

KIERAN MULVANEY

AT THE ENDS
OF THE EARTH



A History of the Polar Regions

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Kieran Mulvaney

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Prologue

A little less than two and a half thousand years ago, a Greek ship set sail from the port of Massilia—present-day Marseille, in the south of France—on a journey of discovery that the Massilians hoped would lead to greater understanding of the distant lands and little-known peoples with which they traded. Under the command of Pytheas, a noted astronomer of the time, the ship sailed through what we now call the Strait of Gibraltar, but which the Greeks, with greater flair, referred to as the Pillars of Hercules; turned north along the Breton coast; and made landfall in Britain. It lingered there awhile, and during this time Pytheas explored the country's interior, reaching as far as Belerium, "Land's End," on the tip of Cornwall. Much of the island, he recorded, was swathed in forests and swamps, above which peeked hilltops where the inhabitants had carved gwent, or open clearings. The people raised wheat, corn, and barley, and they fermented grain to make a kind of wine; they mined tin, kept domestic animals, possessed metal weapons, and rode in wooden chariots adorned with bronze and gold.

Returning to the ship, Pytheas continued his voyage and reached the Orkney and Shetland Islands, far farther north than any Greek explorer before him had gone. But Pytheas was not satisfied. During his British sojourn, he had learned of a place called Thule, six days' sailing to the north, where the sun never set in summer nor rose in winter, and he meant to find it.

The northern realms had long excited the imagination of his people. Many Greeks believed the region was home to a people called the Hyperboreans, who lived "beyond the north wind." These Hyperboreans, noted the poet Pindar, writing roughly a century before Pytheas, held "feasts out of sheer joy. Illnesses cannot touch them, nor is death foreordained for this exalted race."

Unfortunately, Pytheas' own account of his journey is lost, bar a few fragments. What we know of his voyage comes largely from later writers—Polybius and, following him, Strabo—and they treated most of his assertions with scorn, disbelieving his descriptions of the places he visited. We thus do not know exactly where Thule was. Some have suggested it lay on the Norwegian coast; others, that it was nothing more exotic than the northernmost of the Shetland Islands. The Irish monk Dicuil insisted, on the basis of writings of eighth-century clerics, that Thule was Iceland, a view that still commands much support.

We also cannot be sure that Pytheas reached Thule and, if not, how far he did go. Indications are that he did not travel as far north as he wanted to, for he reportedly found his way blocked by a thick barrier—although whether that barrier was of ice or fog, we can but speculate. He did apparently observe that “the seas about the region were of a strange substance, neither sea nor air, on which it was not possible to walk or to sail,” suggesting he had encountered sea ice, the frozen surface of the polar ocean. He may even, as at least one historian has argued, have reached the pack ice off the eastern coast of Greenland.

Whatever Thule's true identity, and however close to Thule Pytheas came, one thing seems clear: Pytheas was the first recorded European to reach the fringes of the Arctic. It would be several centuries before any others even came close.

* * *

About a thousand years later and many thousands of miles away, a young Polynesian adventurer named Ui-te-Rangiora slipped his canoe into the water and steered south. For weeks he traveled, navigating by the stars at night and perhaps following the cues of migrating birds by day. Legends of the time spoke of an earlier explorer, Te Aratanga-nūkū, who had glimpsed a southern land his people would later settle and know as Aotearoa, “Land of the Long White Cloud”: a land more widely known today by the less satisfying name of New Zealand.

Perhaps Ui-te-Rangiora set out in search of this Aotearoa; if so, there is no indication that he succeeded. (In fact, Polynesian colonization of the country probably did not begin until around the eighth or ninth century.) He is, how-

ever, said to have continued far to the south, into a gray, stormy ocean with mountainous, foam-tipped waves, and with ice strewn about its surface. He had no words to describe what he was seeing, as it was beyond the realm of his people's experience. Falling back on the closest comparison he could muster—a common Polynesian plant and the starchy white substance it yields—he pronounced the ocean to be *Tai-uka-a-pia*: the sea with foam like arrowroot.

Acclaimed Polynesian historian Sir Peter Buck has cast doubt on whether Uī-te-Rangiora went very far, suspecting instead that when Pacific voyagers “struck cold weather by getting too far south [they] would turn north again because of their scanty clothing.” A more likely scenario, according to Buck, is that tales of a frozen sea far to the south reached Polynesia via later European explorers, and these were incorporated into existing legends and oral histories.

Perhaps, then, Uī-te-Rangiora's voyage is a product only of mythology and imagination. But given the Polynesian proclivity for traveling extraordinarily long distances and colonizing far-flung islands throughout the Pacific Ocean, it is not wholly improbable that he or one of his countrymen—perhaps even one of the early settlers of Aotearoa—was the first to dip a tentative toe into the frigid ocean around Antarctica.

* * *

Whatever the veracity of the tales told about Pytheas and Uī-te-Rangiora, their existence speaks to the grip the polar regions have had, for many centuries and more, on the imagination of cultures far removed geographically from either the Arctic or the Antarctic. That same fascination has revealed itself throughout the ages in sometimes fanciful accounts of journeys to the ends of the Earth. The Irish monk Saint Brendan, for example, supposedly sailed far to the north during the sixth century in search of the “Promised Land” of the saints. The Norwegian king Harald Hardraada—later slain by the forces of England's King Harold at Stamford Bridge in 1066—is reported to have led a voyage of exploration north into the unknown ocean, withdrawing in time to escape “the vast pit of the abyss.” And Icelandic annals from the year 1194 contain oblique reference to finding the “cold edge” or “cold coast.” Slowly, over time, myth and reality fueled and blended with each other as legendary accounts of the polar

regions inspired explorations in search of the truth, which in turn informed further fictional writings.

In 1719, the Englishman George Shelvocke was rounding the tip of South America when he was driven farther south by a storm. Although he did not actually reach Antarctica, he experienced enough “prodigious seas,” “misty weather,” and “islands of ice” to convince him that this was not a place in which he particularly wanted to tarry. During their time in the Southern Ocean, he and his crew “had not the sight of one fish of any kind . . . nor one sea-bird excepting a disconsolate black albatross, who accompanied us for several days, hovering about us as if he had lost himself.” Shelvocke’s second-in-command, obsessed with their traveling companion and convinced it was a bad omen, shot it, “not doubting,” noted Shelvocke, “that we should have a fair wind after that.”

Far from abating after the bird’s death, the winds that had pushed the ship into this unpleasant stretch of ocean continued to beat mercilessly; eventually, however, ship and crew returned home safely. Although Shelvocke’s voyage is little known today, the image of a possessed sailor killing an albatross lives on, having joined with later accounts of events in icy southern seas to inspire Samuel Taylor Coleridge’s famous 1798 poem “The Rime of the Ancient Mariner.”

A little less than two decades after Coleridge completed the “Ancient Mariner,” just as Britain’s Royal Navy was about to embark on a prolonged series of explorations in the Arctic, Mary Shelley set the opening and climactic scenes of her classic novel *Frankenstein* amid the ice of the north. The book’s narrator, Robert Walton, travels in search of a polar paradise but instead sails his ship into what seems certain to be an icy tomb. The crew is on the verge of mutiny when, to their astonishment, a weak and emaciated Victor Frankenstein staggers out of the mist, later followed by the creature that has pursued him to the very ends of the Earth. At the book’s conclusion, the monster stands triumphantly over the corpse of his dead creator, drifting toward the North Pole on an ice floe and vowing to build a flaming funeral pyre to consume them both.

The polar regions made cameo appearances in other nineteenth-century classics. In Charlotte Brontë’s *Jane Eyre*, for example, the eponymous heroine becomes immersed in the descriptions of the Arctic in Thomas Bewick’s *History*

of *British Birds* (a celebrated ornithological work of the time), and finds her mind drifting off to contemplate “that reservoir of frost and snow, where firm fields of ice, the accumulation of centuries of winters, glazed in Alpine heights above heights.” And they took center stage in still others. In 1835, Hans Christian Andersen used the Arctic in his fairy tale “The Snow Queen.” In the 1860s, Jules Verne set two novels in the Arctic; thirty years later, he wrote one about the Antarctic, a sequel to an 1837 novella, *The Narrative of Arthur Gordon Pym*, by an equally esteemed writer, Edgar Allan Poe.

Alongside these fictional works stand factual accounts by explorers who sought to shine a light on the remote polar realms. Many such narratives contain greater drama than anything dreamed up by the most imaginative of authors—not surprisingly, for those who strove to explore and conquer the Arctic and Antarctic confronted powerful adversaries: regions where conditions are as hostile to human survival as anywhere else on Earth. For daring to undertake such challenges, many paid with their lives—none more famously than British explorer Robert Falcon Scott and four comrades. The British, demonstrating a seemingly inherent preference for heroic failure over outright success, have long gloried in the tale: not of the explorers’ achievement of the South Pole in January 1912, for in that they were beaten by a team of Norwegians, but in their subsequent deaths—and, particularly, the death of Lawrence “Titus” Oates.

Weak, cold, and almost lame from frostbite and gangrene, Oates woke up on the morning of March 13, 1912, and, according to Scott, announced, “I am just going outside and may be some time.” With that, he staggered out of the tent and into a howling blizzard. His body was never found. Oates’ death was probably suicide, brought on simply by the fact that he could no longer bear the excruciating pain and had no desire to stretch out his inevitable demise. But the inference that most of the British public chose to take from Scott’s description of events, and the interpretation that has lingered in the national psyche, was of a selfless man, having recognized that his condition was proving burdensome to his comrades, sacrificing himself stoically for the common good. The names of Oates and, indeed, of the entire expedition became bywords for much that was perceived to be worthy about Britain at the time of empire: battling earnestly against hopeless odds, striving to succeed in the face of certain fail-

ure, and, when forced to confront the inevitable, accepting it with dignity and pride and no hint of rancor. As Scott proclaimed in his final written message to the public, “this journey . . . has shown that Englishmen can endure hardships, help one another, and meet death with as great a fortitude as ever in the past.”

But today, the British Empire has largely faded from favor, and the twenty-first century finds more to admire in another polar hero: Ernest Henry Shackleton, a contemporary of Scott’s and, like him, a naval officer, but a man cut from very different cloth. Scott was a creature of the establishment, scion of a family with Royal Navy traditions and handpicked to lead Britain’s Antarctic endeavors. Shackleton, an Anglo-Irishman and son of a doctor, faced opposition from Scott’s backers, who believed that the glory of Antarctic discovery was Scott’s destiny and his alone. Scott could be imperious and foul tempered, and although his men publicly—and in many cases genuinely—expressed admiration and affection for him, there were those among them who viewed him with contempt. Shackleton presented himself as more a man of the people, and he was a natural leader; among his comrades, he inspired almost universal devotion.

Shackleton, in other words, is the kind of hero we are more comfortable eulogizing in this day and age, and in recent years, his star has come to eclipse Scott’s. His cause is aided by the fact that his most ambitious voyage culminated in perhaps the greatest voyage of survival ever described. His 1914–1917 British Imperial Trans-Antarctic Expedition, which sought to be the first to traverse the continent, saw its hopes of success dashed when the expedition ship, the *Endurance*, became trapped in the ice floes of the Weddell Sea and was crushed. For five months, the twenty-eight members of the crew drifted slowly north on an ice floe before setting out in the three whaleboats they had rescued from the ship and landing on remote Elephant Island. There, twenty-two of the men sheltered beneath two overturned boats while Shackleton and five others took off in the third boat for South Georgia Island. After navigating 800 miles of angry Antarctic waters, they reached their destination only to find that they were on the opposite side of the island from the whaling station where they hoped to find help. Shackleton, Frank Worsley, and Tom Crean then crossed mountains that other men thought could not be crossed, staggered into Grytviken, and organized a rescue party for the men on Elephant Island.

It was a remarkable example of courage and determination, and it is one that continues to inspire. In the late 1990s alone, Shackleton was the subject of several new books and a critically acclaimed museum exhibit that toured the United States; at the time of this writing (October 2000), it is rumored that his story will be given the Hollywood treatment. But if Shackleton has emerged as the first among equals, he has not done so entirely at the expense of his fellow explorers; his is the rising tide that lifts all boats. Polar explorers, and even more so the polar regions themselves, continue to appear—even, it seems, with ever greater frequency—in popular culture.

Andrea Barrett's best-selling 1998 novel *The Voyage of the Narwhal* superimposes fictional characters on the historical search for John Franklin, a British explorer whose Arctic expedition disappeared in 1845. Peter Høeg's *Smilla's Sense of Snow*, a murder story that centers on a detective who is part Danish and part Greenlandic, uses the Arctic as a context to examine relations between the two nations. More fantastically, John Carpenter's *The Thing*—a remake of an earlier movie that was itself an adaptation of the John Campbell short story "Who Goes There?"—portrays the terror unleashed in an Antarctic research station by a murdering, shape-shifting creature from another world. The denouement of the *X-Files* movie sees Fox Mulder rescue Dana Scully from an alien spaceship hidden beneath the Antarctic ice cap.

And so it continues. Two and a half millennia after the Hyperboreans and the voyage of Pytheas, the polar regions remain a source of intrigue and fascination. Yet much of that fascination reflects the fact that even now—even with the Arctic, the Antarctic, and their surrounding regions thoroughly mapped and explored, even with the Arctic widely inhabited and the Antarctic host to permanent scientific stations—both regions remain, for most, places of mystery. Inasmuch as they are considered at all, they are viewed as remote, cold, barren, forbidding, and inhospitable. And so they are, in many ways. But they have played, and continue to play, a surprisingly prominent role in the natural and human history of the rest of the world.

The polar regions exert a profound influence on global climate: blasts of Arctic and Antarctic air bring cold to the Northern and Southern Hemispheres, respectively, and the melting of ice and sinking of cold, dense water in the polar oceans give a critical kick-start to the engine that drives the system

of ocean currents worldwide. In the eighteenth and nineteenth centuries, the pelts of marine mammals from both regions sustained a massive industry that brought riches to places as far afield as England and China, and this in turn proved a catalyst for a series of voyages that lifted the veil from some of the mysteries of the polar realms. Oil from whales killed in the Arctic and Antarctic fueled the lamps that lit the streets of London, helped grease the wheels that turned the Industrial Revolution, and found uses in a suite of applications from soap to nitroglycerine. War has been fought over islands in the subantarctic. World War II was waged partly in the Arctic; World War III, it was long assumed, would be. The Arctic contains by far the largest oil fields in the United States and among the largest in the world; whether or not protected areas of northern Alaska should be opened to oil drilling has been a contentious political issue for at least twenty years, and it seems likely to remain so for some time to come.

But just as the polar regions have influenced the rest of the world, the world has left its mark on the poles and their environs. The fur pelts that brought riches to faraway lands came from the backs of fur seals and sea otters, whose populations were decimated by the slaughter. Similarly, the whales that surrendered oil and other products were, at both ends of the Earth, almost wiped out. Although oil exploration and development have been halted, perhaps forever, in Antarctica, they continue apace in the northern realms, sometimes causing pollution of both Arctic and subarctic environments. More recently, the image of an "ozone hole" above Antarctica and the specter of melting ice caps and rising sea levels as a result of global warming have brought home the potential consequences of human industrialization for even the most remote and pristine environments.

The story of the Arctic and the Antarctic is of two regions that are quite unlike any other—but that are almost as different from each other as each is from the rest of the world. It is a story of interweaving cycles in which exploration leads to exploitation, and exploitation to further exploration. It is a story of how even such remote realms can significantly affect, and in turn be deeply influenced by, events and trends thousands of miles distant—of how the long shadow of humanity has extended, for better and for worse, to the very ends of the Earth.

C h a p t e r 1

Poles Apart

Southern Ocean, December 1994

There was a knock at the door and a flood of light from the passageway into my windowless cabin. One of the crew stood by the side of my bunk, a cup of tea in her hand. She placed the cup on a ledge and smiled as she looked at my bleary, half-comprehending face.

“There’s a penguin outside, in a uniform and holding a Welcome sign,” she said. “We must be in Antarctica.”

She had laughed the night before when I asked to be woken when we crossed the Antarctic Convergence. There are, after all, no official markers delineating the Antarctic Regions’ boundaries, and if the Convergence is shown at all on maps, it is typically as a vague, wavy line. But despite its ephemeral nature, the Antarctic Convergence is a very real, and very noticeable, border. I had never missed its crossing on any of my previous trips to the region, and I was not about to do so now, even if it meant clambering out of bed at 4:00 A.M.

The Convergence is where the cold waters of the Antarctic meet the temperate waters of the Atlantic, Pacific, and Indian Oceans. Heading toward the Convergence from the north, at first you see little sign of the shift that is about to take place. Then, over the course of a few hours of steaming or sailing,

everything begins to change. The water temperature drops by several degrees. The air becomes noticeably more chilly. Where warm and cold air clash, a wall of mist rises to envelop you. Continuing on through the fog, you emerge on the other side in another world: The bird life is different. You may start seeing pieces of ice drifting on the water's surface. Far ahead, the pack ice, unseen but reflecting light, can create a phenomenon known as "ice blink," causing the horizon to appear brighter in the south than in the direction from which you have come. Maybe an iceberg will drift by. Having reached this far north, the iceberg is most likely old and weathered and melting rapidly. Waves may have carved arches and caverns into its expanse, perhaps revealing a bright cobalt blue interior. Standing on the ship's deck—or, by now, looking out from the protective warmth of the wheelhouse—you watch it slip silently past, and you realize you are now in the Antarctic.

There are those who claim that the real Antarctic does not begin until the vicinity of the Antarctic Circle, several hundred miles to the south. The Circle encloses almost all of the Antarctic Continent; it is the line south of which the sun does not set at the peak of summer or rise during the dead of winter. And certainly, those few areas of Antarctica that are north of this line—particularly the extension known as the Antarctic Peninsula, which reaches up toward the tip of South America—are frequently different in feel and form from those farther south. But the Convergence is the unquestioned portal, the opening not only to the continent itself but also to the ocean that surrounds it. Even as it moves slightly, its basic track remains the same from year to year, molded by ocean currents and the location of landmasses: after slicing through the Drake Passage, the channel between the Antarctic Peninsula and Tierra del Fuego, it arches north to around 50°S latitude as it heads into the South Atlantic. It more or less maintains that latitude around the Indian Ocean side of Antarctica before dipping lower, south of 60°S latitude, on the approach to Australia. It keeps south of 60°S as if to be certain of giving Australia and New Zealand an extra-wide berth—averaging a distance of perhaps 750 miles from them both—and then bulges up one more time and, finally, dips back through the Drake Passage.

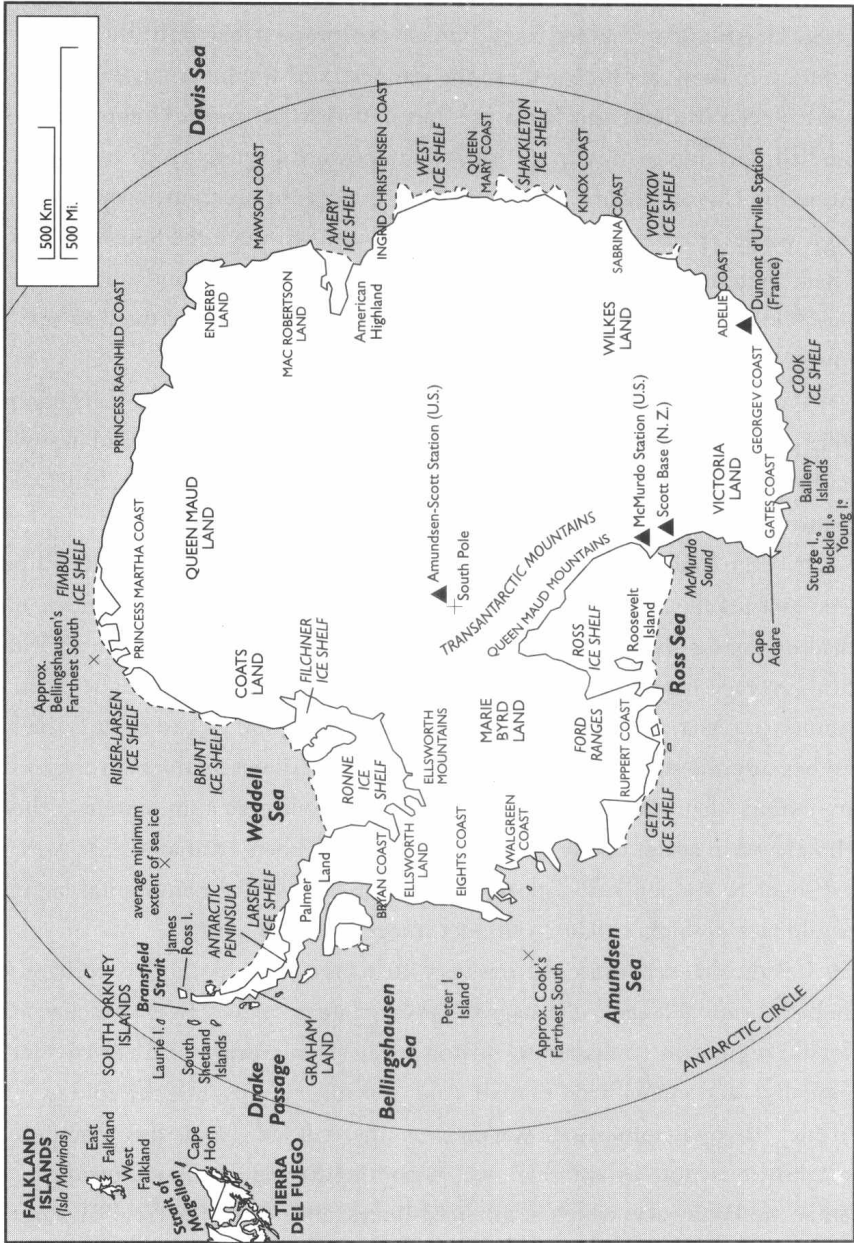
South of the Antarctic Convergence lie 14 million square miles of ocean, one-tenth of all the ocean on the planet and some of the stormiest seas in the

world. Antarctica's remoteness—it is 2,500 miles from Africa, 1,500 miles from Australia, and more than 450 miles from the closest land, the southern tip of South America—helped keep human explorers at bay until the nineteenth century. In the years before then, the tempestuous waters encircling the continent served to deter the few who ventured that far south. Uninterrupted by landfall, circling endlessly and driven by powerful winds from the west, the Antarctic Circumpolar Current, the only true global current, propels a seemingly endless procession of low-pressure systems through the Southern Ocean. These systems bring with them furious, screaming winds and waves of often terrifying dimensions: towering, whitecapped walls of water that can toss and toy with any vessel bold enough to venture into their domain.

Virtually the entire global landmass is north of the Antarctic Convergence. With the exception of a few scattered islands, only one piece of land lies within its boundaries—Antarctica itself, the highest and lowest, driest, and coldest continent in the world.

It is the highest because of the enormous ice sheet that blankets all but a few parts of the continent and boasts an average depth of 6,285 feet, or more than one and a quarter miles. Add the landmass that lies beneath and Antarctica's average height above sea level is around 7,800 feet—far higher than the runner-up, Asia, which crosses the line at a mere 3,000 feet or so. It is the lowest because the sheer weight of all this ice presses down on the bedrock to such an extent that the peaks of many of the continent's mountains, though Himalayan in scale, barely clear sea level. It has been estimated that were the ice sheet to suddenly disappear, the greater part of the continental landmass would rise up higher than 3,000 feet: more than half a mile.

It is the driest because there is very little precipitation: there is perhaps four inches of snowfall each year over the polar plateau, maybe twenty inches in the coastal region (in comparison, Boston receives an average of forty-two inches annually), and virtually no rainfall. And, not surprisingly, it is the coldest. (The Arctic, though somewhat warmer, is disqualified from this competition because it is not, as we shall see, a continental landmass.) Outside of the Antarctic Peninsula, which some hard-liners sniff is not the "real" Antarctica, the highest temperature ever recorded was about 48°F. At the South Pole, the average annual temperature is about -60°F. The coldest temperature ever



recorded in Antarctica—the coldest ever recorded on the surface of Earth—was -129.9°F .

Because of their positions at the ends of the world, the polar regions vary between periods of prolonged, almost continuous, sunlight during summer and months of protracted darkness during winter. This is because Earth tilts as it moves around the sun, offering alternately the Northern and Southern Hemispheres to the star it orbits. This is what gives Earth its seasons; it is why summer in the Northern Hemisphere is winter south of the equator and why the equatorial zones receive almost unchanging amounts of sunlight over the course of the year. But because the Arctic and Antarctic are so far north and south, respectively, the angle of the sun to Earth is such that even in summer, the sun never rises as high above the horizon as it does over the equatorial zone. As a result, observes ecologist Bernard Stonehouse, polar sunshine “can be strong enough to warm rocks, melt snow and encourage judicious sunbathing; it contains enough ultraviolet radiation to cause sun-tanning, serious sunburn and snow-blindness, but it cannot bring lasting warmth to polar areas.”

Antarctica, then, is so cold because of its location and its isolation; at the same time, its blanket of ice, itself a consequence of the extreme conditions, contributes to the continuation of these extremes. What little solar energy reaches the region is reflected back into space by the ice cap. And although there is some circulation of warm waters from north of the Convergence, the Antarctic is so distant from the rest of the world, and the barrier formed by the Convergence and polar currents so effective, that the warming effects of tropical waters are essentially unnoticeable. Whereas the Arctic experiences a degree of interchange between polar and temperate weather systems, the Antarctic is all but sealed in its own self-perpetuating cocoon of cold.

Antarctica is the fifth largest continent, one and a half times larger than Australia, with an area greater than that of western Europe, larger than the United States and Mexico combined. Of its 5.4 million square miles, roughly 10 percent is taken up by ice shelves, large, semipermanent areas of ice that are anchored to the mainland. Fed by glaciers and ice streams—rivers of ice that, apparently because they rest on foundations of water-saturated sediment, move forward at a greater pace than the ice sheets surrounding them—these shelves are forever varying in size and shape and constantly calving off icebergs, on