29 33 53 64-3 77 81 128 Che kov, Capta a 37 Chosta 253 259 268 Chosis 253 259 268 Christensen Lars 333 335 338 Christensen Lars 333 335 338 Chukch Sea, 165 Chukch Fen mau & 54 Chukch Tribes 54-5 Chukchk y Poluostrov sree Chu Church II town 36-7 rov see Chukch Pennsula

Churchill River, 37, 49 Churchill, Winston, 310 Cicero, 12 Cincinatti, 183 Clarence Island, 104, 312 Careton Island, 104, 112 Coats, Andrew and James, 248-9 Coats Land, 249, 306-7, 110 Coltock, William, 223, 230, 241-4 Colimon, Chruno, 116-71, 177, 210 Columon, Chrusopher, 10, 138 Commonwealth Bay, 302, 304 Commonwealth Trans-Antarctice Expedition, 152, 336 (34, 336 Converting Lowering Committee, 264 Connecture, 99, 182 Conrad, J., 226 Contract, s., 249 Contract, 112, 262, 342 Cook, Frederick A, 227, 262-4, 286 Cook, Janet, 45, 47-8, 52, 58-75, 78-9, Cook, Janes, 43, 47-4, Janes, 99-101, 112 Compensation, 95-7, 299 Compensation, 195-7, 299 Contrastil, 3, 23 Contrastil, 81and, 56, 163 Contrastil, 81and, 56, 163 Contrastil, 81and, 56, 163 Contrastil, 164, 330 Contrastil, 164, 330 Contrastil, A, 230 Contrasti Content Jane, 199 Content, Jane, 199 Content, Astron, 19 Content, Janes, 197 Content, 199, 191 Content, Levis, 190, 197 Content Levis, 190, 197 Content Levis, 190, 197 Content Levis, 190, 197 Content Levis, 198, 194, 195 (198), 194, 195, 195, 195 Content Statis, 195 Content S Autocritical Source, 23 Part Garay, Vano, 19, 12 Daram, Vano, 19, 12 Daramet, Arabana Kara, 12 Daramet, Arabana Kara, 12 Daramet, Arabana Kara, 12 Daramet, Ernstein, 12 Daramet, Ernstein, 12 Daramet, Ernstein, 12 Daramet, Start, 24 Daramet, 24 Daramet, 12 Daramet, 1

Derwent River, 153 Deutschland, 306-9, 311 Devon Island, 84, 86 Dezhnev, Smoo, 54-5, 71 Duzz, Batcholonew, 10, 12 Decker, Constan, 161 Dickens, Charles, 161 Dickerson, Mahlon, 129 Duckerson, Stahlon, 129 Duckson, Baron Oscar, 190, 192 Duckson Island, 192 Dugers, Ser Dudley, 36 Dugers Island, 36 Disner (44) Dameery (William Jadon) 15, 31 Disnerry (George Middlecol) 1 Disnerry (George S, Narrah and Disnerry (George S, Dorothen, \$2 Dore, 107 Dowe, 107 Dower, 93 Drake, Sir Francis, 24, 45 Drake Passace, 43, 551 Dronning Loune Land, 107, 293, 342 Dronning Loune Land, 114, 119, 338, 348 Dronning Val 334 Dronning Mand Land, 114 Drygalski, 304 334 Drygalski fet Tospoe, 232 Dublin, 140 Dundee, 235, 269 Dundee Bland, 336 Dunden Island, 336 Derforth, Contraisensen, 11 D'Uroille, 143, 145, 141, 130, 218, 247, 233, 191, 301-4, 316, 347, 340 Dutch Bast India Company, 33-5, 43 Dutch Bast India Company, 23 Dutch San Thailog Company, 23 Dutch San Thailog Company, 23 Reard 2014 33, 71 - 146, 179, 341 East Correlator, 166, 171, 233, 247 East Correlator, 166, 171, 233, 247 East Correlator Constant of the Chamber of East Londa Correlation and the East Correlation  Enterprise (Capia n Martin) 162 Ente prise (Edward Parry) 91 Enterprise (S r James Clark Ross) 166 168-9 210 Equator 12 Errous 145-50 153-5 157 160-64 170-72 222 Enciron Lef 6 22-4 42 20 80 87 90 94 EAR mode, 56 14 170 172 182-3 193 197 107 110 273 9-62 266 203 396-9 321 233 341 Earce 23 26 Earce 23 26 Earce 24 26 26 26 27 19 8-6 27 178 Earl 19 10 20 25 10 3 43 Events, 148 EVEN LC 28 10 3 10 Events, 148 EVEN LC 28 10 324 Events, 148 EVEN LC 28 10 20 Events, 148 EV Frie the Red 5-6 Fa kland Tslands Dependencies 79 243 311 2 316 346-7 333 Falkland Islands Dependencies Survey 346 Fal kres Coast 285 
 μιλική τρώτης προστάστικα Surver 346

 μιλική τρώτης Καλατι 230 (10-17) 121 (27)

 μιατης Καλατι 230 (10-17) 121 (27)

 ματης Καλατι 230 (10-17) 120 (10-17)

 ματης Καλατι 230 (11-17)

 Frederick the Esk mo 188 French Canada, 52 French East India Company 58-61 French Laboratory of Mari une Research, 253 Franus Gemma, 16 Franus Gemma, 16 Frankser Marin 22, 5, 27, 182 Fobliere Station, 341 Fuchs S. Vivan, 249, 314, 350-31 Furers 30, 94 Furer 90, 94 Furer 90, 94 Fury Beach 94 167 Fury and Hecia S rat 90 97

Gabriel 23 Gards, 5 Gaul 3 Gauss Johann Karl Fredrich 139 143 146, 145-50 Gaustieff William 17 General San Artistin 300 General San Artistin 300 General San Artistin 300 Control 10 Artistica Society) 74-5 77 General 24 General 10 Artistica Artis George's Bay 102-4 Georgia Is c, see South Georgia German Scientulic and Med cal Association (Groat) 187 219 226 234 246-7 268 Germany 201 21 309-10 323 338 309-10 323 338 Gen tz, D rck 43 Genetischaft für Eritkunde, G bes um 272 Stra 19 of 3 G ibert W Illiam, 46 G ibert Sound 23-6 74 Gifa 209 10 Gina Haven 210 Glasgow 270 Gloucester 168 Goddard William Henry 104 Section 3: 10 (1997) 107 Section 3: 10 (1997) 107 Section 3: 10 (1997) 111 Section 3: 107 (1997) 11 Godthasb 25 342 Great Fish River 96-7 164-5 172 Great Ion Barner 216 Great Ion Valley 238 Greace 7 9 Adolphus Wash ogton 187-9 199-Greeks, 7 Gree cy A Green the Astronumer 62, 85 Construction 12 (1) 23-6 (2) 2 Grey Earl 165 Greyson John, 342

Grinnell, Henry, 81, 169-70, 179, 181-4 Grinnell Land, 100, 183, 283 Grinnell Pennuell, see Grinnell Land Graper, 84-9, 327 Godf Stream, 185 Gunbjorn, 5,7 Gwynn, Stephen, 285 Haakon VII, 295 Haddington, Lord, 155 Naddungton, Lord, 155 Hadley, John, 46 Hugen, Leuten, 293 Hugen, Deitor, 205 Hugen, The, 205 Hugen, The, Jander, 16-18, 22, 29, 32, 43, 53 Hugen, The, Jander, 16-18, 22, 29, 32, 43, 53 Hugen, The, Jander, 173-4, 181-5, 257, 299 Hugh Land ris Hall, Charles Francis, 173-4, 181-Hall Land, 183 Halley, Edmund, 46, 60 Hamburg, 188, 209, 215, 222, 306 Hampton Roads, 131-2 Hansenic League, 23, 230-31 Hanson, Nicolas, 23, 230-31 Hanson, Nicolas, 23, 230-31 Hansworth, Alfred (Lord Northchile), 203 Harrison, John 607. Hartlorre, Nissani 130 Hartlorre, Nissani 1402. Heart Lian, SJ. Hearts, Samuel, 12 Heart Law, J. Heart, Law, J. Heart, Law, J. Heart, Han, 14 Heart, Han, 16, 17 Herry, Hand, 16 Herry, Hand, 17 Herry, Hand, 16 Herry, Hand, 17 H 234 h. 145, 151-2, 133-6, 200, Hooker, Sir Joseph, 1 222, 224-5, 232, 239 Hopewell, 35, 55 Hoppner, Lacutenant, 1 Hoppner, Lieutenant, 25 Hudson Bay, 55-8, 41, 45-53, 57, 90, 95-7, 183 321-2 "31-13 13-13 1 Huxley, Professor, 220 Ibsen, 195 los Haven, 31-2, 34 lostand, 4, 6-9, 25 Ley Cape, 71

De de France, 63 Imperial Academy of Sciences, 46 Imperial Admirality College, 57 Imperial Trans-Antarctic Expedition, Independence Bay, 198, 207, 255, 265 Independence Tax 309-14 Independence Day, sin, 2017, 2017 Indea, 53, 64, 223, 352 Indea, 50, 64, 223, 352 Indea, Ocean, 64, 109-10, 124, 146 daes, 9-11 matsonal Expedition to Greenland (1959), nelefield Land, 180 343 International Geographical Congress (1895), 22, 224, 226, 228, 230, 234, 246 International Geographical Congress (1904), International Geophysical Year (1957-8), 118, 178, 319, 333, 348-52 List. 379, 333, 348-34 International Polar Conference (1879), 183 International Polar Year (1882-3), 178, 188, 120, 345 International Polar Year (1932-3), 378, 11 International Rolar Year (1932-3), 320, 348 International Rolar (1937-3), 320, 348 International Rolar (1937-3 ubefia, 83, 95 ubefia, 83, 95 uchsen, Gunnar, 208, 333, 335 uchsen Island, 208 ske of Georgia, see South Georgia ske of Georgia, see South Georgia talaa, 326-7, 332 talaan North Polar Espedition (1923), 326-7 tuly, 358 trap the Terrible, 20 an Mayon Island, 33, 41, 325, 329, 343 Janr, 120 Japan, 9, 56, 131 Jason, 196 Java, 63 Java, 61 Areaver, 117, 178, 201, 343 Arearcn, Cargana, 191, 223, 230 Arran and Argania, 191, 223, 230 Arran and Argania, 191, 227, 230 Java, R., Bergler, 233 Johnson, 1300 Johnson, 1300 Johnson, 130, 231, 232, 231 Johnson, 130, 231, 232, 231 Johnson, 130, 241, 232, 231 Java, Kohan, 194, 341 Java, Kohan, 194, 341 Kaner Wilhelm Barrier, 307 Kaner Wilhelm II Land, 247, 301, 304, 353, <sup>353</sup> under 111-12 Korrekanika Preuravia, 54-7, 77, 86, 109 Karrekanika Kerni, 178-11, 204 Karrekanika Kerni, 178-11, 204 Kurs Sca, 179-21, 34, 105 Kurs Strat, 20-31, 34, 105 Kurs Strat, 20-31, 34, 105 Kurs Kerni, 20-31, 2 Lolut. 299

22 Annual Professor 100 Kellan Trofessor 100 Kellan Trofessor 100 Kenna John 120 113 33 Kenna John 120 113 33 Kenna John 120 113 33 Kennady Calena of Prior Albert 111 Kennady Calena of Prior Albert 111 Kennady Calena of Prior Albert 111 Kennady Calena of Prior Albert 112 Kenna Ruckert (Albert 112) 34 31 32 34 Kenna Ruckert (Albert 112) 34 36 30-37 274 317 34 370 393 Kenna General Prior Albert 120 366 305 Kenna General Prior Albert 120 366 305 Kenna General Prior Albert 120 367 King Leopold and Over Astral Coast 335 King Octor Land, 208 Kung Octor Land, 208 Kung Octor Land, 208 King Rudyard, 236 Kunghi, James, 3047 King Rudyard, 236 Kunghi, James, 3047 Kanghi, Kola Penusula (Kol akty Foluostrov) 7 20 29 32 Kolewey 196 Kolewey 196 Kolewey 206 Koopna Char Kyet 33 Koopna Char Kyet 33 Kropana Matha Kyat 114 335 33# Kropana Matha Kyat 114 335 33# Kropana J. 109 112 Kunta E. Dr 111 Kunta Kada 36 Labrador 6 (0 17 41 182 242 Labraubre M 211 Lady Frenklin 198 Lady Frenklin 198 Lady Hennes Bay 130 Lambton The Muset Dawnon 270 Lanstor Scale Society 50 95 158 160 188 360 188 340 Land of Desolar on the Kergorien Island Land of First ner Verra del Pargo Lander Richard 121 Larien Henry 340 Larien Giaser 212 Larien Henry 340 Larien Giaser 212 Larien Giaser 212 Laure Lines 245.9 Lashiy seaman 292 Law Doin, 347 Lawarw Mikhail 111 12 115 118 Lens 192 Lens 192 Lens Rev 55 187 192-3 Len agesd, 110 Lefen 9. Ted to a transmission of the term of t

Inverpool \$1 Lockwood 188 235 Lockwood 188 255 Lomonotor Ride 344 Lomonotor Ride 344 TE-50 83 56 99 101 128 160 167 199 234 226 236 299 345 London Port of 24 Longstaff Llewellyn 234 Longstaff Llewellyn 234 Longyearbyen 328 Loper Mrs 107 Los Angeles 342 Lous XIV 24 Louis XV 56 Louis Ph | ope 141-2 Louis Phil ppe Land 142 Louis burg 51-2 Louissan, 16 Ludwig Archduke 77 unarda 81 Lucabse Channel 332 Lotwidge Skeffington \$2 3 Lyall ac dett st 145 Lyon Jirael \$2 McClintock Sy Leopoid 166 171-4 182 200-201 290 300 McClintock Channel 163 McClure Capian 165-73 177 179 300 McCoroneck 143 McCommeck 143 Mackars putgeon 273 276 Mackars & Abrander 82 Mackars & Rver 81 95 6 210 MacMilan, Donald 259 300 326 McMilardo Bey 145 232 McMardo Bovind 133 240 272 275 287 3 287 289 MacQuarte Island 116-17 302 347 MacRobertson Land 335 347 Made ta 289 Masgelan Ferd nand 12 43 Magelian Stratt of 13 27 42-3 Magelian 216 287 289 Mana 15 Abuyestic 236 Mandewille S r John 12 Margate Roads 146 Margatente Bay 286 Margan Islands 42 Marian Islandi 42 Arone 38 Marte Blyd L4nd 133 314 Marte Blyd L4nd 133 314 Marthum Albert 137 178 190 Marthum Albert 137 178 223-8 231 7 240 301,314-13 331 333 341 243 990 353-4 301,314-13 331 333 341 349 Martham Mrs Caments 238 Martham Sciences 236 Markland 6 Markland 6 Traversey Islands, see Sandwich Land Marsettes 3 Marshall Dr 278 202 Marshall Dr 278 202 Marshall Captain 162 3 Mary Ann 113 Maryland 6 Maskelyne Nevil 46 Mason Commissioner 137 Masson Commissioner Massachusetts 99 Massall a J Malochk a Shar 29 34 Mauer 343 Maunon of Nassau 33 Maury Matthew Fontaune 214-16 219 221 Mawann Sur Douglas, 105 273 276 282, 301-6, 310 315

May, Jan. 33 Mediterranean, 3, 245, 354 Mela, Pomponius, 12 Melbourne, 123, 144, 289 
 Stablebrars 123
 144
 219

 Mortille
 Bars, 18
 100
 240-41

 Mortille
 Bars, 18
 100
 240-41

 Mortille
 Bars, 18
 90, 113
 100, 240-41

 Mortille
 Bars, 18
 90, 113
 100, 240-41

 Mortille
 Bars, 19, 90, 113
 100, 240-41
 Mortille

 Mortalle
 Stand, 19, 90, 113
 100, 240-41
 Mortalle

 Mortalle
 Stand, 19, 90, 113
 100, 240-41
 Mortalle

 Metrator, Gentral, 51, 521
 Mortalle
 Mortalle
 Mortalle

 Metrator, Gentral, 53, 521
 Mortalle
 Mortalle
 Mortalle

 Mithaler, Part, 714, 714
 Mortalle
 Mortalle
 Mortalle

 Mithaler, Part, 714, 728, 728, 724, 724, 728, 724, 726, 726, 728, 727
 Mortalle
 Mortalle

 Mark
 Mortalle
 Mortalle
 Mortalle
 Mortalle

 Mark
 Mortalle
 Mortalle
 Mortalle
 Mortalle
 Mortalle

 Mark
 Mortalle
 Mortalle
 Mortale
 Mortalle
 Mortalle
 348 Munna Bluff, 281 Minnyl, 111, 113-16, 118 Mohn, Professor Henrik, 198 Mohn, Professor Moluccas, 63 Montevideo, 100 Montreal, 52 realized and reali Murray, George, 238 Marray, Ser Joha, 216, 218, 222, 225, 230, 232-4, 237, 245, 245, 302 Myture Enchana, 207-5, 322 Myture Enchana, 207-5, 322 regues-intensen, 291-3, 312 Mys Dezhdeva, zee East Cape Mysterne and Companie of the Marchanits Adventurers for the Discoverse of Report, Dominions, Islands, and Flaces Unknowers, The 17 The, 17 Nanseu, Fridtuef, 187, 190, 195-205, 206-7, 212, 220, 240, 254-8, 273, 281, 286, 290, 293-4, 139, 121 Nater, Jordeorge, 9, 184-5, 183, 195-200, 216, Nater, Dieteorge, 9, 184-5, 183, 195-200, 216, Nater, Dieteorge, 9, 184-5, 183, 195-200, 216, 243, 303 Nassau Bay, 132 National Antarctic Exhibition, 233, 236, 244, 246-7, 277, 293 National Geographic Society of Washington, 244 Autoritat unopprised society or watermore 264 - Accordent 313, 24-5 Manufar (197), Eckerst Williams, 125 Mar (197), 253, 278 Wer fast United Society (197), 278 Werkensteinstein, 197, 378 Werkensteinstein, 197, 378 Werkensteinstein, 197, 378 Werkensteinstein, 197, 378 Werkensteinstein, 197, 278, 271, 278 Werkensteinstein, 197, 278, 271, 278 Werkenstein, 197, 378 Werkenstein, 197, 197, 197, 297, 291, 343 Werkenstein, 197, 197, 197, 297, 291, 343 Werkenstein, 197, 297, 297, 343

"New South Greenland', 308 New South Shetland Islands, see South Shet-land Elands. New York, 35, 106, 169, 183, 256, 258, 267, 342 New York Chamber of Commerce, 180 New Zealand, 63, 68-9, 116, 124, 151, 154, 222, 239, 243, 245, 274, 292, 296, 301, 314, 336, 339, 352 Newcastle, 144 Newland, are Spitsbergen Newland, are Spitsbergen Newles, Sar George, 226, 228, 230 Newles Land, 230 Newnes Lane, 430 Nicholas of Lynn, 8 Nierod, 273-5, 277, 282-3, 296, 301 Nienas, B. E. S., 303, 306 Nienas Glacier, 303 Nobile, Umberto, 326-8 Nordeortland (North-East Land), 191, 212, Nordenskiöld, Baron Nils A. E., 177, 190-6, Nordenskyöld Otto, 234, 247-8, 311 Nordenth jold for Tongue, 282 Norge, 326-7 Norte, 310-7 Norsemen, 4-7, 23, 26, 33 North Cape, 7, 16, 194 North Devon Island, 262 North-East Foreland, 298 333, 345 Norwepan Antarctic, 114 Norwepan Geographical Society, 198 Norweptan Polar Instruct, 343 Norwe Scolar, 6, 61 Norwe Scolar, 6, 61 Norwe Zaching, 21, 22–33, 41, 186, 192 Norwe Zaching, Ostrova, are Now Siberian Islands revenue lasty, F. Na. (13) Oran Castar, 52, 525-3 Oran Castar, 114, 276, 301-3, 333, 346 Obs. Gard C (25, 33, 37 Obs. and C (25, 33, 37 Obs. and C (25, 33, 37) Obs. and (25, 33, 37) Obs. (25, 35) Obs. Novoul'skiy, P. M., 115 Orkanys,

Or cans Channel 142 Greans Chainel 194 Oront us 12 Ortel us 9 21 Oscar K ng of Norway 201 Ostor th Madame 227 O tawa, 342 O Stort 224 343 Pac fic Coast 54 60 Pac fic Coast 54 60 77 84 90 109 10 126-7 129 131 133 136 142 149 158 59 165 177 181 192 194 204 210 217 268 322 334 336-8 351 204 210 217 284 3/2 334 300 374 Palest ne Assoca ao 73 Pa mer Nathan el 105-8 117 Palmer Cand 107 117 123 128 131 227 248 Palmer Pomoriola, 105 Panama Canal 191 351 Pandaro see Jeanne te Papan a Ivan, 300 325 343-4 Pa amour 46 Parier Scograph cal Soc ety see Sociate de Geograph e Parker Hyde 236 Parker: Hyde 236 Park nson Sydney 62 Park nson Sydney 62 Park 5 r Edward 51 80 83-93 108 157 60 153 183 240 297 300 Parker 63 14 Parker 63 14 Parker 63 14 Parker 63 14 5-1010 cm<sup>2</sup> Ålesander 103 hvorr hil un 164-7 Persone 130 132-6 1921, Alexien 1270 391 2030 339 Party Antio Club 232-9 261 Party Antio Club 232-9 261 Party Land, 231 593 343 Party Land, 231 593 343 Party Land, 212 209 Persit Sand 12 209 Feglar 16a ry 173 Gertan 43 Rectan 43 Rectan 43 Perican 43 Pend elon, Benjamin 106 127 Pen nsula & Or ental Luiz 237 Penny Will aco, 168 Persia, 21 77 Persu 223 Pet Arthur 24 28 9 32 Peter 1 By (Ostrov Peter D) 116 118 286 338  $^{333}_{\rm Peter tha Great 38}$  44-6 53-4 111 Petermann A H 183-7 Petermann is and 285 Ph addelph a, 52, 127 180 Ph lade of a Ph losophuad Soc ety 129 Ph log of Spann 27 Ph 1 point Balands 179 Ph 1 point Balands 179 Ph pps Hon Constantine, 33 52-3 82 91 Piners Bay 135 Poners 168 Plate R ver 100 Plover 166 168 Prover 166 168 Promoth 61 310 To nt Barrow 71 97 170 299 327 343 To nt Barrow 71 97 170 299 327 343 Point Barn 16-7 198 203 224 235 Point Barn 16-7 198 203 224 235 Point (Ernest Stackten) 309 Point (Ernest Stackt Porpoire 130 132, 133-6 143 Port Mary 113 Port Ph Up 123 Portsmouth, 79 112 13 Portsmouth, 79 112 13

ossess on Island 151 Pou quoi Past 285-6 Powell George 107 120 Powell's G oup see South Orkney Islands Prestrud K 295 Prickett Abakuk 36 Priestley Se Raymond 273 289 291 2 295 323 Prince Affort 169 171 Prince Reparts Island 300 Prince Reparts are Gaorge IV Prince Reparts and Gaorge IV Prince Reparts and Strat 169 19-30, 93-5 165 Prince of Wales are George V Prince of Wales are George V Prince of Wales are Strat 169 70 338 Princes Astra Land are King Leopold and Queen Astrono Company are aste Princess El zabeth Land 216 335 Princess El rabeth Land 218 333 Prins Christ ans Sund 314 Prins Narald Kyri 315 346 Prinsessa Royar Kyri 335 338 346 Prinsessa Ragih Id Kyri 115 335 Prinzessa Ragih Id Kyri 115 335 Prinze Reget Lu tpold Land 307 310 Puchas Samuel 37 Pytheas 3-4 73 Ouchec 52 61 Oucea Alexandra Mounia ne 284 Oucea Elexabeth Jalanda 297 Oucea Elexabeth Jalanda 297 Oucea May Land 304-6 Oucea Maud Bay, 113 Oucea Maud Suit 920 Oucea Maud Santa 204 Oucea Maud Santa 204 Oucea Jala 323-4 Ree John 166 169-73 299 Ree John 166 169-73 299 Ree Isibmus 183 321 Ree Strai 210 Resemusen Knud 265 298 321 Reeves Glac er 282 Rel ef 130 Renovation 164 Repulse Day 51 321 Repuise Bay 31 Jan Review e 165 Review e 165 Review e 165 Review to (S r Thomas Button) 36 Review to (S r Thomas Button) 36 Review to (S r Thomas Button) 36 Review to (S r Thomas Button) 37 Review to (S r Thomas Button) 36 Review to (S r Thomas Button) 37 Review to (S R ser Larsen Hyalmar 115 333 335 R nagold L eu enant 136-7 R magoid L eu enant 156 R mares Islands 262 R né Henry 191 196 Ruo de Lane ro 113 117 R Ischer Alfred 338 348 Robertson Bay 229 31 Robertson Bay 229 31 Robertson Island 312 Robertson Channel 205  Royal Terror Theatre, 242 Royal Victoria Theatre, 134 Royal Victoria Theatre, 134 Royat, 217 Rupert River, 36 Russa, 7, 20, 21, 24, 25, 35, 47, 43-6, 45, 53-4, 37, 72, 76-8, 81, 33, 97, 108-10, 114-6, 118-20, 109, 158, 178, 105, 452, 194-2, 194-2, 214-15, 300, 321, 325, 327, 329, 339, 343, 347, 331-3 Russian-American Company, 57, 109 Rymill, John, 332-3 Statim, Captan, 34-3, 18, 139-41, 144 Storme Land, 124, 126, 217, 304 Storme Land, 124, 126, 217, 304 Stormer, 149 Station, 15, 15, 49, 51, 61, 98 Station, 77 Station, 77 5) feeds, 40 50 feeds, 40 50 feeds, 50 Sandwell, 14, 52 Sandwell, 14, 52 Sandwell, 14, 57 Sandwell, 14, 57 Sandwell, 14, 57 Sandwell, 14, 57 Sandwell, 15, 15, 15 Sandwell, 15, 15, 15 Sandwell, 15, 15, 15 Sandwell, 15, 15, 15, 15 Sandwell, 15, 15, 15, 15 Sandwell, 15, 15, 15, 15 Sandwell, 15, 15, 15 Sandwell, 15, 15, 15 Sandwell, 15, 15, 15 Sandwell, 15, 15 Sandwell, 15, 15 Sandwell, 15, 15 Sandwell, 15 Suff. 100 Sourcely, William, 75 Scorreby, William, 75 Scorreb, 74 contish National Adjarctic Espedition, 251, 244. 247 Seythia, 17 Sea-Gull, 129-30, 132 eal Island, 104 Porchthrut, 21 Storenneyt, 21 Steen Edands, 212 Shackleton, Ernest Henry, 183, 203, 230, 237-46, 243, 254, 258-85, 287-96, 300-301, 308-13, 323 Shackleton Base, 340 Shackleton Base, 350 Shackleton for Shelf, 304-5 Maccounting too Sacot, 304-Shannon, 4 Harpe, Bartholomew, 43 Sherland Islands, 4 Sharae, Choku, 295 Sharne, Alaghan, 113 Marn, 33

iberia, 45, 53-6, 109, 191-2, 199

- ibmakov, A., 192
- Submikov, A., 192 Subinikov Island, 192 Steur de Jourville's Island, 142 Smanov, Ivan, 111, 115 Sempson, George, 218 Sampson, Thomas, 95, 97

- ampson Stratt, 163, 173-4
- Singapore, 131 Skale, 345
- Skelton, 237, 242 Skelton Glacter, 242

- Shdell, Commissioner, 137 Smath, Leigh, 203, 220 Smath, Wallann, 103-105, 114, 117
- Smith Sound, 38, 83, 179-80, 183-5, 206, 208, 254, 257, 262, 342
- Société de Geographie, 74, 141, 285 Solander, Dr, 62, 66
- Solomon, 42
- Solomon filands, 42, 59 Somerset Island, 90, 94, 167
- Sendte Strendyord, 341
- Sophia 168
- outh Africa, \$1
- South Atlantic, #0-11, 45, 58, 113, 121, 146, 217 South Croorga, 43-4, 69-70, 99, 285, 307-8
- South Georgia, 43-4, 69-70, 99, 285, 307-8 343, 319, 331 South Magnetic Pole, 139-40, 143, 145-50, 152-3, 155, 247, 270-73, 282, 284, 301, 303, 351

- 1137 A. 2014 A. 2014 A. 2014 A. 2015 A. 2015 A. 2014 A. 2014 A. 2014 A. 2014 A. 2015 A. 2014 A

- athera Hemssphere, 6
- outhern Ocean, 58, 99, 116, 121, 126, 218 outhfand, 58-60, 63-5, 102-3, 117 over Northern Sea Route, 192

- Somet Northern Sea Route, 192 Seasberg, Bultin, 36 Seasberg, Bultin, 36 Spetched, 77 Spetched, 77 Spetched, 77 Spetched, 72 Spetched, 72 Spetched, 72 Spetched, 72 Spetched, 72 Spetched, 73 Spetched, 74 Spetched, 74 Spetched, 74 Spetched, 74 Spetched, 75 Spetched, 7

- tarvation Cove, 174 tationenberg, 307-8
- itefamson, Vilhjalmur, 263, 299-300, 327 Stefansson Strait', 332
- Sarila Polare, 255

- Stepher, 255 Stepher, Grorg Wilhelm, 56 Stephense, J. R., 314 Stevenson, Robert Louis, 226 Stelwett, P. L., 302, 305 Stockholm, 190 Stockholm, 190

- tormington, 105 tormington Island, 347
- torkerson, 299-300
- Strabo, 4
- anndbert, Nils, 211-12 uez Canal, 265 uezhine, 25

Svalbard, 329 Svalbard Treaty 329 Sverdrup Haraid 328 348 1300 Sverdrup O to 166 196 201 206-8 253 297 Sverdrup Islands 208 Sweden 192 200 210 212 234 247 268 348 Svdney 116-17 131 133-4 136 145 Syna, 73 Tab to 59-61 63 ren (1 37-01 a) Tantay 17 Tasman Sea 116 Tasmana, 123 131 159-60 Tasmana, 123 131 159-60 Tasmana to Nat onal History Society 146 Tegeringi 186 192 Terrentie 113 Terrentie 113 Terrenife 113 Terrana son Land 216 Terra Nova 245 288-90 291 295-6 Terra Nova Bay 282 295,302 Terra Adue 135 141-4 303 305 338 347 Terratorio An árcteo Chileno 345 Terratorio An árcteo Chileno 345 -crimero An actoreo Chaltono 343 Frence (Frincin Min C Cosser) 145-Terror Bay 174 Thanner M 318 (12) 223 Terror Bay 174 Thomas M 318 (12) 223 Thomas M 318 (12) 233 Thomas M 31 Terror (Francis Mo ra Crozier) 143-50 153-7 Tranty Land 103-5 Tranty Land 103-5 Troughton 113 Troughton 113 Two 121-3 Turkey 64 Twain, Mark, 138 Und ne Harbour 113 Ungava Bay 35 Ungava Feminsula, 35 United States 182 United States 182 United States Service Expedit on 322 University of Mich sau Expedit on 322 Upercaver, 33 278 Vahsel Richard 307 Vahsel Bay 307 308 310 311 Vaigach Stratt 34 Valparanto 100-102, 131 133 Van Heemskerck Jacob 28-9 Vardo 20 Vasilev Commander 108 Vauxhall 167 Vega 191-4 Venus, 60, 62 Verron, 59 Verron, 39 Versco, America, 44 Victor A. Chaster, 14 Victor B. Chaster, 14 Victor B. Lener, 14 Victor B. Lander, 16 Victora B. Lander, 16 Victora B. Lander, 16 Victora Strat, Vergo Hurbour 211 Vens Bellingthausen Euron Fab in Gottlieb 103 8 110-21 123 128 140 141 147 150 158 220 227 248,286 313-4 311 Ven Dryalak, Erch, 234 243 301 306 Vens Gronu 342 Ven Henholdt Atsander 112 141 Venskurzbur Dito 109 Formel 111 115-16 118 Vargo Harbour 211 Wager R ver 51 Wa den 1s and, 91 Wales Will am, 56 Wallis, Samuel 58-9 Wais ngham, Secretary 26 Wardhouse 20 Warw ck Lord 23 ware cu Lord 23 Washington 128 Washington Capita n 140-44 151 215 Washa Salo G 10 no 322-4 Weddel James, 120-21 131 151 245 Weddel James, 120-21 131 151 246 Weddel Salos, 100 120 131 241 2 155 220 238 267 305 307 10 314-15 324 334 338 146-50 
 100-50
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Svalbard 329 Svalbard Treaty 329 Svalbard Treaty 329 Sverdrup Harald 328 345 [300 Sverdrup Otta 166 195 201 206-1 253 297 Sverdrup Is ands 208 Sweden 192 200 210, 212 234 247 268 248 Sydney 116-17 131 133-4 136 145 Syria, 73 Tah ti 59-61 61 Tartary 17 Tasman Sea 116 Tasman a, 123 131 159-60 Tasman an Nat onal Hintory Society 146 Tegethoff 186 192 Jenerale 113 Termony 113 Los Termona to Land 216 Term Nova 245 228-50 201 235-6 Terne Nova Bay 282 235, 302 Terne Addina, 135 143-4 303 305 336, 347 Terner Ana, and a terner, and a star Terner of Parae, a No fa Crossey 145-50 133-7 161-4 110-7 113 Thansa 34 31 34 113 223 Tha Terner (Bay 164) Terrer 93, 174 (13) 233 Terrer 93, 174 (13) 233 Terrer 94, 184 (14) 16 Therms 95, 174 (14) Therms 95, 174 (14) Terrer 94, 174 (14) Und ne Harbour 113 Ungava Fay 35 Ungava Fannau a, 35 Unued S etce 182 Un ted States Serv or Expedition 322 University of M ch gan Expedition 322 Upernavit 38 298 Vahsel Rickard 307 Vansel Bay 307 308 310 311 Vangach Start 34 Valgaratise 100-102 131 133 Van Herriskerk, Jacob 23-9 Vardo 20 Vasiber Commander 108 Vasib Verture 30 Verture 34 Vertur Vikings, see Norsemen Vikuski, Constander 300 Viscenter 130 134-6

Vigo Harbour 211 Viadavostok, 270 Viadewostok, 270 Von Beiturgihnuten Baron Fab an Gottleb 105 H 1(L-21 123 128 140 143 145 Van Derbarg 27 44 266 124 145 Van Derbarg 27 44 266 124 145 Van Gronau 342 Von Gronau 342 Von Hambo dt Alexander 112 141 Von Kotzebue, Gt o 169 Fause 111 115-16 118 Wager R ver 51 Walden Island 91 Wales William 66 Wallis Shmuel 58 9 Wais ngham Sectetary 26 Wardhouse 20 Warw ck Lord 23 Warve ck. [Lord 23 Washington [128 Washington [26] Wark m H G (G no) 322-4 Weddel James 320-21 131 131 248 Weddel James 120-21 131 2 141 2 135 220 238, 297 306 307 (0 314-15 324 334 338 249 50 540 50 Segret Alloci 19 234 12 We is N - 0 234 We is N Will arn 24 miniant 24 B Jant 100-101 (04 114 117 Willoughby Str Hugh 17 21 30 Willoughby Str Hugh 17 21 30 Willon Edward 233, 241 2 245 238 292 Willon Edward 233, 241 2 245 238 292 Willonford, 201 254, 237 Winter Harbour \$8 300 340 Wite American balloonat 213 Wood and Flawes, 38 Woolss on Land 169 Woolwach 161 Wordse S r James 315 323 349 Wranged Island 166 186-7 299 Yakutik 35 Yankee Harbour 106 Yelcho 313 Yenescy R ver 29 188 192-3 Young, Str Allen 177 187 200 208-9 Yukon, 34 Zoeland 29 Zeite 142-3 Zeno Nuolo and Antonio 8-9 17 Zeno Maga 16 21 3 34 41 Zoffany 66 Zonlogzal Society 74