



CLASSIC LIVING BOOK

SOUTH

Ernest Shackleton

COMPLETE AND UNABRIDGED

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THE STORY OF SHACKLETON'S
LAST EXPEDITION 1914-1917

by

ERNEST SHACKLETON



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To
MY COMRADES
WHO FELL IN THE WHITE WARFARE
OF THE SOUTH AND ON THE
RED FIELDS OF FRANCE
AND FLANDERS

Preface

After the conquest of the South Pole by Amundsen, who, by a narrow margin of days only, was in advance of the British Expedition under Scott, there remained but one great main object of Antarctic journeyings—the crossing of the South Polar continent from sea to sea.

When I returned from the *Nimrod* Expedition on which we had to turn back from our attempt to plant the British flag on the South Pole, being beaten by stress of circumstances within ninety-seven miles of our goal, my mind turned to the crossing of the continent, for I was morally certain that either Amundsen or Scott would reach the Pole on our own route or a parallel one. After hearing of the Norwegian success I began to make preparations to start a last great journey—so that the first crossing of the last continent should be achieved by a British Expedition.

We failed in this object, but the story of our attempt is the subject for the following pages, and I think that though failure in the actual accomplishment must be recorded, there are chapters in this book of high adventure, strenuous days, lonely nights, unique experiences, and, above all, records of unflinching determination, supreme loyalty, and generous self-sacrifice on the part of my men which, even in these days that have witnessed the sacrifices of nations and regardlessness of self on the part of individuals, still will be of interest to readers who now turn gladly from the red horror of war and the strain of the last five years to read, perhaps with more understanding minds, the tale of the White Warfare of the South. The struggles, the disappointments, and the endurance of this small party of Britishers, hidden away for nearly two years in the fastnesses of the Polar ice, striving to carry out the ordained task and ignorant of the crises through which the world was passing, make a story which is unique in the history of Antarctic exploration.

Owing to the loss of the *Endurance* and the disaster to the *Aurora*, certain documents relating mainly to the organization and preparation of the Expedition have been lost; but, anyhow, I had no intention of presenting a detailed account of the scheme of preparation, storing, and other necessary but, to the general reader, unimportant affairs, as since the beginning of this century, every book on Antarctic exploration has

dealt fully with this matter. I therefore briefly place before you the inception and organization of the Expedition, and insert here the copy of the programme which I prepared in order to arouse the interest of the general public in the Expedition.

THE TRANSCONTINENTAL PARTY

The first crossing of the Antarctic continent, from sea to sea via the Pole, apart from its historic value, will be a journey of great scientific importance.

The distance will be roughly 1800 miles, and the first half of this, from the Weddell Sea to the Pole, will be over unknown ground. Every step will be an advance in geographical science. It will be learned whether the great Victoria chain of mountains, which has been traced from the Ross Sea to the Pole, extends across the continent and thus links up (except for the ocean break) with the Andes of South America, and whether the great plateau around the Pole dips gradually towards the Weddell Sea.

Continuous magnetic observations will be taken on the journey. The route will lead towards the Magnetic Pole, and the determination of the dip of the magnetic needle will be of importance in practical magnetism. The meteorological conditions will be carefully noted, and this should help to solve many of our weather problems.

The glaciologist and geologist will study ice formations and the nature of the mountains, and this report will prove of great scientific interest.

SCIENTIFIC WORK BY OTHER PARTIES

While the Transcontinental party is carrying out, for the British Flag, the greatest Polar journey ever attempted, the other parties will be engaged in important scientific work.

Two sledging parties will operate from the base on the Weddell Sea. One will travel westwards towards Graham Land, making observations, collecting geological specimens, and proving whether there are mountains in that region linked up with those found on the other side of the Pole.

Another party will travel eastward toward Enderby Land, carrying out a similar programme, and a third, remaining at the base, will study the fauna of the land and sea, and the meteorological conditions.

From the Ross Sea base, on the other side of the Pole, another party

will push southward and will probably await the arrival of the Transcontinental party at the top of the Beardmore Glacier, near Mount Buckley, where the first seams of coal were discovered in the Antarctic. This region is of great importance to the geologist, who will be enabled to read much of the history of the Antarctic in the rocks.

Both the ships of the Expedition will be equipped for dredging, sounding, and every variety of hydrographical work. The Weddell Sea ship will endeavour to trace the unknown coastline of Graham Land, and from both the vessels, with their scientific staffs, important results may be expected.

The several shore parties and the two ships will thus carry out geographical and scientific work on a scale and over an area never before attempted by any one Polar expedition.

This will be the first use of the Weddell Sea as a base for exploration, and all the parties will open up vast stretches of unknown land. It is appropriate that this work should be carried out under the British Flag, since the whole of the area southward to the Pole is British territory. In July 1908, Letters Patent were issued under the Great Seal declaring that the Governor of the Falkland Islands should be the Governor of Graham Land (which forms the western side of the Weddell Sea), and another section of the same proclamation defines the area of British territory as "situated in the South Atlantic Ocean to the south of the 50th parallel of south latitude, and lying between 20 degrees and 80 degrees west longitude." Reference to a map will show that this includes the area in which the present Expedition will work.

HOW THE CONTINENT WILL BE CROSSED

The Weddell Sea ship, with all the members of the Expedition operating from that base, will leave Buenos Aires in October 1914, and endeavour to land in November in latitude 78 degrees south.

Should this be done, the Transcontinental party will set out on their 1,800-mile journey at once, in the hope of accomplishing the march across the Pole and reaching the Ross Sea base in five months. Should the landing be made too late in the season, the party will go into winter quarters, lay out depots during the autumn and the following spring, and as early as possible in 1915 set out on the journey.

The Transcontinental party will be led by Sir Ernest Shackleton, and will consist of six men. It will take 100 dogs with sledges, and two motor-sledges with aerial propellers. The equipment will embody everything that the experience of the leader and his expert advisers can suggest. When this party has reached the area of the Pole, after covering 800 miles of unknown ground, it will strike due north towards the head of the Beardmore Glacier, and there it is hoped to meet the outcoming party from the Ross Sea. Both will join up and make for the Ross Sea base, where the previous Expedition had its winter quarters.

In all, fourteen men will be landed by the *Endurance* on the Weddell Sea. Six will set out on the Transcontinental journey, three will go westward, three eastward, and two remain at the base carrying on the work already outlined.

The *Aurora* will land six men at the Ross Sea base. They will lay down depots on the route of the Transcontinental party, and make a march south to assist that party, and to make geological and other observations as already described.

Should the Transcontinental party succeed, as is hoped, in crossing during the first season, its return to civilization may be expected about April 1915. The other sections in April 1916.

THE SHIPS OF THE EXPEDITION

The two ships for the Expedition have now been selected.

The *Endurance*, the ship which will take the Transcontinental party to the Weddell Sea, and will afterwards explore along an unknown coastline, is a new vessel, specially constructed for Polar work under the supervision of a committee of Polar explorers. She was built by Christensen, the famous Norwegian constructor of sealing vessels, at Sandefjord. She is barquentine rigged, and has triple-expansion engines giving her a speed under steam of nine to ten knots. To enable her to stay longer at sea, she will carry oil fuel as well as coal. She is of about 350 tons, and built of selected pine, oak, and greenheart. This fine vessel, equipped, has cost the Expedition £14,000.

The *Aurora*, the ship which will take out the Ross Sea party, has been bought from Dr. Mawson. She is similar in all respects to the *Terra Nova*, of Captain Scott's last Expedition. She had extensive alterations made

by the Government authorities in Australia to fit her for Dr. Mawson's Expedition, and is now at Hobart, Tasmania, where the Ross Sea party will join her in October next.

I started the preparations in the middle of 1913, but no public announcement was made until January 13, 1914. For the last six months of 1913 I was engaged in the necessary preliminaries, solid mule work, showing nothing particular to interest the public, but essential for an Expedition that had to have a ship on each side of the Continent, with a land journey of eighteen hundred miles to be made, the first nine hundred miles to be across an absolutely unknown land mass.

On January 1, 1914, having received a promised financial support sufficient to warrant the announcement of the Expedition, I made it public.

The first result of this was a flood of applications from all classes of the community to join the adventure. I received nearly five thousand applications, and out of these were picked fifty-six men.

In March, to my great disappointment and anxiety, the promised financial help did not materialize, and I was now faced with the fact that I had contracted for a ship and stores, and had engaged the staff, and I was not in possession of funds to meet these liabilities. I immediately set about appealing for help, and met with generous response from all sides. I cannot here give the names of all who supported my application, but whilst taking this opportunity of thanking everyone for their support, which came from parts as far apart as the interior of China, Japan, New Zealand, and Australia, I must particularly refer to the munificent donation of £24,000 from the late Sir James Caird, and to one of £10,000 from the British Government. I must also thank Mr. Dudley Docker, who enabled me to complete the purchase of the *Endurance*, and Miss Elizabeth Dawson Lambton, who since 1901 has always been a firm friend to Antarctic exploration, and who again, on this occasion, assisted largely. The Royal Geographical Society made a grant of £1,000; and last, but by no means least, I take this opportunity of tendering my grateful thanks to Dame Janet Stancomb Wills, whose generosity enabled me to equip the *Endurance* efficiently, especially as regards boats (which boats were the means of our ultimate safety), and who not only, at the inception of the Expedition, gave financial help, but also continued it through the dark

days when we were overdue, and funds were required to meet the need of the dependents of the Expedition.

The only return and privilege an explorer has in the way of acknowledgment for the help accorded him is to record on the discovered lands the names of those to whom the Expedition owes its being.

Owing to the exigencies of the war the publication of this book has been long delayed, and the detailed maps must come with the scientific monographs. I have the honour to place on the new land the names of the above and other generous donors to the Expedition. The two hundred miles of new coastline I have called Caird Coast. Also, as a more personal note, I named the three ship's boats, in which we ultimately escaped from the grip of the ice, after the three principal donors to the Expedition—the *James Caird*, the *Stancomb Wills* and the *Dudley Docker*. The two last-named are still on the desolate sandy spit of Elephant Island, where under their shelter twenty-two of my comrades eked out a bare existence for four and a half months.

The *James Caird* is now in Liverpool, having been brought home from South Georgia after her adventurous voyage across the sub-Antarctic ocean.

Most of the Public Schools of England and Scotland helped the Expedition to purchase the dog teams, and I named a dog after each school that helped. But apart from these particular donations I again thank the many people who assisted us.

So the equipment and organization went on. I purchased the *Aurora* from Sir Douglas Mawson, and arranged for Mackintosh to go to Australia and take charge of her, there sending sledges, equipment and most of the stores from this side, but depending somewhat on the sympathy and help of Australia and New Zealand for coal and certain other necessities, knowing that previously these two countries had always generously supported the exploration of what one might call their hinterland.

Towards the end of July all was ready, when suddenly the war clouds darkened over Europe.

It had been arranged for the *Endurance* to proceed to Cowes, to be inspected by His Majesty on the Monday of Cowes week. But on Friday I received a message to say that the King would not be able to go to Cowes. My readers will remember how suddenly came the menace of war. Natu-

rally, both my comrades and I were greatly exercised as to the probable outcome of the danger threatening the peace of the world.

We sailed from London on Friday, August 1, 1914, and anchored off Southend all Saturday. On Sunday afternoon I took the ship off Margate, growing hourly more anxious as the ever-increasing rumours spread; and on Monday morning I went ashore and read in the morning paper the order for general mobilization.

I immediately went on board and mustered all hands and told them that I proposed to send a telegram to the Admiralty offering the ships, stores, and, if they agreed, our own services to the country in the event of war breaking out. All hands immediately agreed, and I sent off a telegram in which everything was placed at the disposal of the Admiralty. We only asked that, in the event of the declaration of war, the Expedition might be considered as a single unit, so as to preserve its homogeneity. There were enough trained and experienced men amongst us to man a destroyer. Within an hour I received a laconic wire from the Admiralty saying "Proceed." Within two hours a longer wire came from Mr. Winston Churchill, in which we were thanked for our offer, and saying that the authorities desired that the Expedition, which had the full sanction and support of the Scientific and Geographical Societies, should go on.

So, according to these definite instructions, the *Endurance* sailed to Plymouth. On Tuesday the King sent for me and handed me the Union Jack to carry on the Expedition. That night, at midnight, war broke out. On the following Saturday, August 8, the *Endurance* sailed from Plymouth, obeying the direct order of the Admiralty. I make particular reference to this phase of the Expedition as I am aware that there was a certain amount of criticism of the Expedition having left the country, and regarding this I wish further to add that the preparation of the Expedition had been proceeding for over a year, and large sums of money had been spent. We offered to give the Expedition up without even consulting the donors of this money, and but few thought that the war would last through these five years and involve the whole world. The Expedition was not going on a peaceful cruise to the South Sea Islands, but to a most dangerous, difficult, and strenuous work that has nearly always involved a certain percentage of loss of life. Finally, when the Expedition did return, practically the whole

of those members who had come unscathed through the dangers of the Antarctic took their places in the wider field of battle, and the percentage of casualties amongst the members of this Expedition is high.

The voyage out to Buenos Aires was uneventful, and on October 26 we sailed from that port for South Georgia, the most southerly outpost of the British Empire. Here, for a month, we were engaged in final preparation. The last we heard of the war was when we left Buenos Aires. Then the Russian Steamroller was advancing. According to many the war would be over within six months. And so we left, not without regret that we could not take our place there, but secure in the knowledge that we were taking part in a strenuous campaign for the credit of our country.

Apart from private individuals and societies I here acknowledge most gratefully the assistance rendered by the Dominion Government of New Zealand and the Commonwealth Government of Australia at the start of the Ross Sea section of the Expedition; and to the people of New Zealand and the Dominion Government I tender my most grateful thanks for their continued help, which was invaluable during the dark days before the relief of the Ross Sea Party.

Mr. James Allen (acting Premier), the late Mr. McNab (Minister of Marine), Mr. Leonard Tripp, Mr. Mabin, and Mr. Toogood, and many others have laid me under a debt of gratitude that can never be repaid.

This is also the opportunity for me to thank the Uruguayan Government for their generous assistance in placing the government trawler, *Instituto de Pesca*, for the second attempt at the relief of my men on Elephant Island.

Finally, it was the Chilean Government that was directly responsible for the rescue of my comrades. This southern Republic was unwearied in its efforts to make a successful rescue, and the gratitude of our whole party is due to them. I especially mention the sympathetic attitude of Admiral Muñoz Hurtado, head of the Chilean Navy, and Captain Luis Pardo, who commanded the *Yelcho* on our last and successful venture.

Sir Daniel Gooch came with us as far as South Georgia. I owe him my special thanks for his help with the dogs, and we all regretted losing his cheery presence, when we sailed for the South.

Into the Weddell Sea

I decided to leave South Georgia about December 5, and in the intervals of final preparation scanned again the plans for the voyage to winter quarters. What welcome was the Weddell Sea preparing for us? The whaling captains at South Georgia were generously ready to share with me their knowledge of the waters in which they pursued their trade, and, while confirming earlier information as to the extreme severity of the ice conditions in this sector of the Antarctic, they were able to give advice that was worth attention.

It will be convenient to state here briefly some of the considerations that weighed with me at that time and in the weeks that followed. I knew that the ice had come far north that season and, after listening to the suggestions of the whaling captains, had decided to steer to the South Sandwich Group, round Ultima Thule, and work as far to the eastward as the fifteenth meridian west longitude before pushing south. The whalers emphasized the difficulty of getting through the ice in the neighbourhood of the South Sandwich Group. They told me they had often seen the floes come right up to the group in the summertime, and they thought the Expedition would have to push through heavy pack in order to reach the Weddell Sea. Probably the best time to get into the Weddell Sea would be the end of February or the beginning of March. The whalers had gone right round the South Sandwich Group and they were familiar with the conditions. The predictions they made induced me to take the deck-load of coal, for if we had to fight our way through to Coats' Land we would need every ton of fuel the ship could carry.

I hoped that by first moving to the east as far as the fifteenth meridian west we would be able to go south through looser ice, pick up Coats' Land and finally reach Vahsel Bay, where Filchner made his attempt at landing in 1912. Two considerations were occupying my mind at this juncture. I

was anxious for certain reasons to winter the *Endurance* in the Weddell Sea, but the difficulty of finding a safe harbour might be very great. If no safe harbour could be found, the ship must winter at South Georgia. It seemed to me hopeless now to think of making the journey across the continent in the first summer, as the season was far advanced and the ice conditions were likely to prove unfavourable. In view of the possibility of wintering the ship in the ice, we took extra clothing from the stores at the various stations in South Georgia.

The other question that was giving me anxious thought was the size of the shore party. If the ship had to go out during the winter, or if she broke away from winter quarters, it would be preferable to have only a small, carefully selected party of men ashore after the hut had been built and the stores landed. These men could proceed to lay out depots by man-haulage and make short journeys with the dogs, training them for the long early march in the following spring. The majority of the scientific men would live aboard the ship, where they could do their work under good conditions. They would be able to make short journeys if required, using the *Endurance* as a base. All these plans were based on an expectation that the finding of winter quarters was likely to be difficult. If a really safe base could be established on the continent, I would adhere to the original programme of sending one party to the south, one to the west round the head of the Weddell Sea towards Graham Land, and one to the east towards Enderby Land.

We had worked out details of distances, courses, stores required, and so forth. Our sledging ration, the result of experience as well as close study, was perfect. The dogs gave promise, after training, of being able to cover fifteen to twenty miles a day with loaded sledges. The transcontinental journey, at this rate, should be completed in 120 days unless some unforeseen obstacle intervened. We longed keenly for the day when we could begin this march, the last great adventure in the history of South Polar exploration, but a knowledge of the obstacles that lay between us and our starting-point served as a curb on impatience. Everything depended upon the landing. If we could land at Filchner's base there was no reason why a band of experienced men should not winter there in safety. But the Weddell Sea was notoriously inhospitable and already we knew that its sternest face was

turned toward us. All the conditions in the Weddell Sea are unfavourable from the navigator's point of view. The winds are comparatively light, and consequently new ice can form even in the summertime. The absence of strong winds has the additional effect of allowing the ice to accumulate in masses, undisturbed. Then great quantities of ice sweep along the coast from the east under the influence of the prevailing current, and fill up the bight of the Weddell Sea as they move north in a great semicircle. Some of this ice doubtless describes almost a complete circle, and is held up eventually, in bad seasons, against the South Sandwich Islands. The strong currents, pressing the ice masses against the coasts, create heavier pressure than is found in any other part of the Antarctic. This pressure must be at least as severe as the pressure experienced in the congested North Polar basin, and I am inclined to think that a comparison would be to the advantage of the Arctic. All these considerations naturally had a bearing upon our immediate problem, the penetration of the pack and the finding of a safe harbour on the continental coast.

The day of departure arrived. I gave the order to heave anchor at 8:45 a.m. on December 5, 1914, and the clanking of the windlass broke for us the last link with civilization. The morning was dull and overcast, with occasional gusts of snow and sleet, but hearts were light aboard the *Endurance*. The long days of preparation were over and the adventure lay ahead.

We had hoped that some steamer from the north would bring news of war and perhaps letters from home before our departure. A ship did arrive on the evening of the 4th, but she carried no letters, and nothing useful in the way of information could be gleaned from her. The captain and crew were all stoutly pro-German, and the "news" they had to give took the unsatisfying form of accounts of British and French reverses. We would have been glad to have had the latest tidings from a friendlier source. A year and a half later we were to learn that the *Harpoon*, the steamer which tends the Grytviken station, had arrived with mail for us not more than two hours after the *Endurance* had proceeded down the coast.

The bows of the *Endurance* were turned to the south, and the good ship dipped to the southwesterly swell. Misty rain fell during the forenoon, but the weather cleared later in the day, and we had a good view of the coast of South Georgia as we moved under steam and sail to the southeast.

The course was laid to carry us clear of the island and then south of South Thule, Sandwich Group. The wind freshened during the day, and all square sail was set, with the foresail reefed in order to give the lookout a clear view ahead; for we did not wish to risk contact with a "growler," one of those treacherous fragments of ice that float with surface awash. The ship was very steady in the quarterly sea, but certainly did not look as neat and trim as she had done when leaving the shores of England four months earlier. We had filled up with coal at Grytviken, and this extra fuel was stored on deck, where it impeded movement considerably. The carpenter had built a false deck, extending from the poop-deck to the chart-room. We had also taken aboard a ton of whale-meat for the dogs. The big chunks of meat were hung up in the rigging, out of reach but not out of sight of the dogs, and as the *Endurance* rolled and pitched, they watched with wolfish eyes for a windfall.

I was greatly pleased with the dogs, which were tethered about the ship in the most comfortable positions we could find for them. They were in excellent condition, and I felt that the Expedition had the right tractive-power. They were big, sturdy animals, chosen for endurance and strength, and if they were as keen to pull our sledges as they were now to fight one another all would be well. The men in charge of the dogs were doing their work enthusiastically, and the eagerness they showed to study the natures and habits of their charges gave promise of efficient handling and good work later on.

During December 6 the *Endurance* made good progress on a south-easterly course. The northerly breeze had freshened during the night and had brought up a high following sea. The weather was hazy, and we passed two bergs, several growlers, and numerous lumps of ice. Staff and crew were settling down to the routine. Bird life was plentiful, and we noticed Cape pigeons, whale-birds, terns, mollymauks, nellies, sooty, and wandering albatrosses in the neighbourhood of the ship. The course was laid for the passage between Sanders Island and Candlemas Volcano. December 7 brought the first check. At six o'clock that morning the sea, which had been green in colour all the previous day, changed suddenly to a deep indigo. The ship was behaving well in a rough sea, and some members of the scientific staff were transferring to the bunkers the coal we had stowed

on deck. Sanders Island and Candlemas were sighted early in the afternoon, and the *Endurance* passed between them at 6 p.m. Worsley's observations indicated that Sanders Island was, roughly, three miles east and five miles north of the charted position. Large numbers of bergs, mostly tabular in form, lay to the west of the islands, and we noticed that many of them were yellow with diatoms. One berg had large patches of red-brown soil down its sides. The presence of so many bergs was ominous, and immediately after passing between the islands we encountered stream-ice. All sail was taken in and we proceeded slowly under steam. Two hours later, fifteen miles northeast of Sanders Island, the *Endurance* was confronted by a belt of heavy pack-ice, half a mile broad and extending north and south. There was clear water beyond, but the heavy southwesterly swell made the pack impenetrable in our neighbourhood. This was disconcerting. The noon latitude had been $57^{\circ} 26' S.$, and I had not expected to find pack-ice nearly so far north, though the whalers had reported pack-ice right up to South Thule.

The situation became dangerous that night. We pushed into the pack in the hope of reaching open water beyond, and found ourselves after dark in a pool which was growing smaller and smaller. The ice was grinding around the ship in the heavy swell, and I watched with some anxiety for any indication of a change of wind to the east, since a breeze from that quarter would have driven us towards the land. Worsley and I were on deck all night, dodging the pack. At 3 a.m. we ran south, taking advantage of some openings that had appeared, but met heavy rafted pack-ice, evidently old; some of it had been subjected to severe pressure. Then we steamed northwest and saw open water to the northeast. I put the *Endurance's* head for the opening, and, steaming at full speed, we got clear. Then we went east in the hope of getting better ice, and five hours later, after some dodging, we rounded the pack and were able to set sail once more. This initial tussle with the pack had been exciting at times. Pieces of ice and bergs of all sizes were heaving and jostling against each other in the heavy southwesterly swell. In spite of all our care the *Endurance* struck large lumps stem on, but the engines were stopped in time and no harm was done. The scene and sounds throughout the day were very fine. The swell was dashing against the sides of huge bergs and leaping right to the top



Photograph by F. Hurley

THE LEADER



Photograph by F. Hurley

THE WEDDELL SEA PARTY

- | | | | | | |
|-----------|-------------|------------|------------|------------|-----------|
| Chicotham | Cream | McNeish | Holness | Bakewell | Howe |
| Clark | Greenstreet | James | Wild | Stephenson | Green |
| | Ernest | Worsley | Hudson | Hudson | Green |
| | Shackleton | Sir Ernest | Shackleton | Sir David | Gooch |
| | Moo-kin | Wordie | Moo-kin | Murston | M. Ibbot |
| | | | | | Rathewson |
| | | | | | Hurley |

of their icy cliffs. Sanders Island lay to the south, with a few rocky faces peering through the misty, swirling clouds that swathed it most of the time, the booming of the sea running into ice-caverns, the swishing break of the swell on the loose pack, and the graceful bowing and undulating of the inner pack to the steeply rolling swell, which here was robbed of its break by the masses of ice to windward.

We skirted the northern edge of the pack in clear weather with a light southwesterly breeze and an overcast sky. The bergs were numerous. During the morning of December 9 an easterly breeze brought hazy weather with snow, and at 4:30 p.m. we encountered the edge of pack-ice in lat. $58^{\circ} 27' S.$, long. $22^{\circ} 08' W.$ It was one-year-old ice interspersed with older pack, all heavily snow-covered and lying west-southwest to east-northeast. We entered the pack at 5 p.m., but could not make progress, and cleared it again at 7:40 p.m. Then we steered east-northeast and spent the rest of the night rounding the pack. During the day we had seen adelic and ringed penguins, also several humpback and finner whales. An ice-blink to the westward indicated the presence of pack in that direction. After rounding the pack we steered $S. 40^{\circ} E.$, and at noon on the 10th had reached lat. $58^{\circ} 28' S.$, long. $20^{\circ} 28' W.$ Observations showed the compass variation to be $1\frac{1}{2}^{\circ}$ less than the chart recorded. I kept the *Endurance* on the course till midnight, when we entered loose open ice about ninety miles southeast of our noon position. This ice proved to fringe the pack, and progress became slow. There was a long easterly swell with a light northerly breeze, and the weather was clear and fine. Numerous bergs lay outside the pack.

The *Endurance* steamed through loose open ice till 8 a.m. on the 11th, when we entered the pack in lat. $59^{\circ} 46' S.$, long. $18^{\circ} 22' W.$ We could have gone farther east, but the pack extended far in that direction, and an effort to circle it might have involved a lot of northing. I did not wish to lose the benefit of the original southing. The extra miles would not have mattered to a ship with larger coal capacity than the *Endurance* possessed, but we could not afford to sacrifice miles unnecessarily. The pack was loose and did not present great difficulties at this stage. The foresail was set in order to take advantage of the northerly breeze. The ship was in contact with the ice occasionally and received some heavy blows. Once or twice she was brought up all standing against solid pieces, but no harm was done. The

chief concern was to protect the propeller and rudder. If a collision seemed to be inevitable the officer in charge would order "slow" or "half speed" with the engines, and put the helm over so as to strike the floe a glancing blow. Then the helm would be put over towards the ice with the object of throwing the propeller clear of it, and the ship would forge ahead again. Worsley, Wild, and I, with three officers, kept three watches while we were working through the pack, so that we had two officers on deck all the time. The carpenter had rigged a six-foot wooden semaphore on the bridge to enable the navigating officer to give the seamen or scientists at the wheel the direction and the exact amount of helm required. This device saved time, as well as the effort of shouting. We were pushing through this loose pack all day, and the view from the crow's-nest gave no promise of improved conditions ahead. A Weddell seal and a crab-eater seal were noticed on the floes, but we did not pause to secure fresh meat. It was important that we should make progress towards our goal as rapidly as possible, and there was reason to fear that we should have plenty of time to spare later on if the ice conditions continued to increase in severity.

On the morning of December 12 we were working through loose pack which later became thick in places. The sky was overcast and light snow was falling. I had all square sail set at 7 a.m. in order to take advantage of the northerly breeze, but it had to come in again five hours later when the wind hauled round to the west. The noon position was lat. 60° 26' S., long. 17° 58' W., and the run for the twenty-four hours had been only 33 miles. The ice was still badly congested, and we were pushing through narrow leads and occasional openings with the floes often close abeam on either side. Antarctic, snow and stormy petrels, fulmars, white-rumped terns, and adelies were around us. The quaint little penguins found the ship a cause of much apparent excitement and provided a lot of amusement aboard. One of the standing jokes was that all the adelies on the floe seemed to know Clark, and when he was at the wheel rushed along as fast as their legs could carry them, yelling out "Clark! Clark!" and apparently very indignant and perturbed that he never waited for them or even answered them.

We found several good leads to the south in the evening, and continued to work southward throughout the night and the following day. The pack extended in all directions as far as the eye could reach. The noon observa-

tion showed the run for the twenty-four hours to be 54 miles, a satisfactory result under the conditions. Wild shot a young Ross seal on the floe, and we manoeuvred the ship alongside. Hudson jumped down, bent a line on to the seal, and the pair of them were hauled up. The seal was 4 ft. 9 in. long and weighed about ninety pounds. He was a young male and proved very good eating, but when dressed and minus the blubber made little more than a square meal for our twenty-eight men, with a few scraps for our breakfast and tea. The stomach contained only amphipods about an inch long, allied to those found in the whales at Grytviken.

The conditions became harder on December 14. There was a misty haze, and occasional falls of snow. A few bergs were in sight. The pack was denser than it had been on the previous days. Older ice was intermingled with the young ice, and our progress became slower. The propeller received several blows in the early morning, but no damage was done. A platform was rigged under the jib-boom in order that Hurley might secure some kinematograph pictures of the ship breaking through the ice. The young ice did not present difficulties to the *Endurance*, which was able to smash a way through, but the lumps of older ice were more formidable obstacles, and conning the ship was a task requiring close attention. The most careful navigation could not prevent an occasional bump against ice too thick to be broken or pushed aside. The southerly breeze strengthened to a moderate southwesterly gale during the afternoon, and at 8 p.m. we hove to, stem against a floe, it being impossible to proceed without serious risk of damage to rudder or propeller. I was interested to notice that, although we had been steaming through the pack for three days, the northwesterly swell still held with us. It added to the difficulties of navigation in the lanes, since the ice was constantly in movement.

The *Endurance* remained against the floe for the next twenty-four hours, when the gale moderated. The pack extended to the horizon in all directions and was broken by innumerable narrow lanes. Many bergs were in sight, and they appeared to be travelling through the pack in a southwesterly direction under the current influence. Probably the pack itself was moving northeast with the gale. Clark put down a net in search of specimens, and at two fathoms it was carried southwest by the current and fouled the propeller. He lost the net, two leads, and a line. Ten bergs

drove to the south through the pack during the twenty-four hours. The noon position was $61^{\circ} 31' S.$, $18^{\circ} 12' W.$ The gale had moderated at 8 p.m., and we made five miles to the south before midnight and then we stopped at the end of a long lead, waiting till the weather cleared. It was during this short run that the captain, with semaphore hard-a-port, shouted to the scientist at the wheel: "Why in Paradise don't you port!" The answer came in indignant tones: "I am blowing my nose."

The *Endurance* made some progress on the following day. Long leads of open water ran towards the southwest, and the ship smashed at full speed through occasional areas of young ice till brought up with a heavy thud against a section of older floe. Worsley was out on the jib-boom end for a few minutes while Wild was conning the ship, and he came back with a glowing account of a novel sensation. The boom was swinging high and low and from side to side, while the massive bows of the ship smashed through the ice, splitting it across, piling it mass on mass and then shouldering it aside. The air temperature was $37^{\circ} F.$, pleasantly warm, and the water temperature $29^{\circ} F.$ We continued to advance through fine long leads till 4 a.m. on December 17, when the ice became difficult again. Very large floes of six-months-old ice lay close together. Some of these floes presented a square mile of unbroken surface, and among them were patches of thin ice and several floes of heavy old ice. Many bergs were in sight, and the course became devious. The ship was blocked at one point by a wedge-shaped piece of floe, but we put the ice-anchor through it, towed it astern, and proceeded through the gap. Steering under these conditions required muscle as well as nerve. There was a clatter aft during the afternoon, and Hussey, who was at the wheel, explained that "The wheel spun round and threw me over the top of it!" The noon position was lat. $62^{\circ} 13' S.$, long. $18^{\circ} 53' W.$, and the run for the preceding twenty-four hours had been 32 miles in a southwesterly direction. We saw three blue whales during the day and one emperor penguin, a 58-lb. bird, which was added to the larder.

The morning of December 18 found the *Endurance* proceeding amongst large floes with thin ice between them. The leads were few. There was a northerly breeze with occasional snow-flurries. We secured three crab-eater seals—two cows and a bull. The bull was a fine specimen, nearly white all over and 9 ft. 3 in. long; he weighed 600 lbs. Shortly before noon



YOUNG EMPEROR PENGUINS

Photograph by E. Hurley



Photograph by F. Hurley

A HUGE FLOE OF CONSOLIDATED PACK

further progress was barred by heavy pack, and we put an ice-anchor on the floe and banked the fires. I had been prepared for evil conditions in the Weddell Sea, but had hoped that in December and January, at any rate, the pack would be loose, even if no open water was to be found. What we were actually encountering was fairly dense pack of a very obstinate character. Pack-ice might be described as a gigantic and interminable jigsaw-puzzle devised by nature. The parts of the puzzle in loose pack have floated slightly apart and become disarranged; at numerous places they have pressed together again; as the pack gets closer the congested areas grow larger and the parts are jammed harder till finally it becomes "close pack," when the whole of the jigsaw-puzzle becomes jammed to such an extent that with care and labour it can be traversed in every direction on foot. Where the parts do not fit closely there is, of course, open water, which freezes over, in a few hours after giving off volumes of "frost-smoke." In obedience to renewed pressure this young ice "rafts," so forming double thicknesses of a toffee-like consistency. Again the opposing edges of heavy floes rear up in slow and almost silent conflict, till high "hedgerows" are formed round each part of the puzzle. At the junction of several floes chaotic areas of piled-up blocks and masses of ice are formed. Sometimes 5-ft. to 6-ft. piles of evenly shaped blocks of ice are seen so neatly laid that it seems impossible for them to be Nature's work. Again, a winding canyon may be traversed between icy walls 6 ft. to 10 ft. high, or a dome may be formed that under renewed pressure bursts upward like a volcano. All the winter the drifting pack changes—grows by freezing, thickens by rafting, and corrugates by pressure. If, finally, in its drift it impinges on a coast, such as the western shore of the Weddell Sea, terrific pressure is set up and an inferno of ice-blocks, ridges, and hedgerows results, extending possibly for 150 or 200 miles off shore. Sections of pressure ice may drift away subsequently and become embedded in new ice.

I have given this brief explanation here in order that the reader may understand the nature of the ice through which we pushed our way for many hundreds of miles. Another point that may require to be explained was the delay caused by wind while we were in the pack. When a strong breeze or moderate gale was blowing the ship could not safely work through any except young ice, up to about two feet in thickness. As ice of that nature