Introduction

~~Antarctica: A Threatened Continent~~

Twice
As large as Australia, the Antarctic Continent is the last land mass on the planet to be explored. Though not yet developed or exploited, it is nevertheless already threatened by the pursuit of natural riches that human beings have carried on almost since the beginning of their history—not merely to meet their needs but because of an appetite for wealth, the source of power over one's fellow men. Antarctica had escaped the fate of other continents up until modern technology made its penetration possible. But now the tenure of its security in the face of rival national claims appears uncertain.

Already, for example, the Adélie penguins on Cape Royds, whose rookery is the southernmost bird colony in the world, are declining as a result of human disturbance. Since the nineteenth century, as in other parts of the world [redacted], the fur seals of the Antarctic have been nearly wiped out by the depredations of sealers; as the whole population declined the seal population has increased ~~only a few small rookeries have survived~~. Whales in great numbers and of many kinds once roamed the sub-Antarctic seas; today, because of the efficiency, persistence, and greed of the Japanese, Russian, and Norwegian whaling fleets, among others, they are rarely seen. The blue whale, the largest animal ever to have lived on earth, has been ~~very nearly~~ brought near to extermination.

As the pursuit of other species of whales becomes uneconomic because of their scarcity, new targets will no doubt succeed them—including so small an organism as the shrimplike krill, which provides whales with their primary sustenance and [redacted] is the most abundant remaining

By the time the Antarctic Treaty is susceptible to change in 1991, the pressures to exploit the continent's resources of food, fuel, and minerals may well be irresistible. With the world's population doubling every thirty years, the search for food will become ever more intense, reaching for as yet unexploited sources of animal protein, and for coal, oil, and ore deposits.

As world reserves of oil and gas go on shrinking, and as the richest mineral deposits approach exhaustion, international consortia will begin to exert pressure on governments to permit exploratory drilling in the unglaciated dry valleys (which most geologists believe are unpromising) and on the continental shelf of Antarctica, and to permit intensive exploration of the mountainous regions for ore deposits. Still a formidable obstacle to offshore drilling are the drifting pack ice and icebergs, which could wipe out a drill rig in short order. But although that obstacle may not be surmountable until a technology for underwater drilling has been developed, drilling on land alone will surely and irreversibly change the character of Antarctica. The machinery, the supportive establishments, and the roads that will be necessary for conducting intensive, year-round exploration for oil cannot but produce a devastation at least equal to that for which the consortium of petroleum corporations at Prudhoe Bay on the Arctic coast of Alaska have been responsible. Even were it to be spared the devastation of oil spills, the great, wild, austere beauty of Antarctica will be corrupted by trash and pollution. And oil spills in the Antarctic seas from tankers or wells would have an incalculably damaging effect on Antarctic marine life. Seals, even if not directly injured, could not escape adverse indirect effects; oil-soaked penguins would die by the thousands, and their

[illegible] in the dry valleys. [illegible] Prudhoe Bay in Antarctica.

Chapter II

Palmer Station and the Islands

My first glimpse of Antarctica came on January 11, when an outpost of the South Shetland archipelago appeared off the port bow. During the night we had crossed the Atlantic Convergence to enter a new climatic zone. From then on weather conditions would be controlled by all the vagaries of unpredictable forces originating on the Antarctic Continent--which even in summertime can bring fierce sudden gales, days gloomy with driven snow, or ice fogs and whiteouts. Yesterday's calm had been replaced by wind and low stormy clouds racing across the sky. On our left rose Elephant Island, a huge, menacing mountain hulk,

Minnesota ornithologist, Dr. David Parmelee, and Dr. David Morrish, a physiologist working on penguin circulation, who generously spent his time showing me around.

Litchfield is noted more for its vegetation than for its animal life. The gray granite of its rocky terrain is fissured by a series of steep, narrow clefts or miniature valleys, carpeted with brilliant green and yellow mosses that grow in spongy hummocks dense enough to walk on. Even on the ridges themselves, where the slope was relatively gradual, the mossy growth could reach a depth of eight inches. Small tarns filled the lowest spots in some of the valleys with a brown infusion of thin peaty soil. In just one of these tarns we found an odd, colorless, shrimplike crustacean not more than half an inch long. Bright yellow and orange lichens spotted the granite cliffs in widely separated places; and tufts of a short-bladed grass grew on the exposed tops of some ridges, in pockets of scant soil that had been fertilized by bird droppings and by the dead remains of limpets which gulls had deposited there by the thousands.

The bird population of Litchfield was sparse as compared with some of the smaller islands. In one corner was a small colony of Adélie penguins; and on the opposite side the nests of giant petrels, which are larger than gulls, were distributed by the score over several acres of a rocky headland. The plumage of these birds can vary from brown to almost pure white, with every permutation in between, such as birds with pale heads and brown bodies. Although they did not leave their nests as we approached, they rotated so as always to be facing the intruder and would lunge at anyone who came too close. A blow from one of those large bills would not have caused injury, but there was the risk of being fouled by an oily, malodorous regurgitant. The giant petrels did not offer much resistance to our picking them up to see whether their nests contained eggs or chicks--which would be quickly

Chapter III

Misfortune at Deception Island

On January 18, at 9:00 a.m., the Hero left Palmer Station on a northbound course for Deception Island, the southernmost of the South Shetland group. Her first call was at Domer Island to pick up Larry Schock, who was looking for an opportunity to photograph seals. The passage through the Neumayer Channel was made during the middle of the day, when the conditions of light and atmosphere were less spectacular than on the voyage south. We passed many crabeater, leopard, and Weddell seals, lolling on the flat rafts of sea ice, indifferent to our approach.

The weather was holding beautifully calm when we entered Bransfield Strait and Captain Lenie agreed to divert the ship to Couverville Island so that Frank Todd could look for snow petrels reported to be breeding there. Couverville lies on the east side of Bransfield Strait in a bay close to the Antarctic Peninsula shore, where it is well protected from bad weather. It is a fairly large island, consisting of a thousand-foot mountain with a wide shelf that extends out from its steep western slope. On its north side the mountain drops precipitously into the bay, and here in cracks and on ledges Dominican gulls were nesting. At the foot of the cliff, on a buttress of rock, blue-eyed shags had established a small colony. The most accessible part of the island, and the place where Frank Todd and I went ashore, was the low western extension, where several groups of gentoo and chinstrap penguins in separate rookeries were

After flying three hours above unbroken overcast, we left the clouds behind and could look down on a sea covered with pack ice. The plane was now south of the Antarctic Convergence, where the cold north-moving water sinks below the warmer water of the South Pacific. The ocean was covered with pans and irregular floes of ice separated by narrow channels of blue water. From the air, the packed cakes of ice looked like a floor paved with angular blocks of white marble, reflecting the bright sun with such intensity that after a short time, turning back to the interior of the plane was like entering a dark closet.

After a while, land appeared below. The plane had crossed the Antarctic coast west of Cape Adare and was flying above a landscape where range after range of triangular black peaks projected out of a vast white plain of glacial ice, on which the low-lying sun cast deep shadows. As we flew on and on, the Ross Sea eventually appeared far away to the left, its open water much less tightly packed with sea ice than that of the north.

As we came close to McMurdo Sound, I began seeing valleys between mountain ranges that were free of snow except for hanging glaciers on the highest slopes--the dry valleys of which I had heard and which I hoped to visit ~~explore~~. Then the plane passed over a white surface threaded with dark lines--cracks in the ice covering McMurdo Sound--and interspersed here and there by a grayish band of glacial till where the Koettlitz Glacier had spilled onto the Ross Ice Shelf. We now seemed to be descending rapidly, and before long with a slight bump we touched down and came to a stop. We had landed on the ice runway on McMurdo Sound, used by wheeled planes from September to December.

A Holmes and Narver representative, who met me in a red Ford pickup fitted with enormous tires, showed me to my quarters in the "Hotel," the dormitory where most of the scientists were staying. My roommate was Tom Kellogg, a University of Maine geologist. He was an associate of George

and diatoms. Skuas, always alert for a new source of food, are thus attracted in large numbers to the wake of an icebreaker. Scarcely has the ship begun to back away before they come swarming down to pick off the organisms attached to the stained undersurfaces. So bold and greedy are they that they go right on feeding as the vessel returns to ram the ice, even as the bow seemed about to override them.

On the afternoon of January 15 I boarded the Glacier along with a a research group headed by Dr. Theodore Foster of the Scripps Institution of Oceanography. When we sailed, at ten in the evening, the white mass of Mt. Erebus, its mantle of snow streaked gray with ~~faint~~ outcrops of bare rock, could be made out faintly in the clear eastern sky. A pennant of smoke and condensed vapors, ethereal yet unchanging, floated north from the crater.

The next morning the ship was sixty miles northeast of Ross Island. Mt. Erebus and Mt. Terror, its twin volcanoes, both much diminished, were still in sight on the southern horizon. This was to be my last view of Antarctica for ten days, during a 2,300-mile voyage through the Ross, the Amundsen, and the Bellingshausen seas to Palmer Station, and from there to the Weddell Sea, where Dr. Foster and his party were to carry on their research. As we steamed northward, the ice floes became more extensive and reached to the horizon on both sides. As the ice became thicker, we crashed unavoidably into some of these, splitting them and driving the fragments apart. Each time we hit the ice, the blow would throw the ship to one side. The sensation was much like that of driving over a rutted road in a truck with stiff springs. Icebreaking is accompanied by thumping and scraping sounds against and along the hull, and by the sloshing of the broken pieces as the bow wave overturns them.

[redacted]. The effect of all this [redacted] was to delay our arrival at Palmer Station by at least six days.

Snow fell during the night, blanketing the ship, and continued to fall in the morning, whipped by a strong east wind. We were running through patches of dense pack ice separated by open stretches of water. Crabeater seals, recognizable by their light color [redacted] and dog-like muzzles, were much more numerous than on the outward trip. As the ship approached a sleeping seal, the ~~seal~~ animal would raise its head to stare in bewilderment at the monstrous object bearing down on it, [redacted] wait until the last minute to plunge into the water. Adelies in groups of a dozen or more [redacted] curiously watching our approach [redacted], hurrying away [redacted] the ship loomed over them. Snow petrels were abundant and for the first time I saw arctic terns; indistinguishable in breeding plumage from the antarctic [redacted], these [redacted] wintering birds from the northern hemisphere [redacted] All day we drove through an ice-covered sea under a white sky. From below deck, ice scraping along the hull sounded like surf on a gravel beach.

When I awoke in the morning, and realized that the ship was not moving. I thought we had reached our rendezvous point. It turned out, however, that we were beset in a polinium--a body of water surrounded by pack ice--and [redacted] still 390 miles from the meeting place. The ice surface was very irregular. Smooth, snow-covered areas were fenced in by

Mr. Porter- please check

This meant [redacted], I had time for a visit to the islands near the station.

[redacted] ¶ Black clouds obscured the mountains of the peninsula to the southeast for most of my first day, but from time to time they lifted to give brief views through a slot on the horizon of pink sunlit peaks.

The bad weather continued the following day, but on February 9 however, a break in the heavy overcast accompanied by moderating winds gave promise of brighter conditions. After the midday meal, Bill Fraser and I took a Zodiac to Bonaparte Point, which is separated from the Palmer Station peninsula by a long narrow inlet. Fraser, a University of Minnesota [redacted] – on the flight, had been observing the gull colony of Bonaparte Point since egg laying began in December, We hoped on this day to round up all the unfledged, banded chicks for measuring and weighing. ¶ Bonaparte Point is a narrow neck of glacier-scoured, deeply gullied gray granite on which [redacted] blocks, torn from their original attachments by past glaciation, lie scattered about. In crevices and hollows, tufts of grass and moss [redacted] have taken root over the years, fertilized by bird excrement and the decayed remains of organisms gathered from the sea by the gulls. A favorite food of the black-backed gulls is limpets; the

No hue was overwhelmed by any other, but each maintained its identity--the blues and purples against the yellows and oranges and pinks. This phenomenon is attributable to the clear air and to the low angle of sunlight in polar regions. [redacted] thread in along on intricate passage among these resplendent, by colored islands, The Hero dropped anchor at a United Kingdom base where with some of the crew, Bill Fraser and I went ashore to pay a social call and drink some English ale, and to pick up the mail from the base.

We departed the Argentines at 2:30 for Adelaide Island, following the outer route where the ship met the full force of the winds and waves of the Bellingshausen Sea. [redacted] outside of Renaud, one of the Biscoe Islands group, the Antartic Ocean was rough with long swells coming from two directions. A forty-knot gale blew up from the south, clearing the sky. The sea was a deep blue, streaked black with foam and spindrift and speckled with the white, semicircular crests of breaking waves. The Hero pitched and rolled heavily taking a lot of water over the bow. Water squirted through the hauser pipes it each plunge.

hawser

Soon after we left the Argentine Islands, the sea was empty of icebergs. Birds, however, had increased in number and variety, for we were now on the edge of the polar feeding grounds. I saw several black-browed albatrosses, all juveniles; flocks of southern fulmars looking like dirty gulls; and snow petrels that followed the ship in company with groups of

lichened rocks and mosses we spotted a bull fur seal. He was well camouflaged and had he not taken alarm, we might have overlooked him.

Mrs. Porter please check repeats ears & dupl.

Fur seals belong to a different family within the order pinnipedia from all the other seals found in Antarctica. Like the sealions, with which they have close affinities, they have external ears (hence the term eared seals) and hind limbs that can be folded forward under their bodies so as to be used for locomotion on land. Neither of these traits is shared by the true seals, which have traveled further along the course of evolution away from their terrestrial ancestors than have the fur seals. The structure of their hind limbs and the size of their fore limbs give the fur seals a posture more erect than that of the true seals, and they are more agile on land. This difference was quickly evident to us when we tried to photograph the bull fur seal close up; he scrambled over the rocks with great ease and we had a lively time getting pictures of him. Fur seals are far less tolerant of man than the true seals, and with good reason.

From the top of the beach the land leveled off to form a narrow valley between a craggy hill to the left and a [illegible] whose floor sloped gradually down from the highest point discernible for about a quarter of a mile to a shallow cove enclosed by bare rocky hills. This was a muddy [illegible] place where elephant

world resource from which food for human consumption may eventually be processed. Indeed, the killing of whales may have brought about an increase in the abundance of krill, fed as they are by the incredible richness in nutrients and planktonic life of the antarctic seas. Estimates of the total mass of antarctic krill vary from several hundred million to several billion tons, from which stock it is proposed that 100 million tons could be harvested annually without depleting the supply.

The exploitation of krill has in fact already begun with the outfitting of several Soviet and Japanese trawlers for the purpose. Other nations will soon join the rush and then all hope for restraint in the name of conservation on the basis of sustainable yield, as was the case with the great whales, will be in vain. No antarctic marine animal commission could be expected to be more successful in controlling the exploitation of these resources than the International Whaling Commission has been in conserving whales.