Antarctic Conservation

Only by careful planning and cooperation can we save this primeval region from the ravages of man.

Robert Cushman Murphy

The land areas enclosed within the Antarctic Circle are unique in a number of ways. Their relationships to polar and lower latitudes differ sharply from those of land areas around the other end of the earth's axis, where we find a gradual transition from arctic to subarctic, to cold-temperate, to warm-temperate, and where a continental climate produces mild summers that lead to a rich diversity of plant and animal life.

The Antarctic, on the other hand, is the most isolated terrain on the globe. The narrowest part of the gap that separates it from other continental masses is the 300-mile stretch across Drake Passage from Palmer Land to Cape Horn. Equally significant is the fact that Antarctica is also the most *insulated* part of the globe. It is meteorologically buffered from the rest of the world by a permanently cold ocean and an overlying belt of circling winds. It has been well said that Antarctica has "trapped" its cold. The site of a present-day ice age more stupendous than the northern Pleistocene glaciation, it thus far discloses no sign of a coming interglacial period. The effective double factor of isolation and insulation seems to forestall that. A melting of the present load of antarctic ice would raise sea level throughout the world by at least 200 feet. But glaciologists tell us that the 7 million cubic miles of antarctic ice are not lessening, despite recent amelioration of the climate. On the contrary, the ice-cap appears to be growing at a net rate of about 293 cubic miles a year. The gain is surprising in view of the low precipitation and the fact that tabular icebergs, which in some instances attain the size of the state of Connecticut, are constantly carrying vast quantities of ice outward from the coast. The principal effect of such transport is to keep the isolating and insulating ocean as cold as possible and thus to maintain the status quo.

Correlated with these geophysical conditions is the fact that Antarctica is now the only part of the world in which man has not yet existed long enough to have had an overwhelming effect upon the native ecosystem. I need hardly add that in almost every other land area he has transformed primordial conditions to such an extent that we have only an imperfect idea of what they once were. Spots in which we can observe and experiment in a primitive climax grow scarcer year by year—or day by day—but in Antarctica they are still, happily, at our service.

Sealing

Even Antarctica has escaped profound alteration by only a narrow geographical margin. The first southern ice-capped land known was South Georgia, discovered by Captain James Cook in January 1775. His description of the "sea-bears" or fur seals on the beaches was sufficient to start British and Yankee sealers on forays to that island and all the others that ring the southern oceans on either side of the Antarctic Convergence. (I am aware that Harry Wexler, of the U.S. Weather Bureau, has demonstrated that this famous boundary is not really a convergence but is, in fundamental physical structure, a divergence.) At any rate, the sealers crossed this polar front, and within a few years after the end of the American Revolution they had killed more than a million fur seals on South Georgia alone. There is no record of the unimaginable total slaughter around the world. All we know is that always and everywhere it went far beyond reasonable limits and resulted in both local and general extirpation.

Contamination

Nor was the wiping out of seals the only disaster. Contamination, such as we are now aiming to avoid when man first lands on the moon or lands on another planet, was an equally unfortunate by-product. Rats, for example, gained a foothold as far south as their winter-temperature threshold would permit. On South Georgia, in the opinion of the Swedish zoologist Lönnberg, the introduced brown-rat population evolved sufficiently within a single century to form a distinct subspecies, characterized by exceptionally long and dense fur. In any event, the presence of this rat population on South Georgia has been so devastating that only the lucky persistence of an uninfected site, Bird Island, has enabled Lance Tickell and his associates to carry out their illuminating bird-banding campaign among the albatrosses.

Farther from antarctic shores lie the Falklands, likewise a former sealers' paradise. How amazing it is that the tussock grass *(Poa flabellata)* which once covered this archipelago, and which has been called the world's most nutritious pasture grass, has so speedily disappeared, except on outlying islets too small to be inhabited by man.

But sealing and the introduction of rats were only the first of the destructive processes in the far south. Later, with the fur seals wiped out, there was a wanton and wasteful exploitation of penguins and elephant seals for oil. Most coasts where elephant seals once swarmed are now devoid of them. And the latest stage in the historic sequence is whaling which bids fair to run the same course as sealing in spite of international efforts toward control. When I was at South Georgia in 1912–13, humpback whales comprised 98 percent of the local catch, but within 20 years this species had become so

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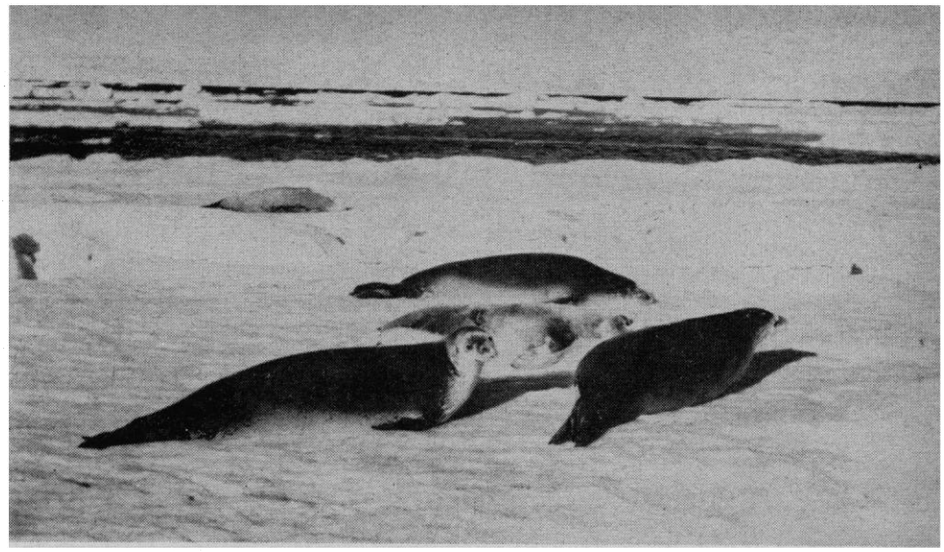
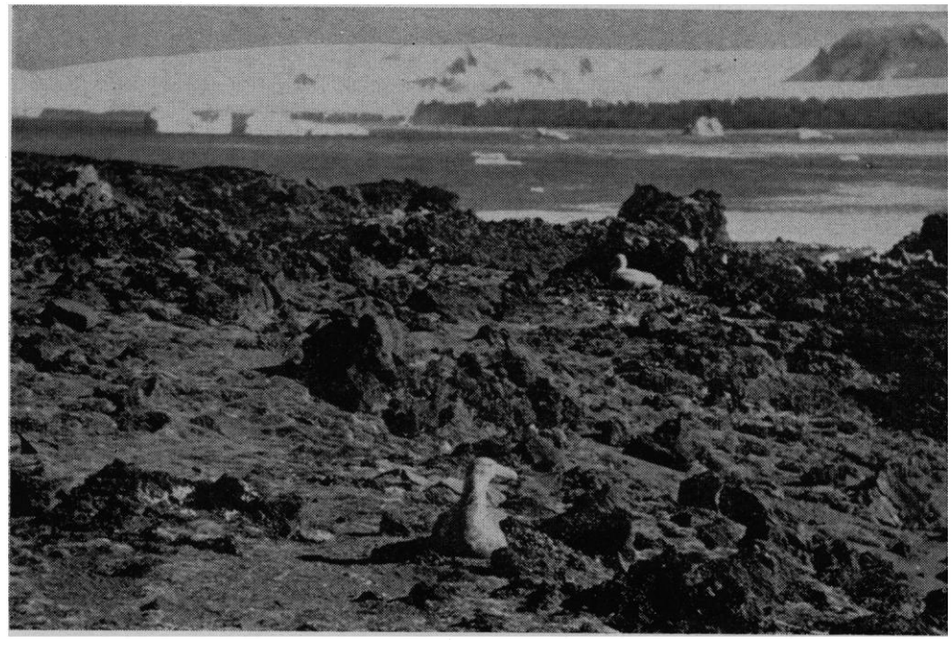




(Top right) Crabeater seals (*Lobodon carcinophaga*) in the Bellingshausen Sea. This is the common seal of antarctic pack ice. It subsists mainly upon the euphausian shrimp, on which penguins and whales also feed. (Botton right) The giant fulmar (*Macronectes giganteus*) on an islet off King George I Island, which looms in the background. Largest of all petrels, this species has somewhat vulturine habits.

depleted that it made up only 2 percent of the catch. Whaling was later regulated in terms of "blue-whale units"; this meant that two finbacks or five humpbacks were the marketable equivalent of one blue whale. The peak was reached in 1937, when the season's kill, the great bulk of which was in waters fringing the Antarctic, amounted to 54,664 whales.

But on the Antarctic continent (so called, whatever it may ultimately turn out to be), the biosphere can still be kept intact, uncontaminated, and virgin, provided the ideal and the means of its realization are held constantly in the plan by representatives of all the cooperating nations. Antarctica is the only section of the world that man has not yet occupied, saturated, and extensively changed. We have to remember that parties from a dozen or more nations, working year after year in the Antarctic, could do very much more harm than the single, occasional expeditions that entered the field between 1840 and the beginning of the present century. We need to remember that civilized man can be, and often is, the worst enemy of every other form of life. He seems to be the sole insatiable predator, because, unlike lower animals, he takes his prey from motives other than that of personal survival.

Flora and Fauna

The most inhospitable climatic regime in the world has prevented man from invading and exploiting Antarctica until just about now. This is therefore the moment of crucial responsibiiity. We find, to be sure, no highly varied flora and fauna, such as once filled the lands that crowd around the North Pole. The hundred or more flowering plants of the Arctic, the land birds, and mammals such as the lemming, hare, fox, wolf, bear, caribou, and musk-ox, are all missing from Antarctica. Their presence at one end of the world and their absence from the other emphasize the geographical isolation and insulation already referred to. In addition, it shows us that it is not so much the periodic low temperatures of polar winters as the cold antarctic summer, in contrast to the softer summer climate of the Arctic, that is so inimical to life.

Yet the Antarctic has produced its own spectacular assemblage of life above sea level, teeming in terms of numbers of individuals if not in terms of range of species. The penguins; the flying sea birds; the seals of the shores and fast ice; the extraordinary invertebrates of pools that are frozen except for a few days in each year; the lichens, mosses, and other cryptogamic plants—all are there to be investigated through many scientific disciplines. We need these life forms for ecological, behavioristic, sociological, physiological, medical, and many other reasons. We require them also for esthetic and humane ends. Since the Antarctic is the only fragment of the world that still seems unsuited to what human beings euphemistically call "development," let us keep it essentially as we found it. Nobody any longer doubts the importance of national parks, even though New Zealand is probably the only country that has thus far reserved a decent proportion of its territory to that end. The Antarctic might properly be regarded as an international park or sanctuary—an idea that harmonizes completely with agreements already made among the nations which began joint research during the International Geophysical Year.

Man's Responsibility

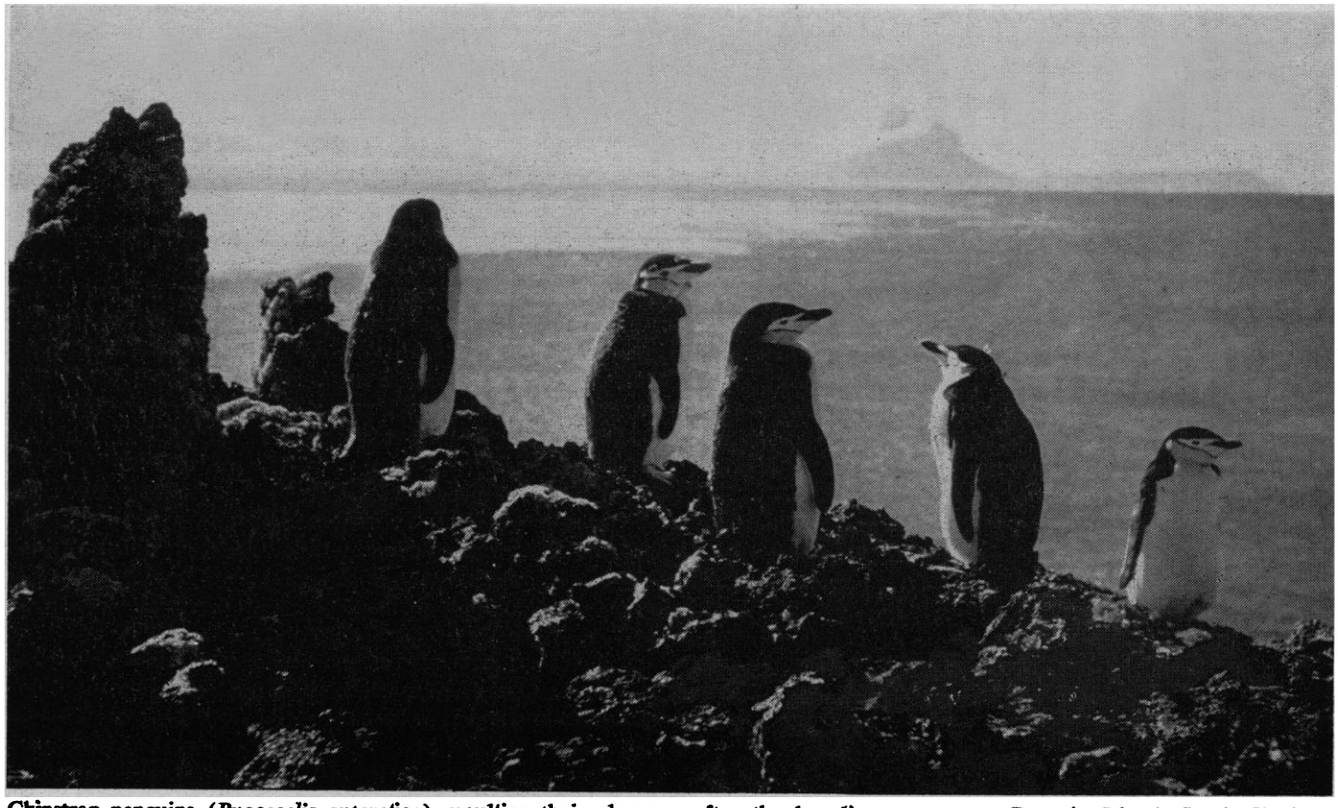
Now, in practical terms, what does this signify with respect to human behavior in the Antarctic, particularly in the peripheral ring that harbors life for about 100 miles back from the sea? It means that the pumping of ships' bilges in coastal waters and the ill-considered use of explosives are no more tolerable in the Antarctic than elsewhere. It means that innocuous disposal of human waste is important, for reasons that go beyond the sufficient one of good taste. It means that all the resources are to be used only purposefully, for justified cultural aims. It means that life is not to be sacrificed for sport or for "trophies." It means that colonies of penguins and other sea birds are under no circumstances to be regarded as centers of amusement. No one, of course, would want to deny any worker at an antarctic station the privilege of seeing penguin colonies, but regulations should leave no doubt that this is a privilege, subject to necessary restrictions.

A penguin colony cannot be a human playground—not if it is to remain a penguin colony. Intentional damage, such as we call vandalism, is actually less to be feared than damage from ignorant trespass. Those who have spent patient weeks recording the normal behavior of colonies of animals during their season of reproduction know this all too well. The same devoted researchers know likewise the murderous havoc that can and still does result from heedless maneuvering of planes and helicopters. At the Antarctic Symposium held at Buenos Aires in November 1959 it was "conceded that each season the resupply operations in support of Antarctic scientific bases bring with them into the Antarctic a number of persons, members of ships' companies and others, who possess a minimum of interest in the natural life and its conservation and who, if not supervised and controlled, have made and will continue to cause serious damage to the flora and fauna."

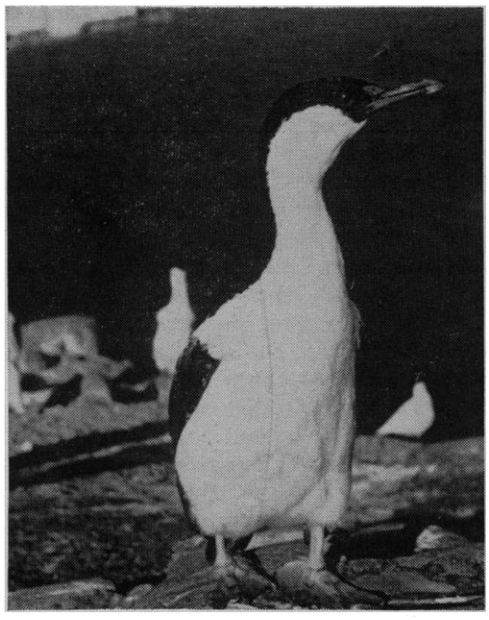
And of course the time is long past, when we are entitled except in emergencies, to rely upon antarctic resources for any significant proportion of station food. Marine invertebrates and fish are an exception, but penguin eggs and seals are not. Nobody can complain because 200 or 300 tons of seals were killed and cached as food for the dogs of a former antarctic expedition. But today there are too many of us, coming too often, to make such a custom safe. Lest you suspect me of exaggeration, I will quote from records of the fourth meeting of the Special Committee on Antarctic Research, assembled at Cambridge in 1960.

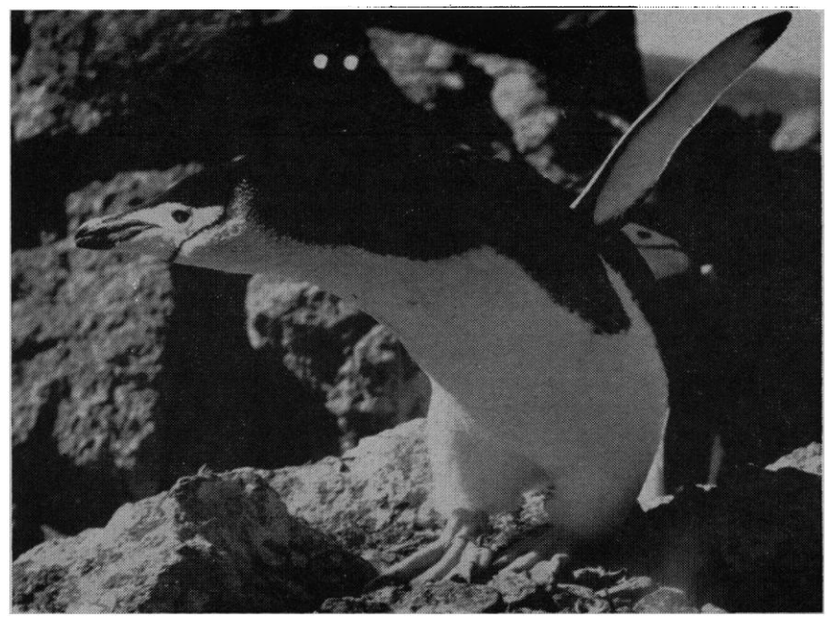
"In recent years the depredations of expeditions upon this traditional food source have become alarmingly heavy, and are now continued without respite from year to year. For example, near several stations the stocks of Weddell seals have been so disturbed that breeding rates have been affected and scientific research rendered difficult. Animals are killed without regard to age or sex, and even animals marked in the course of scientific studies have been taken. Without biological research it is impossible to assess the permissible annual crop which the various seal colonies would stand, but it is certain that this figure is being seriously exceeded in many areas."

We have better uses for the seals and, fortunately, decreasing need of the dogs. Man is an enormous, always threatening, consumer. We seldom stop to consider what a truly huge ani-



Chinstrap penguins (*Pygoscelis antarctica*) moulting their plumage after the breeding season, on Penguin Island, South Shetland Islands.





(Left) Blue-eyed shag (*Phalacrocorax atriceps*) on Brabant Island. This is the only member of its order that breeds in the true Antarctic Zone. (Right) A Chinstrap penguin (*Pygoscelis antarctica*) on Penguin Island, South Shetland Islands. Slightly less "polar" than the Adélie, this species inhabits a belt on both sides of the Antarctic Circle.

mal he is; actually, there are only about 200 species that exceed him in size. A housefly is of about average size in the animal world. Man is also the only large animal that constantly increases in numbers. So it behooves us to continue lugging food to Antarctica, at least until we begin to grow vegetables there, hydroponically or in mushroom sheds.

Few persons are free from prejudices, and some of the prejudices may spring from altruistic motives. An example in Antarctica is the enmity that the skua arouses in the tender breasts of many of those who come in the ships and planes or work at the stations. Skuas devour penguin eggs. They miss no opportunity to steal, swallow whole, or tear to bits young penguins at every stage of growth. They hang around, ghoulishly, every adult penguin that shows signs of being ready to depart this life, and at the favorable moment they are quick to hasten its demise. (I may add that the presence of indignant human observers usually adds to the skua's chances of doing such mischief to "friendly" creatures.) From an objective point of view, this relationship between skua and penguin is neither to be condemned nor condoned but merely to be accepted. Penguins live (in part) on euphausians, skuas (in part) on penguins. So it has been, presumably, throughout the latter half of the Tertiary or longer. To make a moral issue of clubbing skuas and smashing their eggs is of no benefit to the penguins or to anything else. A childish desire to upset an ecological regime should have no place in the mental attitudes of anyone who is to head southward. We are all down there to learn the ways of nature, not to reform them.

Huskies and Wolves

The risk of contaminating Antarctica with alien forms of life appears to be relatively slight. The climate is capable of correcting most of man's carelessness as well as his deliberate blunders. Rats and reindeer are acclimated to South Georgia, but neither could survive long anywhere south of the Antarctic Circle. Dogs, however, represent a possible danger worthy of international consideration. There are rumors aplenty that parties of at least two cooperating countries have allowed their dogs to run free, with resulting butchery of penguins. Flying birds and lying-up seals are scarcely less vulnerable than penguins, because no native antarctic animals are instinctively wary of terrestrial enemies. How could they be when they have never known them?

Last year I alluded to the not altogether remote chance that feral dogs might become established in Antarctica, to take on the role of arctic wolves. In February 1958 the Japanese antarctic contingent was forced to abandon 15 sledge dogs of the Karafuto breed when heavy ice prevented the relief vessel *Soya* from reaching the station, and blizzard weather made it impossible to recover the animals by helicopter. In the following spring, two of these dogs were found alive, and the information was headlined in big type in Tokyo newspapers. The expedition leader radioed that when the advance party landed, Taro and Jiro came bounding forward, wagging their tails. It was assumed that the other 13 dogs had fallen into crevasses, had been frozen or rafted to sea on ice, or had been eaten by the survivors.

When Sir Vivian Fuchs came aboard U.S.S. *Glacier* off Marguerite Bay, in March 1960, he told me that he had lost one of his sledge dogs somewhere near the base of the Palmer Peninsula. Sixty days later the truant turned up again at the ship, not simply in good condition but *fat*, after journeying more than 150 miles across the ice. Dogs and wolves are of the same genus. Huskies and wolves are as close in habitus as in heritage. It is horrifying and not altogether chimerical to picture wild dogs surviving, breeding, and multiplying on a winter diet of emperor penguins and a summer diet of Adélies, as long as the birds last.