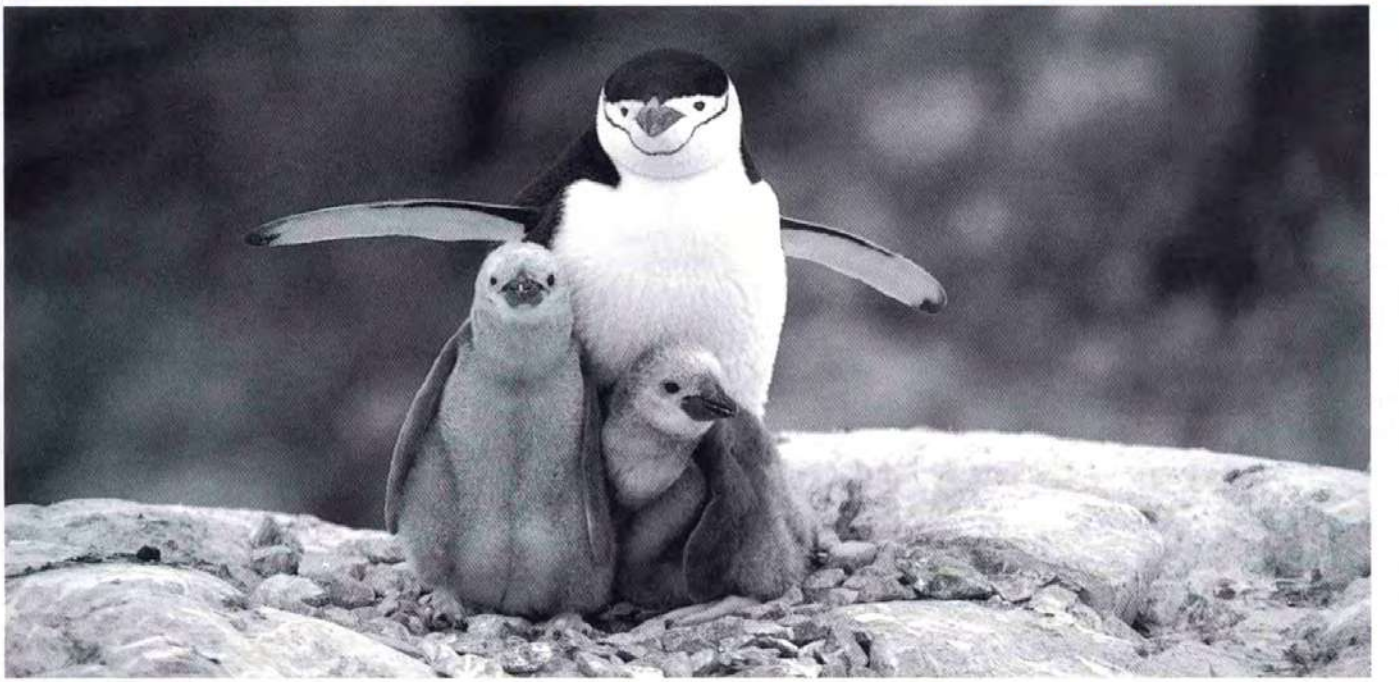
The Antarctic Century

NUMBER 5 JULY 1990



Chinstrap Family, © 1990, Ron Naveen

Brush-Tails, Tuft-Heads, Emperors, and Kings

by Ron Naveen

Penguins are beautiful, interesting, and funny.
They are a pleasure to watch even though
they do smell and their voices are not melodious.
. . . George Gaylord Simpson

They are extraordinarily like children,
these little people of the Antarctic world,
either like children, or like old men,
full of their own importance and late for dinner,
in their black tail-coats and white shirt-fronts — and rather portly withal.
. . . Apsley Cherry-Garrard

Not only do they smell, they can be smelled — literally — miles away from their calamitous, densely packed colonies! And not only can't they sing very well, their riotous honking and braying is enough to drive one to earplugs! Yet, I, like Simpson and Cherry-Garrard, find these to be only mild distractions. I, too, am just wild about penguins.

The reasons aren't too hard to pinpoint. Penguins simply give us *homo sapiens* fits of anthropomorphic joy. Their upright

SPECIAL THANKS

We are most grateful to Daniel and Polly Morgenstern and The Electroline Manufacturing Company, whose generous support has made publication of this issue of **The Antarctic Century Newsletter** possible.

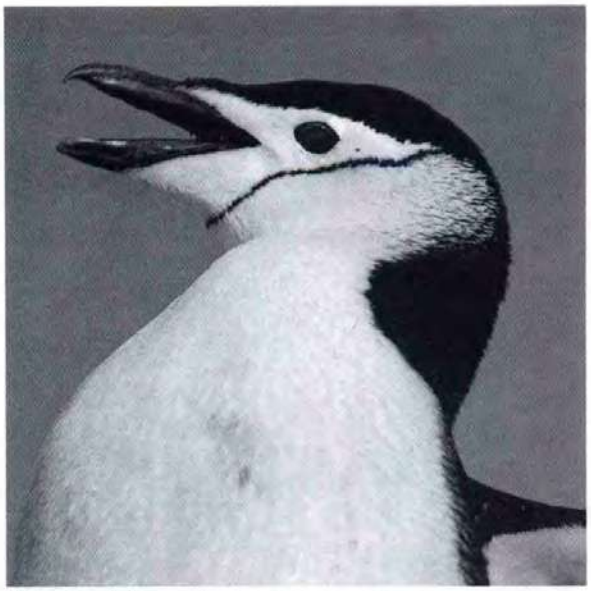
waddling and strutting is rather human-like, absolutely reminiscent of chubby folks in tuxedos or children scampering off to school. Another charming aspect is that, despite their avian lineage, they don't fly through the air. Rather, they've moved their talents to another medium, which they've mastered to the fullest. In a sense, penguins are metaphors because, better than almost any other creature on Spaceship Earth, they and their incredibly rugged life styles remind us vividly of the fragility of life on this planet.

Curiosity and Common Questions

Let's start with some basics, some of the many questions that often arise when people start contemplating penguins.

How many species exist, and how big are they? There are seventeen species worldwide, ranging from the Antarctic's huge, Emperor Penguin, at four-and-a-half feet tall and ninety pounds, to the diminutive Fairy and Little Blue Penguins found Down Under that are no bigger than a backyard Starling. But these represent only the current versions: in the Antarctic, fossil penguin parts suggest an ancestor that was taller than five feet and weighed at least 130 pounds.

How many are found in the Antarctic region? Six species are regularly found in The Ice and along the fringe in the cold-water Antarctic convergence zone: the just-mentioned Emperor; its close relative, the three foot tall King Penguin; the three members of the genus Pygoscelis — the Chinstrap, Adélie, and Gentoo Penguins; and, finally, one member of the crested penguin genus Eudytptes, the boisterous, tuft-headed Macaroni Penguin, found both along the fringe and nearer the continent. Just outside the convergence zone, north of the true Antarctic, there are strongholds for two other Eudyptids, Rockhopper and Royal Penguins. Of these smaller types, the Gentoo is the largest at two-and-a-half feet tall and up to thirteen pounds, making it the world's third largest penguin.



Chinstrap Penguin, *© 1990, Ron Naveen*

Why are penguins found only in the Southern Hemisphere? In great part, because of the absence of land predators. There aren't any polar bears or arctic foxes to wreak havoc in their land-based colonies. Numbers of Antarctic penguins, though, are lost in the water to Leopard Seals and perhaps a few to Orcas and Fur Seals; on land, penguin adults and chicks often have to run the gauntlet of marauding sheathbills and skuas, but there are no Antarctic counterparts to the bears and the foxes.

Where does the name "penguin" come from? From Pinguinis, the scientific, generic name of the flightless Great Auk, now extinct in the north Atlantic Ocean.

How many feathers do they have and how do they survive in the ocean? There are up to seventy feathers per square inch according to one estimate, the densest arrangement on any bird. Penguins' fusiform bodies, a layer of fat under densely packed and well-oiled feathers, and solid bones all contribute to their adapting to that 75% of Earth's surface that is so alien to us humans. In the Antarctic, these fluffballs of fat and densely packed feathers are so well insulated that a bigger danger may be overheating.

How long do they live? Not too long, perhaps a decade in the case of some of the Antarctic species.

Are they really cute and fun to work with? Yes, but it is important to have a lot of respect for some of the most wicked chompers in the business, especially those of the Macaronis. Working with penguins is dirty, hard, grueling work, but some of us love to do it anyway!

The Antarctic Century Newsletter and its contents are solely the property of **OCEANITES** and may not be used without its permission. **OCEANITES**, Inc. is a non-profit foundation incorporated under the laws of the State of Maryland, and a Sectiuon 501(c)(3) tax-exempt organization udner the provisions of the U.S. Internal Revenue Code. Tax-deductible contributions to **OCEANITES** would be greatly appreciated, but are not necessary to continue receiving the **Newsletter**.

The Antarctic Century Newsletter is edited and, unless otherwise indicated, written by Ron Naveen.

Additional copies are available at $3.00 (U.S.) per copy. Please address all correspondence to **OCEANITES**, 2378 Route 97, Cooksville, MD 21723 (301-854-6262).

How fast can they swim and how deep do they dive? They can swim up to ten or twelve miles per hour, in bursts, but these bursts aren't necessary sustained for long periods of time. The champion diver among the penguins is the Emperor, which can dive to 900 feet and stay submerged for almost twenty minutes.

Are they increasing in numbers? In the Antarctic, they seem to have increased over the last few decades, but this appears to have leveled off. They have colonized Antarctica's shores in great numbers. One recent estimate is a minimum of at least 75 million individuals of the six species normally inhabiting the Antarctic region, having a combined biomass of greater than 300 million metric tons. Elsewhere, some species, like the Humboldt Penguin on the west coast of South America and the Jackass Penguin of South Africa, are thought to be decreasing dangerously.

Penguins and Explorers

Just as Antarctic exploration is a phenomenon of this latest century of ours, so is our knowledge of penguin lives and times. Penguins are inexorably and dramatically linked to Antarctic exploration history. For example, in recalling Captain Scott's Terra Nova expedition at the turn of the century, Apsley Cherry-Garrard writes about the thrills produced by the first glimpses of these spectacular creatures:

> *No one of us whose privilege it was to be there will forget our first sight of the penguins, our first meal of seal meat, or that first big berg . . . Hardly had we reached the thick pack, which prevailed after the suburbs had been passed, when we saw this little Adêlie Penguin hurrying to meet us. Great Scott, they seemed to say, what's this? and soon we could hear the cry which we shall never forget. "Aark, aark," they said, and full of wonder and curiosity, and perhaps a little out of breath, they stopped every now and then to express their feelings, and to gaze and cry in wonder to their companions; now walking along the edge of a floe in search of a narrow spot to jump and so avoid the water, and with head down and much hesitation judging the width of the narrow gap, to give a little standing jump across as would a child, and running on the faster to make up for its delay. Again, coming to a wider lead of water necessitating a plunge, our inquisitive visitor would be lost for a moment, to reappear like a jack-in-the-box on a nearer floe, where, wagging his tail, he immediately resumed his race towards the ship. Being now but a hundred yards or so from us pokes his head constantly forward on this side and on that, to try and make out something of the new strange sight, crying aloud to his friends in his amazement, and exhibiting the most amusing indecision between his desire for further investigation and doubt as to the wisdom and propriety of closer conduct with so huge a beast.*

G. Murray Levick, the ship's surgeon noted:

Gentoo Penguin, © 1990, Ron Naveen

Small ice-floes are continually drifting past in the water, and as one of these arrived at the top of the ice-foot, it would be boarded by a crowd of penguins, sometimes until it could hold no more. This "excursion boat," as we used to call it, would float its many occupants down the whole length of the ice-foot, and if it passed close to the edge, those that rode on the floes would shout at the knots of penguins gathered at the ice-foot who would shout at them in reply, so that a gay bantering seemed to accompany their passage past the rookery.

What the world now remembers, of course, is the tragic demise of Scott's party on their return from the South Pole in 1912, after they had lost their priority at the Pole to the Norwegian, Amundsen. What's forgotten is that in the winter preceding this tragedy, two of Scott's polar party, Birdie Bowers and Bill Wilson, along with Cherry-Garrard, had made the phenomenal, and so called "Worst Journey in the World," during the dead of the Antarctic winter to find the nesting site of Emperor Penguins at Cape Crozier.

At the time, it was believed that the embryos in the eggs of these penguins would increase our understanding of evolution. Alas, the three tromped and trudged through many weeks of hardship to reach the Cape, collect their eggs and, somehow, return to safety. As it happened, though, the eggs unlocked few evolutionary mysteries, but this great journey opened the keys to an increased understanding of the whys and wherefores of penguin breeding biology.

The first feminists

The breeding biology of Emperors is rather remarkable. Indeed we probably need to recognize that female Emperors were liberated long before many of us humans!

Emperors — and their close relatives, the Kings of the Antarctic fringe — lay only one egg. While the King Penguin takes its time raising and fledging its chick (often requiring a 15-month investment that deprives it of the opportunity to raise more than two chicks every three years), the Emperor has an annual strategy. The single eggs are laid around the onset of the polar winter, and on fast ice. With the exception of a small breeding colony at the Dion Islands, the Emperor is the only bird that avoids nesting on land!

The female Emperor transfers the single egg to the male who is charged with incubation duties during the long Antarctic winter. While the males huddle closely in groups called tortues or creches, the females go off to sea for a couple of months to bask in the comparative warmth offshore and to feed mightily, only returning with the spring, when the ice breaks up and their shrunken mates (which have lost one-third or more of their body weight) are ready to exchange the now emerged chicks. If the females don't return on time, the males can nourish the chicks with a reserve of stomach oil.

The Emperors' closest relative is the King Penguin, found mainly on the fringe of the Antarctic in places like South Georgia and the sub-Antarctic islands of New Zealand. Unlike the Emperors, Kings have a longer than yearly breeding cycle, and can only raise two chicks in every three years at best. Although not as tall as their deep Antarctic relatives, the King — at three feet tall and at least forty pounds — is perhaps the world's most gloriously colored penguin, a glittering combination of white chest, black face, gray back, and large, inverted orange teardrops on the sides of the head.

The most appealing aspect of their breeding biology is the strangely attired chicks — dubbed oakum boys (or girls). The chicks spend many months laden with long brown, wooly-like feathering that, to the old sealers and whalers, resembled the caulk, oakum, that they used to seal and waterproof their ships and barrels. The dense feathering peels away in clumps, starting at the feet, producing some amazingly funny-looking chicks as they complete their post-juvenile molt.

Brush-tails

The stately, single-egg tactic of the largest penguins contrasts sharply with the feverish strategy of their smaller Antarctic relatives. These penguins conduct their breeding cycle in a much shorter period of time. As the pack begins to break-up in spring, the three Pygoscelid, or brush-tailed, penguins begin a furious procession to their breeding sites, to court, copulate, lay, incubate, and fledge their young during a short , two to three month window of opportunity. The Adélies and Chinstraps, which winter at great distances from home, have the longest migration, the Gentoos, which often linger close to their breeding grounds in winter, generally have the shortest distance to cover.

Gentoo Penguin, © 1990, Ron Naveen

These three — the Adélies, Chinstraps, and Gentoos — are characterized by stiff tail feathers that seem to help the penguins prop themselves up, much like the strong tail shafts of woodpeckers. They are concentrated on the edges of the Antarctic continent, the Gentoo more to the north on the Antarctic Peninsula side, the Adélies ranging farther to the south and sharing with the Emperors the distinction of being the most southerly — and most truly Antarctic — penguin.

The Adélies are very much site-specific animals, returning to the exact location where they bred the previous season, but often changing mates. Indeed, it is believed that the mates do not stay together during the non-breeding season. Gentoo pairs have a far stronger bond, and the two may stay together during the non-breeding season. They are not as site-tenacious as the others, and are prone to changing their nest site from season to season.

Chinstraps also are site-specific animals, and often wind-up with the same mate, year after year. This is a function of the female returning to the same spot shortly after the male arrives in the austral spring. The male Chinstrap, for example, will return

as early as possible, the more experienced breeders accessing the taller, more rugged nesting sites that have been blown free of snow by the howling, spring Antarctic winds. The male begins displaying on site, the expectation being that the female will return in short order. If she doesn't, the male's hormones are running at such a pitch that he'll start to court and mate with any available, single female he can find. If the original mate happens to return to find that another woman has moved in, a raging battle ensues, not unlike a heavyweight championship bout, the loser being pummeled mercilessly and often tossed downhill.

Certain breeding site preferences emerge among these three, especially when there's inter-specific competition. Chinstraps, as mentioned, are renown Antarctic mountain climbers, often taking the loftiest sites, hundreds of feet up. Adélies take slightly lower sites, and Gentoos most often seem to take the lowest ground. However, there's some overlap and, at places like Couverville Island, Gentoos may claim sites at least 200 feet above the tide line.

Among the brush-tails, two eggs are normal, and incubation is shared by both parents — one on duty, the other feeding at sea. After an incubation period of just over a month, the chicks emerge from the eggs to be brooded by their parents for about two to three weeks, then fed for another five weeks or more beyond that, before they fledge and head off to sea. After the brood stage, the chicks often assemble in creches — for warmth and as a defense from marauding skuas — while both parents go off to feed.

The chicks don't return for a while and, even then, the vast majority don't make it back at all. A twenty per cent return would be high. Typically, Adélie chicks don't return until age three to attempt breeding for the first time, although Gentoos may try for the first time at age two.

After the chicks leave, the parents get a much deserved chance to rest, to feed and replenish their own energy, and then to molt before heading off for the winter. While Chinstraps and Gentoos molt on site, Adélies do so at the pack, where they'll spend the "off-season." Chinstraps now are believed to winter in open water beyond the pack edge. Gentoos actually will winter on-site in the Antarctic, if there's any open water.

At least during the breeding season, krill is the dominant item for these animals, but the resource is exploited in different fashions. From the work of Wayne and Susan Trivelpiece in Admiralty Bay (see the interview in this issue), we know that, in summer, Gentoos exploit water nearer to shore (up to 15 miles) and dive deeper than the other brush-tails (to more than 500 feet); the Chinstraps range up to 20 miles offshore, but dive only to about 200 feet. The Adélies range farther offshore, to 30 miles, and dive to at least 250 feet.

But much remains unknown about the diets and general feeding ecologies of the brush-tails during winter. We know that Gentoos take both krill and fish and, presumably, do so in winter, but it's unclear whether or to what extent Chinstraps and Adélies may alter their basic, all-krill, summer diet.

Routines and Delights

Although creatures of routine, the brush-tails exude behaviors that clearly arouse our curiosity and humor. The eminent ornithologist Robert Cushman Murphy perhaps best describes their different personalities:

> *. . . Nor is the noisiness all bluster, for the Ringed [Chinstrap] Penguin has the universal reputation of being the boldest, most pugnacious, and most agile member of its genus if not, indeed, of the whole penguin tribe. The relative reactions of the three species of Pygoscelis, when brought face to face with man, might be broadly characterized as follows: the Johnny [Gentoo] Penguin turns tail; the Adélie stands his ground; the Ringed [Chinstrap] charges.*

And there's a curious way of dealing with us humans. Penguins see very well underwater, but are rather near-sighted on land. Perhaps their strain, trying to see us more clearly when we're in close proximity, adds to the curious appearance. Witness, Levick, again:

> *[The Adelie's] carriage is confident as he approaches you over the snow, curiosity in its every movement. When within a yard or two of you, as you stand silently watching him, he halts, poking his head forward with little jerky movements, first to one side, then to the other, using his right and left eye alternately during his inspection. He seems to prefer using one eye at a time when viewing any near object, but when looking far ahead, or walking along, he looks straight ahead of him, using both eyes. He does this, too, when his anger is aroused, holding his head very high, and appearing to squint at you along his beak.*

Tuft-heads

The sub-Antarctic fringe is the stronghold of Macaroni Penguins, reaching its zenith at South Georgia Island where a few million pairs breed. Squid, fish, and krill are staples of the Macaroni diet, and they seem to be thriving quite substantially.

Macaronis, like all of the "crested" penguins, have a curious breeding strategy. Two eggs are laid in sequence, but the first is very small and is usually lost to predators like skuas or sheathbills, or to the chaotic interactions, bumping, and feuding among the Macaronis in the colony. The second egg is larger and is the one that usually hatches. Both may hatch, but rarely do two chicks survive. Sacrificing one egg to the chaos may be one way of insuring the species' numbers; another idea, though, is that these animals are moving toward single-egg clutches.

Chaotic is an appropriate adjective for describing the bustling scene in a Mac colony. They often pick very steep slopes to nest, which makes it very difficult to work among them. Macs have an appealing countenance with their flowing, golden locks and reddish eyes, but underneath that disguise is the soul of a bulldog! Those who study Macaronis often return with an assortment of bites, bruises, and scrapes.

Humility and Sensitivity

I have often had the impression that, to penguins,
man is just another penguin — different, less predictable,
occasionally violent, but tolerable company when he sits still
and minds his own business.
. . . Bernard Stonehouse

Most people acknowledge that they will never see penguins in the wild.
But just knowing that they are there is enough.
. . . Frank S. Todd

Yes, knowing that they're there is important. But, when asked what appeals most to me about penguins, I'm usually trapped somewhere between humility and curiosity. Penguins have a relatively short longevity, they survive an environment that I can't tolerate, and they humble me with routines that effortlessly get them through their frenzied lives. How do we relate to a creature that's succeeded so well, whose numbers have blossomed into the millions? Perhaps by reverence or respect. As the eminent paleontologist George Gaylord Simpson once asked:

> *"What good are penguins?" It may be crass to ask what good a wild animal is, but I do think the question also may be legitimate. That depends on what you mean by good. If you mean "good to eat," you are perhaps being stupid. If you mean "good to hunt," you are surely being vicious. If you mean "good as it is good in itself to be a living creature enjoying life," you are not being crass, stupid, or vicious. I agree with you and I am your brother as well as the penguin's.*

Chinstrap Penguin, © 1990, Ron Naveen

INTERVIEW: WAYNE & SUSAN TRIVELPIECE

Wayne and Susan Trivelpiece manage the longest running penguin study in The Ice, located in the relatively comfortable confines of the Antarctic "Banana Belt" — on Admiralty Bay in the Antarctic Peninsula. Their study site at Copacabana Beach has provided unique insights into the breeding biology, feeding ecology, and life histories of the three Antarctic brush-tailed penguins — Chinstraps, Gentoos, and Adélies — many of which are close-at-hand. Wayne has worked the study site for twelve years, Susan for ten, and each year brings new clues into the lives of their penguins, a major component of the Antarctic food chain.

Over these years, Wayne and Sue have collected much data on the factors that may regulate the penguins' populations. This past season was especially exciting for them, and for co-workers Doug Wallace, Christine Fritz, and Kent Montgomery. They used radio telemetry and time-depth recorders more extensively in efforts to observe their banded study animals, collect additional data on known-age populations, determine the differences of sex, age, and experience on survival and behavior at-sea, and compare the foraging abilities of each species (and of younger versus older members of each species). The season brought a new dive-depth record for Gentoos and possibly new connections between variables like winter pack ice coverage and over-winter survival.

Wayne's and Sue's home base is Bolinas, California, where they are presently associated with the Point Reyes Bird Observatory. For additional details about their work, see their article "Antarctica's Well-bred Penguins" in the December 1989 issue of Natural History magazine. I interviewed them on board the World Discoverer in January, while visiting the Antarctic Peninsula on behalf of the **Newsletter**

. . . Ron Naveen

Ron Naveen: At this point, what do we know about penguins, and what might we be on the verge of discovering in the future?

Wayne Trivelpiece: In the last decade we've found out a lot about these three Pygoscelids. When we began our work, only the Adélie was relatively well known. Chinstraps and Gentoos were pretty much an unknown black box. We now know that all three are major krill consumers in the summer, which is the only time we really get to look at them (Gentoos do take fish, perhaps more regularly in the winter). Both Adélies and Chinstraps were long thought to be members of the pack ice community in winter, but that appears to be true only for Adélies. Chinstraps, it's been discovered, are pelagic in winter, spending more time in the open ocean. This has led to some real insights about their overwinter survival.

RN: How do these new data correlate, if at all, with some broader questions about the health of the ecosystem, interactions with other major components of the Antarctic food chain?

WT: By and large, penguins are among several predators that rely almost entirely on krill during summer. Of all the predators, they're clearly the easiest to study because they're flightless, present in large numbers, not particularly afraid of humans, colonial, and site tenacious — all of which allows you to study a discrete population through time. The young that are born here, return here to breed when they reach adulthood. The Adélies and Chinstraps go away and spent the winter in two completely different habitats. The Gentoos generally remain if the bay stays open. When the penguins return in the Antarctic spring, we can look at certain factors like overwinter survival, per cent of young that breed, and weight of arriving birds to get some indication of the food resources in these very different wintering habitats.

RN: Can you describe "good" years and "bad" years in terms of krill availability?

WT: There definitely are good and bad years in terms of certain measures that vary tremendously from year to year: How many chicks are produced? How much they weigh? How much food is brought to them? We take these measures to indicate something about the food availability in the penguins' foraging ranges — probably within 30-50 kilometers of the rookery during the chick phase. By getting a good "baseline" now on facets of the penguins' lives we think are heavily impacted by food availability, we hope to have information on hand before there may be any heavy krill exploitation — something that will serve as a useful comparison later on.

RN: What's the most exciting part of your work?

Susan Trivelpiece: It's really neat being here, and this place really grows on you. Yes, you're ready to leave when the season's over in February or March, but you're also anxious to get back in October, the start of the next year. This season was no different, and perhaps was more exciting because we were starting some new work with transmitters and time depth recorders. This will be-a three year effort, depending on the data we get, to learn more about these guys' habits — how long they are away, how often they dive for food while away, how deep they really go, what quantities they bring back, and myriad other aspects. We've already gotten some world record dives, including a Gentoo that dived to over 500 feet. There may be even deeper dives when we get home and finally analyze all of the data.

INTERVIEW CONT.

RN: Penguins are rather impressive characters, aren't they?

ST: They're pretty tough characters, well adapted to what they do, but in comparison to our intelligence, you might coldly and rationally conclude that they're not too bright! Some might suggest that they're pretty dumb, but maybe we should say they're so well adapted that they're somehow quite advanced!

RN: What's special about living in Antarctic, getting away from the rest of the world for such long periods of time?

ST: Some days, there are wild thoughts of hot fudge sundaes, pizza, and good cheeseburgers, but I must say that, like all who've spent lots of time down here, it's rather hard to describe the feelings. All of us get this "Antarctic Fever" into the blood. On a day-to-day basis, though, the focus is more on what needs to get done at that moment, wondering where some of our TDR (time-depth recorders) birds might be, and what new data might come rolling in. I feel very privileged to be here. There are few who have had the special chance to make Antarctica an important part of their lives, and it would be very upsetting if I wouldn't be coming back. I'd miss the whole interaction of so many life forms — Leopards hanging out in the Bay, Humpbacks blowing offshore, penguins rushing about, and getting to meet so many wonderful people from so many nationalities.

WT: It's been a real constant in our life, coming each October and staying five months each season. The Ice never really leaves us. It's never far away. Even for all of the time we're home, it's constantly going over the data, looking for patterns, trying to understand more and more about what we've been observing.

I don't feel great connections with the old explorers, but only in the sense that this part of the Antarctic where we work doesn't evoke the same harsh realities and environmental characteristics that are ingrained in the Antarctic exploration literature. After all, this is the Banana Belt, of sorts, and it's really no harder than camping out in northern Canada in the summertime. But the winds are something else, and you quickly learn what must be done in the lee, and how to avoid the gusts. We feel a great affinity with those who get down here, from the tourists to our fellow scientists, all of whom take the Antarctic as a special responsibility. We've encountered many tourists over the years and we do our best to make sure that they have a keen appreciation of our work so they can go home feeling really jazzed about the Antarctic.

RN: Both of you have actually worked here for about one-third of the life of the Antarctic Treaty. What changes have you seen?

WT: There have been dramatic changes since I arrived in 1976. Then, Admiralty Bay was totally unoccupied. The old British Station across the bay had closed around 1960 (the Brazilian Ferraz Station now occupies this site). We established a tent site on the other side of Admiralty — near to where the Polish station is now located, and not far away from our present study site — on what we thought was totally unexplored land. We had visions of people never having set foot here since the days of the sealers. In the intervening years, we've seen four bases built in this bay, two of them being big, full time, all-winter operations. We used to see one tour ship, the old Lindblad Explorer, twice a season; last year we had 24 tour ship visits, about one every three days. This has its good and bad points. A lot more people are seeing this place and therefore it's becoming more well known, and there's a growing constituency at home that can be tapped insofar as knowing what's here and what's worth saving. On the other hand, the ships seem to repeat the same stops, trip after trip, and at some of the bases that potentially causes interference with work and other activities for which there's a short window during the austral summer.

This whole island — King George — may not be a fair indication of the whole. It's so close to South America and has grown considerably, from two bases in Maxwell Bay to eleven or twelve right now. Like expansion in the suburbs,

Adélie Penguin, *© 1990, Ron Naveen*

it's just gone wild. No matter how good the intentions, we find, nonetheless, that some of our birds — the skuas and gulls particularly — learn to subsist on station handouts and feeding off of some of the garbage. Everybody seems to want to repeat the same basic science over and over again.

More positively, this is absolutely one of the best laboratories on Earth and we're nowhere near knowing everything we'd

INTERVIEW CONT.

like to know. I'm encouraged about the directions our own program is taking through the National Science Foundation. For example, the AMERIEZ project picks a very difficult area — the ice edge during winter — and commits large amounts of resources to it. This is very valuable work, and it's paying fantastic dividends with all the data that are coming in. The ozone hole is another important area, especially the suggestions that the phytoplankton is being adversely affected by increased UV radiation.

RN: Can you mention some special moments?

ST: There have been so many. Rounding up thousands of penguin chicks for banding is always a thrill. A large part of our work is following these animals throughout their lives, if possible, which means banding quite a few chicks every season. You take a big net to gather the chicks, two people holding the ends, the others inside the perimeter "ringing and flinging" as we say. This year it will total 1,500 Adélie chicks, 1,000 Gentoo chicks, and all of the Chinstrap chicks (there being many fewer of these chicks in the study area).

Also, I've always enjoyed skiing over to the Arctowski Base across the glacier, or over to Demay. You can really lose your self in the surroundings. It's a wonderful experience, just to realize how special it is to be out on skis, crossing a glacier, in Antarctica. It's rather special.

RN: What goes through your head when you feel these little penguin hearts beating in your hands?

ST: Sometimes, if you've got a real fighter, you can hear yourself saying, "You're 'gonna make it fella, go get 'em, we want to see you back in a couple years." On the other hand, when you're banding a thousand or more chicks, it can be hard thinking about individuals. No doubt, you get very attached to banded adults and known-age birds that you've worked with for a while.

WT: You're so interested in studying them, and you don't want to upset them. Actually, the penguins seem to be totally naive and never quite get used to you. Some of the others, like the skua pairs that we've been working with for twelve years seem very habituated to my presence. I just walk up to them at the nests like they're old friends, they're only half-cawing at me, and you can just pick them up a bit, check for the presence of eggs and chicks, and you're off. Pat them on the head, say goodbye and "good luck this year," no muss, fuss or bother. They're really tame.

ST: But other skuas just get more and more hostile!

RN: You get to spend so much time with these chicks, and you also realize that so few of them actually will make it to adulthood.

ST: At our site, an average of about 17% of the Adélie chicks will make it back to attempt breeding for the first time in their third year. With the Gentoo chicks, we've had less than 1% return to begin breeding for the first time at age two, and as many 30%.

RN: Does the ecosystem have more food now, perhaps because the whales are depleted, leaving more available krill for other consumers?

ST: We really don't know. The Adélies and Chinstraps have seemingly increased in the last 30 years.

WT: But, as of the '70s, that apparent increase was over, and it may have ended even sooner. It's probably reasonable to assume that because of the very compacted period during which the whales were so heavily hunted — the late '40s to the early '60s — that there may well have been some food left over. If it helped the penguin populations at all, it was probably through the increased overwinter survival of the young chicks. But they may have adapted — along with the seals — very quickly to the new levels, and our data from the '70s onward indicate no major changes. But, in our area, the comparative data between the '40s and '70s show doubling and tripling of numbers. There does appear to be a rise, it very well may be attributable to the whales' demise, but the penguins and seals quickly acclimated to new stable levels.

RN: Have the penguins reached carrying capacity, their maximum numbers in the ecosystem?

WT: It's hard to say. I'd guess that they're probably right at carrying capacity, but in a simple system like this — which has such huge variations from year to year — you don't get a stable rise and a stable plateau. We have data over ten years showing population changes of plus and minus 30% from one year to the next. So, the physical impacts on things like survival of bird populations are tremendously variable, and it looks like the key driving force, among all possible factors, may be the amount of pack ice in the winter. Apparently, the more pack ice, the better chance for survival of Adélies; the less pack, the better it is for Chinstraps and Gentoos. Gentoos, of course, will overwinter here in the bay, if they can, taking fish, amphipods, and squid, if necessary.

RN: I've had my own experiences shedding blood at the Ferraz soccer field and feasting on kielbasa at Arctowski. What's it like living near the Brazilians and Poles ?

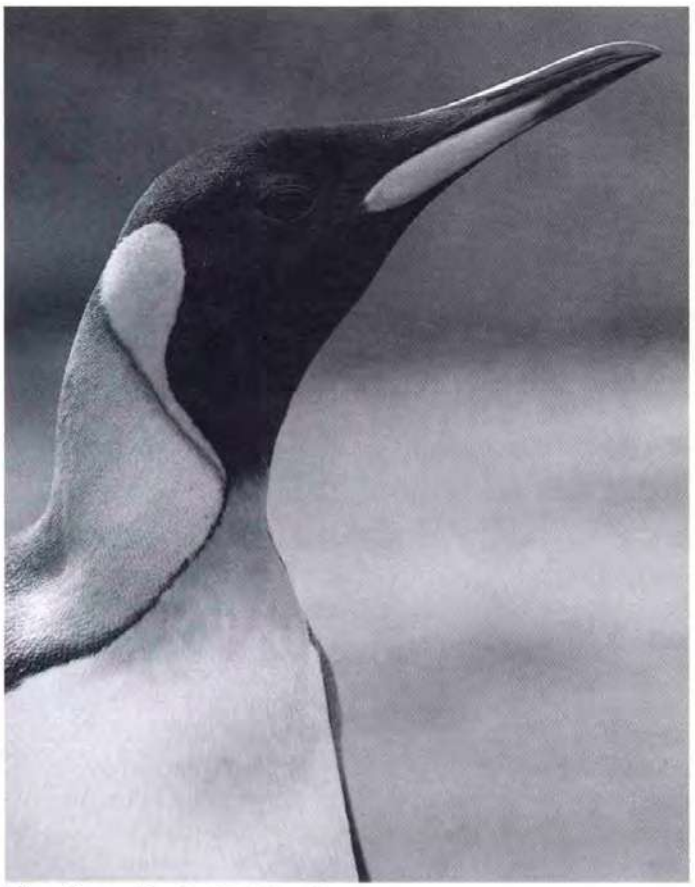
WT: It's the great bonus of working here, an incredible, unparalleled opportunity for international interaction and friendship. It's wonderful to see how well people of different cultures and backgrounds can work together. We lived with the Polish for seven years during our early years as visiting scientists at their base, and there's not a more gracious, considerate group of people anywhere. Except, perhaps, the Brazilians! If you really wanted to pick any two bases to have

INTERVIEW CONT.

in your bay, these two would certainly be high on my list. They run very clean bases, and just about everything is compacted and taken out.

RN: What's the feeling at the Polish base, given all the changes going on in Eastern Europe?

ST: They can't wait to go home. They don't actually know what they're going back to, but the anticipation is very high. There's concern that they're actually missing out on history, they want to be there for it, and they don't want it passing them by. It's a very exciting time.



King Penguin, © 1990, Ron Naveen

RN: What's your favorite Antarctic animal?

ST: It's probably a toss-up between skuas and sheathbills. Among the penguins, it's the Chinstraps, but skuas and sheathbills are really interesting. We've done much behavioral work with them, and they're always finding newer and better ways to make their living. There are lots of learned behaviors. There's one pair of skuas that predates Gentoo eggs and chicks in a special way. The male skua pulls on the tail of the penguin sitting in the nest and when the Gentoo turns to chase away this skua, the female skua grabs whatever is underneath the sitting bird. We lost the female in this particular skua pair a few years ago, and the new female is just learning the "snatch and seize" routine. And the sheathbills! They'll eat everything and anything!

WT: Yeah! A sheathbill will sit in ambush of a penguin that's about to feed its begging chick. Just as the adult starts regurgitating, the sheathbill comes out of nowhere, flies in between the adult and the chick, the chick pulls back, and the adult, which can't stop, just drops a whole lot of krill on the ground. Since the chick doesn't recognize food on the ground, it just stays there. The adult penguin chases the sheathbill around for a while, after which the sheathbill circles back to scoop up it's meal. They get a lot of food this way.

RN: Have your expectations about working in Antarctica been met?

WT: When I first came, I really fell in love with the place. I felt that if I could manage some funding for about ten years, I could do a very worthwhile piece of work. And I think that's happened. Whatever the future holds, I'll feel very good about the contribution I was able to make. But, there's much more to do, and I hope that I can continue to be a part of it.

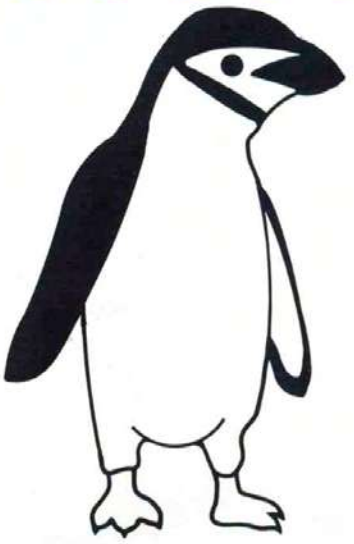
ST: I came down for science and, of course, to be with Wayne, and I'm very happy with what we've achieved. Looking back to when I first came in 1981, there were very few women working in Antarctica. So, I've been very fortunate to be one of the women who have worked so regularly and for so long down mere.

RN: How do we enthuse our friends at home more substantially about The Ice?

WT: Antarctica is starting to get more exposure in the press, and more folks are becoming aware. But, with so many other pressing needs - the homeless, AIDS, the changes in Eastern Europe - I guess that Antarctica, as much as we know it and love it, needs to be put in the perspective of so many other pressing human needs. Hopefully, there's some room for money and funds and awareness about The Ice so that the progress and momentum of the past few years will be continued, and more people will take up the cause. It is the world's last frontier, and it's certainly worth everyone's attention.

Macaroni Penguin, © 1990, Ron Naveen

The Antarctic Century BOARD



NEWS

compiled by Ron Naveen

Antarctic Treaty Meetings in Paris. The 15th meeting of the Antarctic Treaty Consultative Parties took place in Paris, October 9-20, 1989. At a Special Meeting prior to these sessions, Finland, the Republic of Korea, and Peru became Consultative (voting) Parties. The applications of Ecuador and Netherlands for Consultative Party status were deferred until a further assessment of these countries' research activities. There are now 25 Consultative (voting) Parties, and 14 Non-consultative (non-voting) Parties to the Treaty.

The parties adopted 22 recommendations (by consensus, as required), including: a major revision of the Code of Conduct on Waste Disposal; in the area of marine pollution, an agreement to prohibit the discharge of oil, plastic, sewage, and garbage, an agreement to ensure compliance with other international maritime arrangements, and a decision to convene meetings of experts to work on emergency contingency plans. The parties approved two new categories of protected areas: Specially Reserved Areas (SRAs) to protect areas of outstanding geologic, glacialogic, geomorphic, aesthetic, scenic, and wilderness values; and Multiple-Use Planning Areas (MPAs), to provide for cooperative planning and coordinated management of activities in places where multiple activities may interfere with one another, or cause cumulative environmental effects. The parties also agreed to expand efforts to monitor global environmental changes and to prepare impact assessments for the siting of new stations, to deal with the potential overcrowding of bases. There were agreements to: exchange information on air safety, including flights, frequencies, and emergency communication; to work with the International Hydrographic Organization to improve navigational charts; and to work with the World Meteorological Organization to improve the accuracy and availability on information on Antarctic weather and sea ice.

Specially Protected Area (SPA) No. 11 at Cape Shireff was redesignated as a Site of Special Scientific Interest (SSSI). Three new SSSIs were designated: Ablation Point-Ganymede Heights, Alexander Island; Avian Island, Northwest Marguerite Bay; and Mount Flora, Hope Bay, Antarctic Peninsula. Two new Historic Monuments (HMs) were designated: Richard E. Byrd, McMurdo Station and East Base, Stonington Island.

The Scientific Committee on Antarctic Research (SCAR) will be considering additional recommendations for protected sites at its upcoming July 1990 meeting in Sao Paulo, Brazil. One site already under consideration is at Lion's Rump on King George Island.

Special Meeting in Chile. Pushed along by a U.S. paper, the Treaty Parties established a work program to identify the necessary elements that would comprise a comprehensive environmental protection scheme for the Antarctic, and the forms that such protections might take (for example, a new Treaty, a protocol to an existing regime, or Agreed Measures adopted under the Treaty). To advance this particular effort, there will be a Special Meeting of the Parties in Santiago, Chile in November 1990. Among the environmental issues that are likely to be discussed are: tourism, vessel source pollution, environmental monitoring, environmental impact assessments, expansion of the protected areas system, more effective inspections, and the potential exploitation of Antarctic ice. The Santiago meeting also will deal with the parties' elaboration of the protocol on liability for Antarctic minerals activities, a section of the proposed minerals controls regime that has not yet been written.

Proposed Minerals Controls Treaty. The debate over the proposed Antarctic minerals controls treaty (CRAMRA) has begun in the U.S. At this very early stage, before the State Department officially submits CRAMRA to the U.S. Senate for ratification, the debate seems to have broken into two "Just Say No" camps.

One side wants to kill the proposed Treaty outright, banking

on the hope that the Parties will change their minds, after six-plus years of negotiations, and agree to a legally binding moratorium on all future, minerals, oil, and gas development. The other side suggests that CRAMRA and its tough environmental standards and procedures offer substantial rules for limiting future development, and should be a touchstone for future environmental protections in The Ice. Concerns on this side are that killing CRAMRA outright might cause the Treaty Parties to abandon the voluntary moratorium that's been respected during the CRAMRA negotiations or might generate the internal discord the Antarctic Treaty was designed to prevent in the first place.

King Penguin, © 1990, Ron Naveen

Both sides, though, support additional, comprehensive measures to protect the Antarctic, which, as mentioned above, might cover issues like vessel source pollution, tourism, and garbage. One suggestion is that, ultimately, CRAMRA might be associated with a more comprehensive environmental regime and, since no development appears to be imminent, with a binding moratorium that extends for a specific number of years.

On the international level, Australia and France have announced intentions to not sign CRAMRA, but, rather, to push for a comprehensive, Antarctic environmental regime. No specific language has yet been proposed, but it likely will emerge just before or during the Santiago special meeting. Prime Minister Palmer of New Zealand recently announced displeasure at the slow pace for developing comprehensive, environmental measures, and that his government would not proceed with legislation to implement CRAMRA until greater progress on comprehensive measures is shown. Diplomatic clarifications indicate that New Zealand isn't abandoning CRAMRA, but that the Prime Minister is unhappy that the CRAMRA debate is thwarting the effort to develop a broader environmental scheme.

As mentioned above, the upcoming, special meeting of the Treaty parties in Chile will also cover the still-unwritten liability protocol to CRAMRA. A future issue of the Newsletter will focus on the proposed minerals controls/comprehensive measures debate more particularly.

Under the direction of project director, Dr. William Westermeyer, the U.S Congressional Office of Technology Assessment has prepared a 230-page analysis of U.S. interests in Antarctica and in the proposed minerals controls treaty (CRAMRA). It is entitled Polar Prospects: A Minerals Treaty for Antarctica (GPO stock number 052-003-01161-1; cost, $10 U.S.) and may be ordered from the Superintendent of Documents, Government Printing Office, Washington DC 20402-9325 (phone inquiries: 202-783-3238).

Antarctic Travelers and Visitors Codes.

Oceanites's **Antarctic Travelers' Code** (see **The Antarctic Century Newsletter**, Number 4) was distributed informally at the Paris meetings of the Antarctic Treaty countries last October. The **Code** received press coverage by the New York Times and newspapers served by the New York Times News Service, the Baltimore City Paper, Travel Life Magazine, and GEO Magazine (West Germany). The **Code** was posted during the season at the U.S. Palmer Research Station, and was distributed to the HMS Endurance. The Spanish-language version of the **Code** was distributed in March 1990 at III Taller de Autosuficiencion Financieta in Quito, Ecuador. This conference of Latin American/Caribbean Basin, non-governmental organizations was sponsored by the Latin American Division of The Nature Conservancy, and was attended by 57 participants from 32 organizations in 21 countries. German- and French-language versions of the **Code** are now available, free, by writing to **Oceanites**. The International Council For Bird Preservation, Cambridge, England, will assist with additional, foreign language translations, and Oceanites has begun development of a land-based supplement to the **Code**.

Adventure Network, Inc., a Canadian company that operates aviation supported, mountain climbing, hiking, and skiing adventures in Antarctica has agreed to follow the **Code**. This represents the first, non-American travel company to adopt it.

After the **Antarctic Travelers' Code** was released in late July, four Antarctic shipboard tour operators — Society Expeditions (World Discoverer and Society Explorer), Lindblad Travel, Mountain Travel, and Travel Dynamics

(Illiria) — wrote their own voluntary guidelines for the 1989-1990 season. As it happened, Lindblad Travel and Mountain Travel did not operate/charter their own vessels during the season, but the voluntary guidelines were put into effect aboard the Travel Dynamics and Society Expeditions ships. Reports from all three vessels indicate a rather determined attempt to spread the gospel about sensitive Antarctic travel. The U.S. National Science Foundation abetted this effort by making copies of its booklet about the Antarctic Conservation Act available to ships' officers and expedition staff. As mentioned above, the subject of visitors' codes and tourism, generally, will be a major topic at the Chilean Special Meeting of the Antarctic Treaty countries, now set for November in Santiago.

Shipboard Tourism, 1989-1990. The recently-concluded 1989-1990 shipboard tourist season in The Ice produced some interesting developments. The Nordbrise, which was supposed to pick-up the slack left by the sunken Bahia Paraiso, apparently went out of business and never made it south. Nor did Lindblad Travel, which went bankrupt and did not recharter the Antonina Nezhdanova. The Illiria made six trips to The Ice, and the two Society Expeditions ships, the Society Explorer and World Discoverer, made about fourteen trips south. Approximately, 2320 passengers sailed to Antarctica on these ventures.

New Ships, New Tours. With the new Frontier Spirit already slated to begin operations for Salen Lindblad Cruising, Inc. next season on the Australian/New Zealand side of Antarctica, there is late word of a new vessel that Abercrombie & Kent hopes to operate in the Antarctic Peninsula next season. Details are sketchy, but the ship is apparently being built in Norway, is intended to have superior ice hardening (perhaps, even an icebreaking capability) and to carry about 80 passengers. In addition, Society Expeditions and its operating company, Discoverer Reederei, announced plans to build two new expedition ships, both in the greater than 300-foot,160-passenger range.

In January, Punta Arenas and Santiago were buzzing with talk about the possibility of increased flights into the Chilean Teniente Marsh Research Station on King George Island, perhaps tied to a tourist vessel that would offer Peninsula trips without the usual four days' back-and-forth in the Drake Passage. For years, many have expressed concern that the "hotel" operation at Marsh was inconsistent with the scientific purposes and spirit of the Antarctic Treaty. Now, as we go to press, Lan Chile Airlines apparently has announced that it intends to commence regularly scheduled air service to Marsh next season, using a 90-passenger propellor aircraft.

Concluding the rumor mill, a number of sources indicate that Lars-Eric Lindblad plans to bring a 400-passenger, non-ice reinforced vessel, Ocean Princess, to the Antarctic Peninsula next season.

All of the new ships raise similar questions: How many people can safely visit the various landing sites? Is the vessel safe for Antarctic operations? Can the various passenger-contingents be properly supervised at the landing sites? This flurry of activity coincides with recently introduced U.S. legislation that seeks to regulate U.S. aspects of the Antarctic tourism industry, and the upcoming Special Meeting of the Antarctic Treaty Parties that, on the Treaty level, will consider tourism as part of a comprehensive environmental protection scheme for the Antarctic.

On the science side, the U.S. National Science Foundation has announced plans for a new, ice-strengthened research vessel, in the 300-foot-length range, which hopefully will be ready in early 1992.

Land-Based Tourism, 1989-1990. Adventure Network of Vancouver, British Columbia, Canada, concluded another season of aviation-backed tourism to the Ellsworth Mountains and the Antarctic Peninsula. Approximately 50 passengers participated. Adventure Network also supplied some backup support to Will Steger's successful dog-sledging venture across the continent. Some exploratory routes for future hiking/mountain climbing trip were investigated, as well as a scouting trip on skis down the Beardmore Glacier. One participant in this latter trip emphasized the company's commitment to hauling out all garbage, including human waste products.

No data are in on the number of visitors who participated in Chilean tourism this season, utilizing the previously mentioned "hotel" at the Marsh Station on the western end of King George Island. There was a skiing competition at Marsh early in the season. The January article about Antarctica in TIME magazine produced some positive, clean-up operations. Spurred by the emerging concern about station garbage, Marsh personnel made arrangements with Adventure Network to haul out many of the refuse drums around the station, and to fly the garbage back to Chile for disposal.

Books. Antarctica, by Charles Swithinbank, part of a series called the Satellite Image Atlas of Glaciers of the World, is now available from the U.S. Geological Survey, Books and Open File Reports Section, Federal Center, Box 25425, Denver, CO 80225. The cost is $40 (U.S.) and the publication number is 1386-B. It contains many startling images, and is a worthy addition to one's Antarctic library.

Wild Ice: Antarctic Journeys, the Smithsonian Institution Press book about Antarctica, co-authored by Ron Naveen, Colin Monteath, Tui De Roy, and Mark Jones will be available in early September. Copies autographed by Ron Naveen will be available through **Oceanites**, and an order form will be available in the next issue of the **The Antarctic Century Newsletter**.

Bahia Paraiso/Arthur Harbor Update.

Preliminary data from Arthur Harbor — where the Bahia Paraiso sank in January, 1989 — indicates that penguin numbers may be down about 10%, and that shags, skuas, and Kelp Gulls are having another difficult breeding season. However, for a second straight season, it is clear that krill availability in the area is down, making it extremely difficult to pinpoint the Bahia Paraiso accident as the proximate cause for these more obvious, ornithological effects. Adélie Penguin chicks generally do not return to attempt breeding until their third year, so assessment of the oil spill's potential impact on the 1988-1989 Adélie cohort won't be available for a while. A cooperative paper will be published shortly by the team assessing these impacts, and analyzing preliminary results from this season's work. Further details will appear in the next issue of the **Newsletter**.

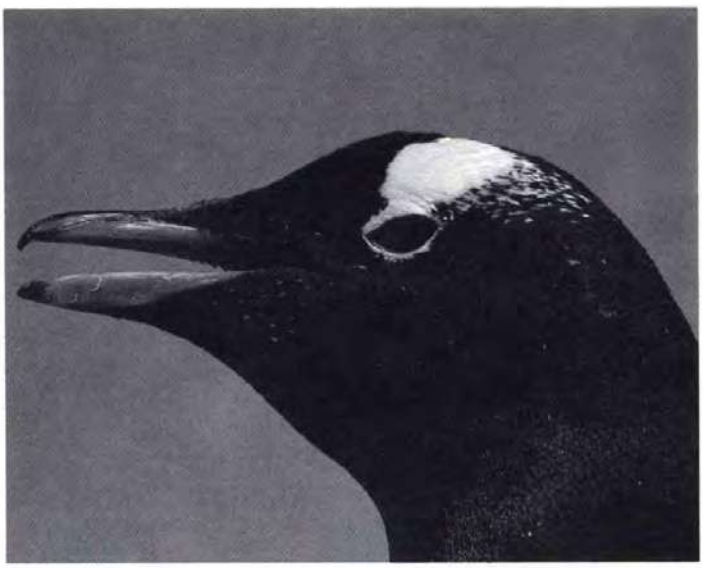
An inspection of the ship's remains in mid-January found the hull just barely above the water line, the smell of oil — at least that day — still lingering in the air, and evidence of oil obvious in the water. The ship still leaks.

Tragedy in Jones Sound.

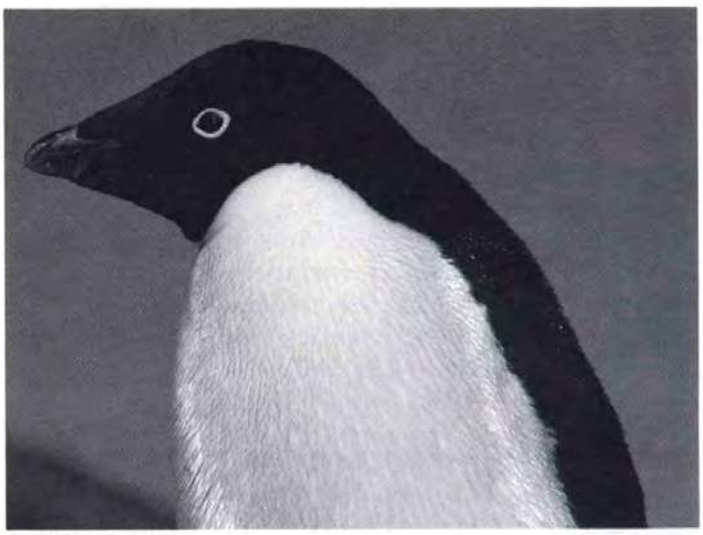
The hopes for an accident-free, safe, 1989-1990 Antarctic summer were dashed with the sad news regarding the Jones Sound gyrocopter crash that killed veteran Antarctic pilot Giles Kershaw. Giles was working with a National Geographic film crew when his craft was hit by strong winds and smashed to the ice. Giles's exploits in Antarctic are legendary, and those who had contact with this most enthusiastic Antarcticist grieve, and offer condolences to his wife Annie. A memorial service was held for Giles in London on April 11.

Miscellaneous.

An **all-female scientific and operations team** has been assigned to run the West German Neumayer Station on the eastern side of the Weddell Sea. ... The Peruvian **Macch Picchu Station** erected near Admiralty Bay was destroyed during the winter. No word, yet, on repairs. ... Under the auspices of the Antarctic Living Marine Resources Treaty (see The Antarctic Century Newsletter, Number 2), the U.S. announced an **inspection of a Japanese krill vessel** during the recently concluded fishing season. ... The **resumption of formal diplomatic relations between Great Britain and Argentina** raises interesting possibilities for the future of the Southern Ocean and Antarctica. The Falklands/Malvinas conflict of the early 1980's evidenced the epitome of international discord that the Antarctic Treaty was designed to prevent. The resumption of relations draws down the exclusive zone around the Falklands Islands, with the prospects of increased fishing activity by Argentina and other countries. There also is the prospect of increased tourism should flights to the Falklands be reinstituted from the South American mainland. ... In March 1990, **the international dog team expedition** co-led by American **Will Steger** and Frenchman **Jean-Louis Etienne** successfully reached the Russian Mirnyy Base on East Antarctica's Wilkes Coast. Other team members on this first-ever, dogsled traverse of Antarctica included Geoff Somers of Great Britain, Qin Dahe of The People's Republic of China, Keizo Funatsu of Japan, and Victor Boyarsky of the Soviet Union. The expedition covered 3,800 miles and took seven months. ... In February 1990, **Reinhold Messner** of Italy and **Arved Fuchs** of Germany successfully completed their 92-day **skiing journey from the Ronne Ice Shelf to Ross Island**. ... Penguin researchers Boris Culik, Rory Wilson, and Robert Danfeld, from the Institute for Marine Science in Kiel, West Germany, concluded a successful season at the Argentine Esperanza Station at Hope Bay in the Peninsula. ... In recognition of his recent Antarctic presentation at the Smithsonian Institution, Ron Naveen was honored at the celebration of "Wilderness 25" held at the Ansel Adams Gallery of The Wilderness Society in March.



Gentoo Penguin, © 1990, Ron Naveen

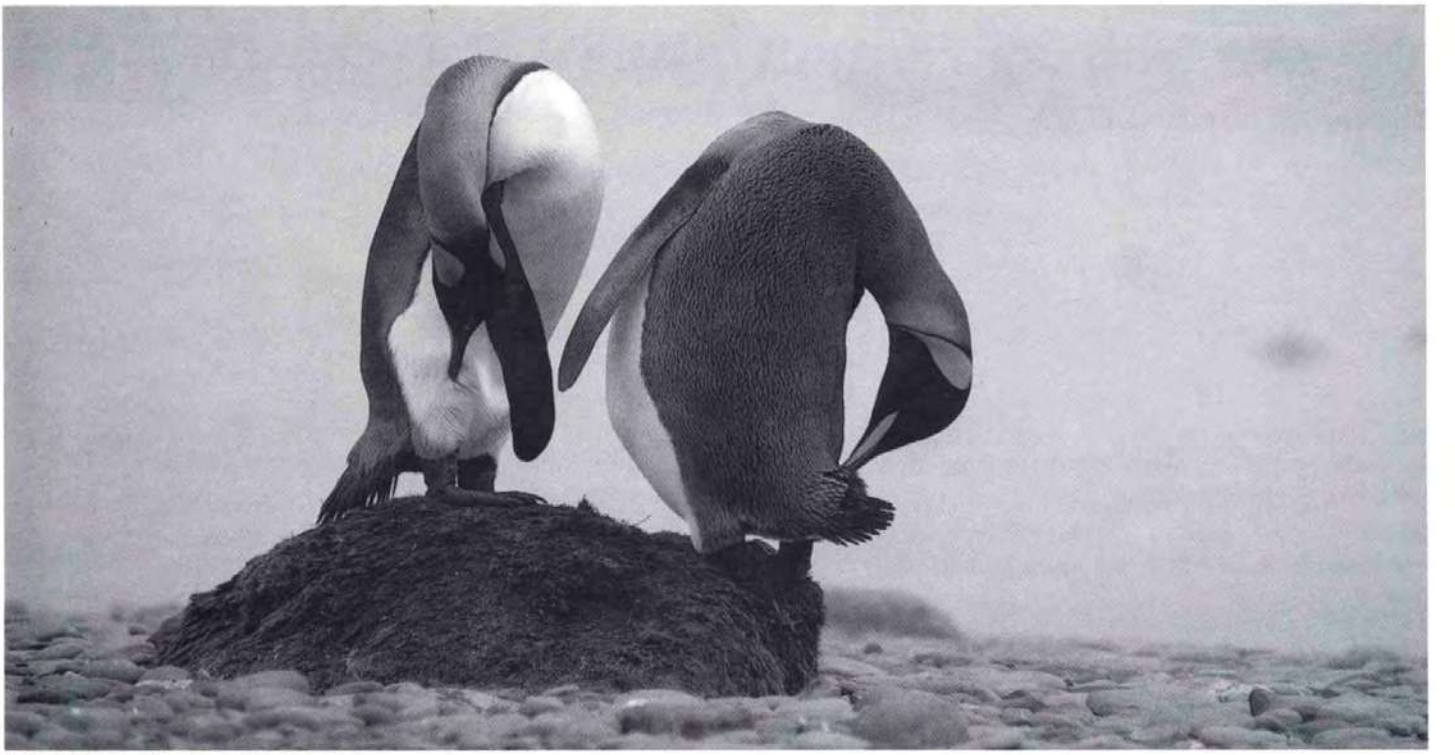


Adélie Penguin, © 1990, Ron Naveen

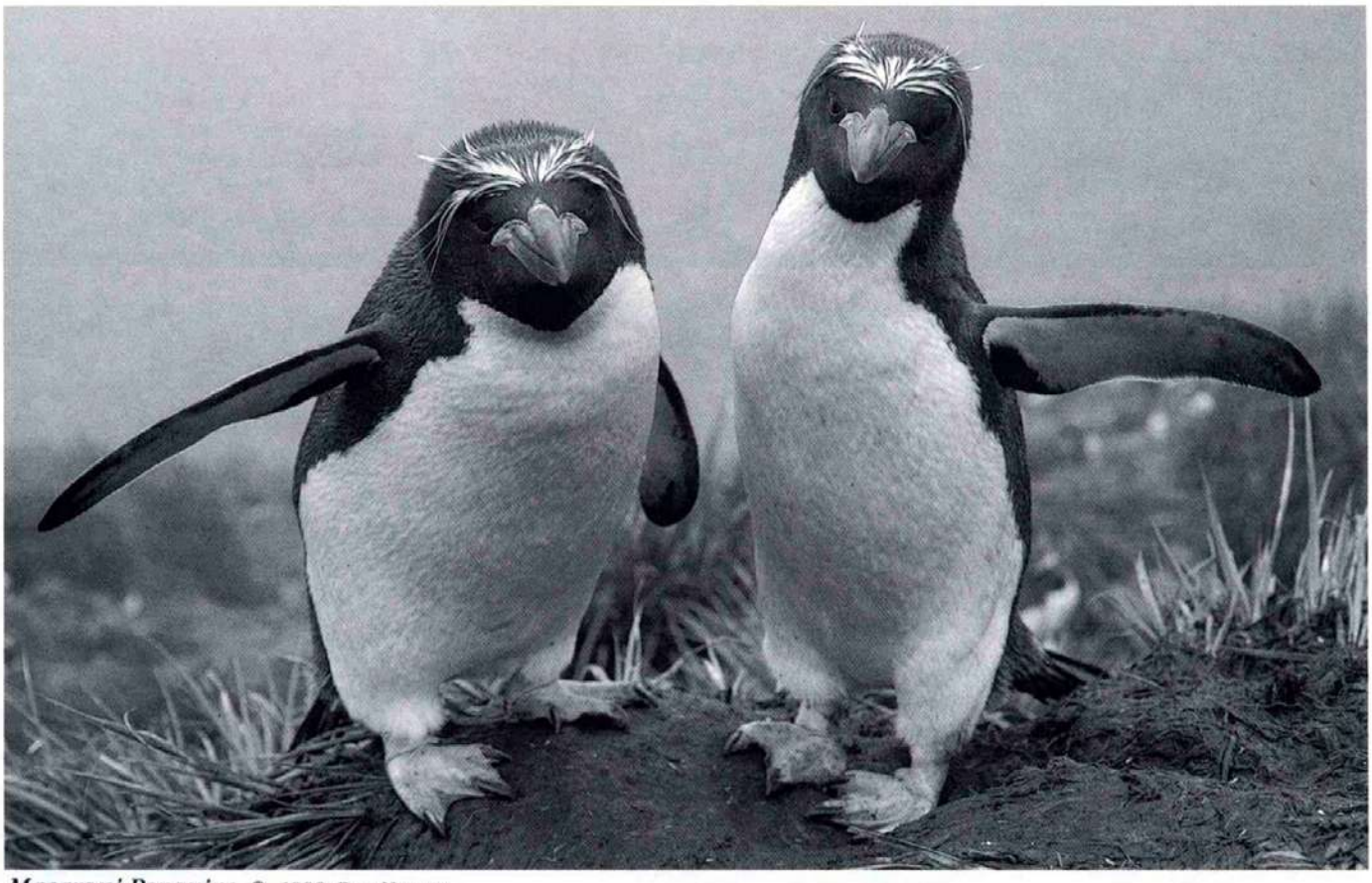
Let's Hear From You

The Antarctic Century Newsletter is distributed to interested Antarcticists worldwide, including: all national Antarctic programs and their administrators; scientists and scientific institutions; educators; zoos, parks, and aquaria; government officials, elected representatives, and their staffs; and contributors to **OCEANITES**. Please let us know if there are any present or future Antarcticists whom we might have missed. Also, please keep us up-to-date about any news or information about Antarctica, and feel free to comment on the **Newsletter** and its contents.

King Penguins, © *1990, Ron Naveen*



King Penguins, © *1990, Ron Naveen*



Macaroni Penguins, © *1990, Ron Naveen*

Oceanites