

VOYAGE TO THE ANTARCTIC

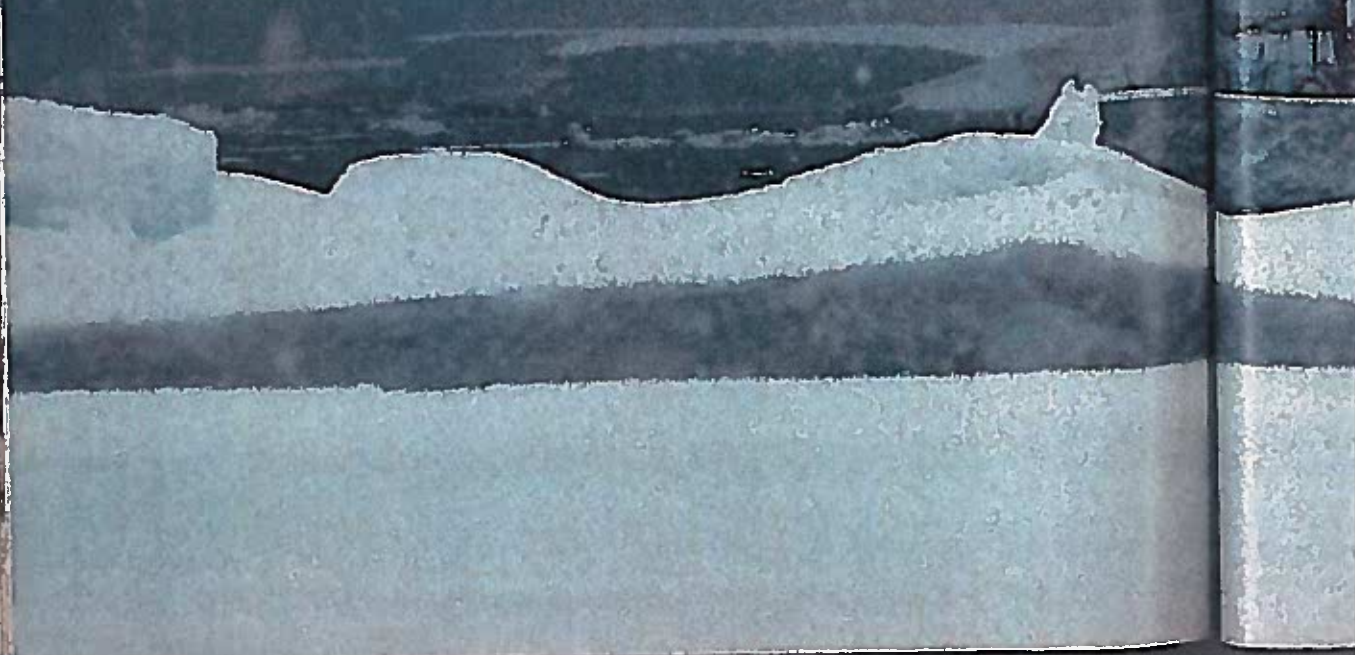
By DAVID LEWIS

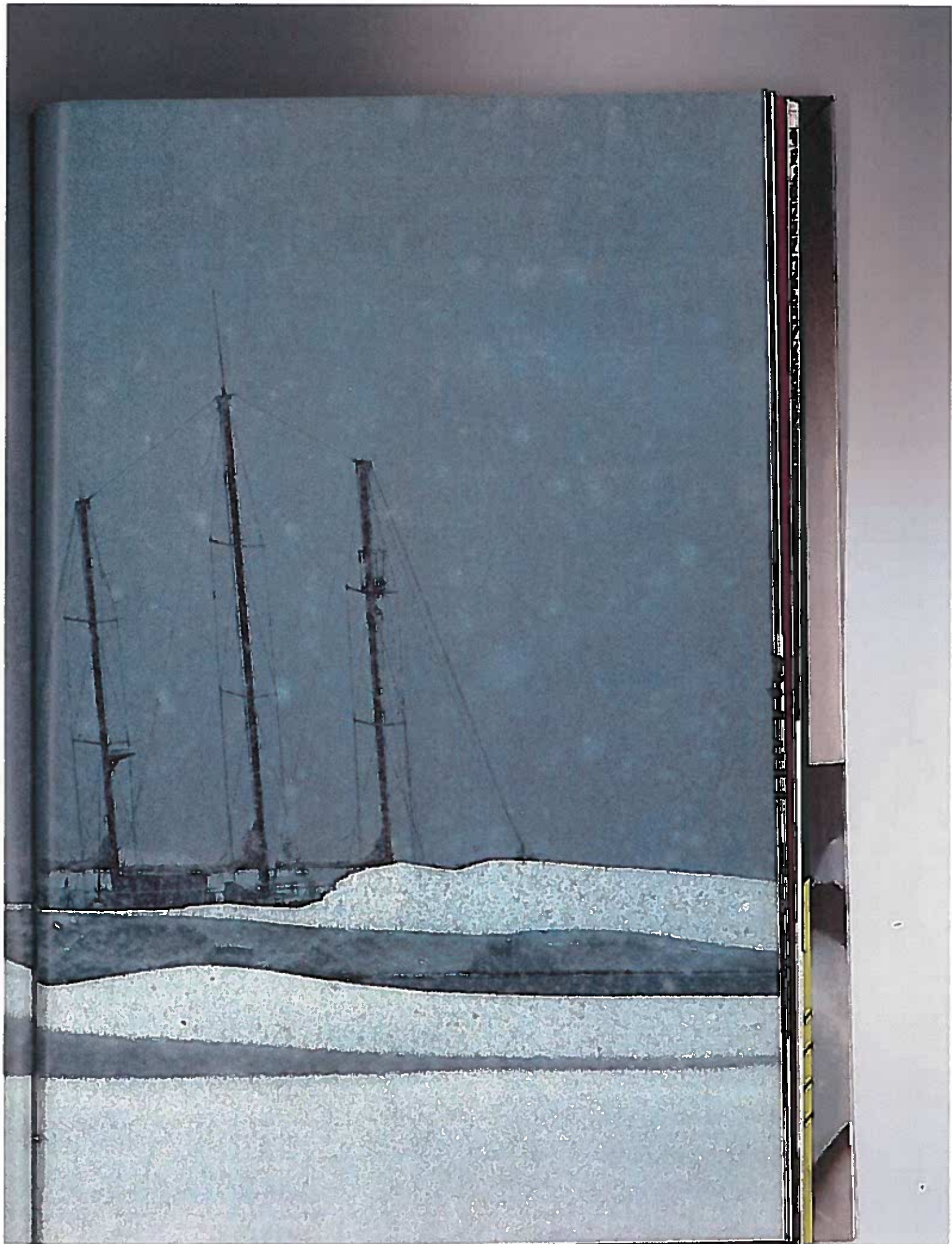
I HAVE TO CONFESS an unusual addiction: I am hopelessly drawn to Antarctica. That vast polar continent with its immense reaches and boundless extremes has attracted me ever since I saw my first chart of the Southern Hemisphere.

Such areas of the world fascinate me, both for their isolation and the fact that they are virtually unknown. A couple of years ago I began planning for an expedition to carry

BARBARA MUNDEN FOR SYDNEY SUN-HERALD

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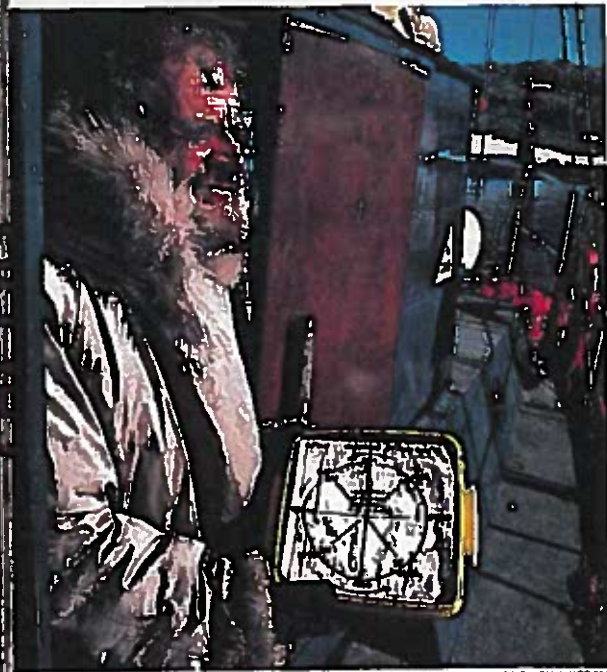




out biological and earth-sciences research relating to Antarctica.

The expedition involved sizable risks, and my fellow members and I were aware of them. In retrospect I believe all of us consider them worthwhile. But that takes a little explaining.

For all our advanced technology and the immense sums spent on antarctic research, we still know relatively little about the southern polar seas. Over the past ten years I have explored Antarctica's waters in small sailing craft, once with a crew and twice on solo voyages.* Those experiences taught me that small, well-organized, self-sufficient research expeditions can contribute greatly to our knowledge of the antarctic region. Such information is vital, for the



BARBARA MUNVICH, SYDNEY SUN-HERALD

Veteran navigator of many seas, author David Lewis displays an improvised sun compass. His standard compass was incapacitated by the continually shifting south magnetic pole. Knowing both local time and that the sun circles the horizon near the poles in summer, moving 15 degrees an hour, skipper Lewis found his way.

current international Antarctic Treaty is subject to review in 1991. By then we must have both the knowledge and the wisdom to chart the future of the polar continent for years to come.

In 1981, with the experience gained from my three previous voyages, I organized an expedition to one of the most inhospitable regions of the world—an area of the antarctic coast known as the Home of the Blizzard (see map, right). The name stems from powerful winds that funnel down off the high central Antarctic Plateau over Cape Denison into Commonwealth Bay, part of the area I proposed to explore.

THE NAME Home of the Blizzard was coined by a fellow Australian, the great antarctic explorer Sir Douglas Mawson, who wintered over at Commonwealth Bay in 1912 and 1913. Since Mawson's time there, only a handful of people have explored the Cape Denison area.

Mawson estimated that the winds at Cape Denison averaged 50 miles an hour year round. Our own measurements were later to confirm Mawson's observations and to record regular gusts of more than 80 miles an hour. One of the consistently windiest spots on earth, Cape Denison under extreme conditions can experience gusts as high as 185 miles an hour.

Weather was only one aspect of Cape Denison that interested me. The Adélie penguin population of the cape and nearby Mackellar Islets was another. Though believed to be large, the penguin population had never been counted. The data are important, for penguins are major consumers of krill, the key food for virtually all Antarctica's marine life. Our studies would aid an international program, Biomass, which seeks to increase man's knowledge of the food web in the southern ocean.

We were also interested in ice movement. Mawson's party had made some measurements and taken photographs of the margin of the continental ice sheet at Cape Denison. New photographs could show whether the ice is advancing or retreating, a factor in Antarctica's future climate.

*See NATIONAL GEOGRAPHIC's "Alone to Antarctica," December 1973, and "Ice Bird Ends Her Lonely Odyssey," August 1975, both by Dr. Lewis.

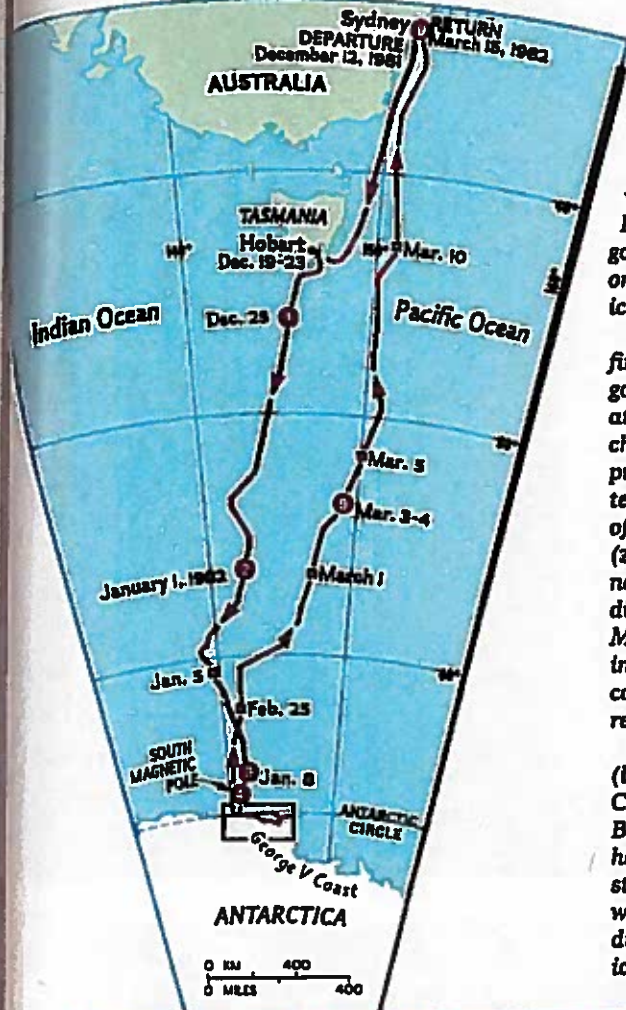
Course to the Home of the Blizzard

THUS CHILLINGLY NAMED by Australian polar explorer Douglas Mawson, a forbidding stretch of Antarctica's George V Coast drew 12 hardy Australians and New Zealanders. To arrive during the 100th anniversary of Mawson's birth, they set out in the *Dick Smith Explorer*, a 65-foot steel-hulled schooner designed as a fishing trawler, bound for one of the windiest places in the world. The Oceanic Research Foundation supported their goals: to compare data with Mawson's on climate, wildlife, and the coastal ice sheet, and to study icebergs.

Sailing from Sydney, the crew loaded final provisions at Hobart, Tasmania, then got under way to spend Christmas (1) at sea, where they relished a feast of ham, chicken, roast potatoes, wine, and Christmas pudding. The New Year (2) brought the test of the first gale, and a first glimpse of the southern lights. About a week later (3) the sailors sighted their first ice and neared the south magnetic pole (4), discovered in a different location by Mawson in 1909. While under its influence, the crew relied on their sun compass, though overcast skies once rendered it useless for ten hours.

Explorer reached the George V Coast (explorer below) on January 10, anchoring at Cape Denison in an arm of Commonwealth Bay that Mawson had called the boat harbor (5). There, mapping and other studies were performed—along with a wedding. But fierce weather caused a near disaster, and down the coast dangerous pack ice near Mertz Glacier Tongue (6) thwarted measurements, finally made at the French station of Dumont d'Urville (7). Homeward bound, the crew battled a farewell storm with 30-foot seas (8), returning on March 15 (9) after a 4,500-mile odyssey.

DRAWN BY JOHN G. WEBER
COMPILED BY JOHN B. TREISEN
CARTOGRAPHIC DIVISION, U.S.S.



Finally there were the icebergs. Many scientists believe these huge floating fragments of ice shelves and glaciers could supply precious water to arid areas of the earth if a practical method for towing the bergs long distances could be devised. The waters around Cape Denison abound with icebergs, offering ideal conditions for study of the effects of wind and wave action, important information should the bergs ever be towed to distant places.

BY EARLY DECEMBER I had gathered a team of 11 scientists, expert sailors, and general crew members. Six of the team had had previous antarctic experience: Harry Keys, a geochemist; Karen Williams, field assistant; Jeni Bassett and Paul Ensor, both marine biologists; Dick Heffernan, a geophysicist and mountaineer; and Dot Smith, a veteran crew member from one of my earlier expeditions.

The newcomers to Antarctica were Don Richards, my first mate and radio operator; Garry Satherley, a newspaper deputy editor who was to be ship's handyman and mechanic; Barbara Muhvich, Garry's wife and fellow journalist; Malcolm Hamilton, a television director and cameraman; and Margaret Huenerbein, a sailor and veteran trek leader in the Himalayas.

The team was divided almost evenly between Australians and New Zealanders.

As in the past I chose a sailing vessel for the expedition, to demonstrate that even in navigating through hazardous seas conservation of energy is possible.

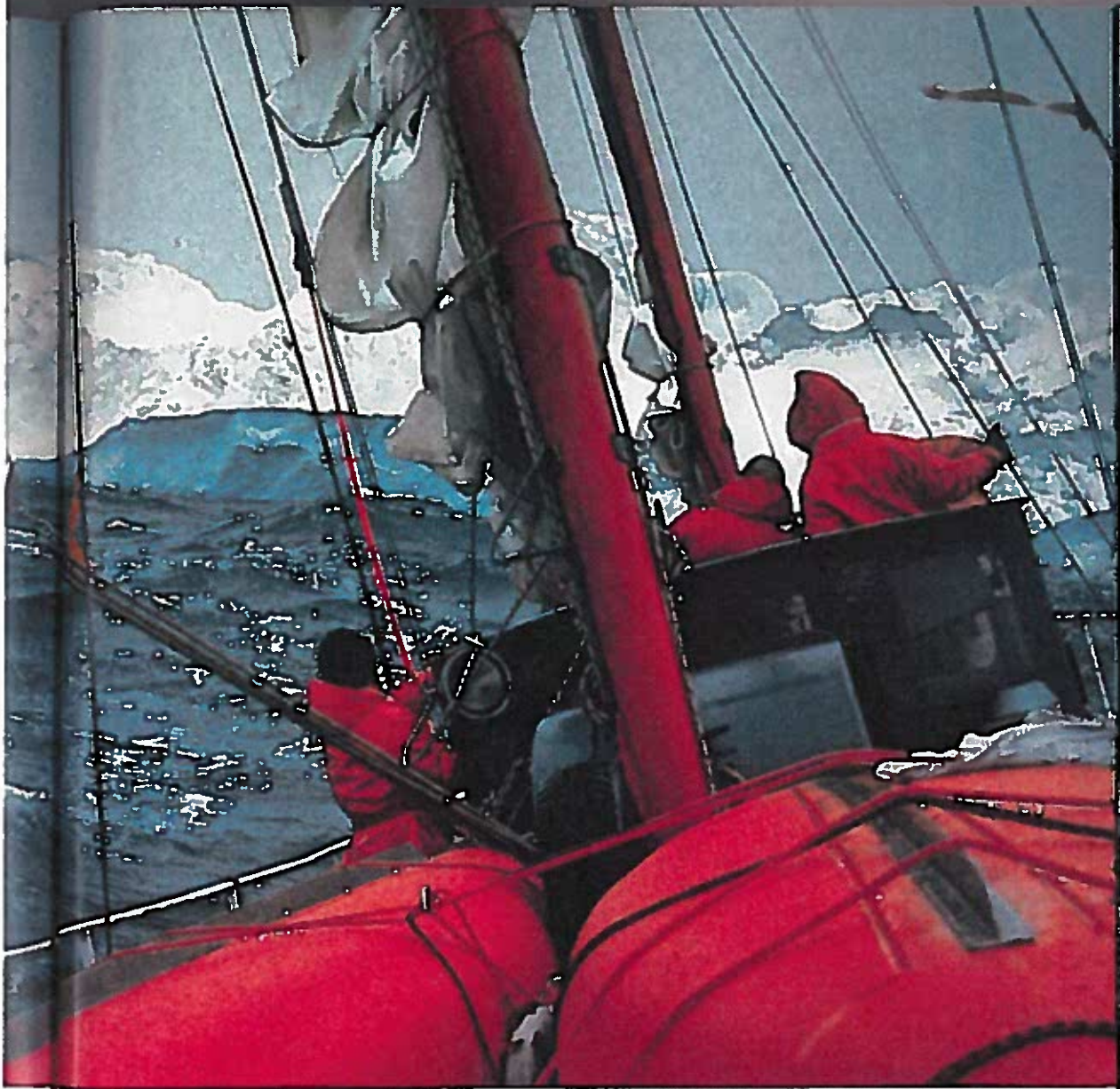
Our vessel was a 65-foot three-masted schooner with a quarter-inch-thick steel hull capable of withstanding the inevitable collisions with ice. I named the ship *Dick Smith Explorer* after a fellow Australian and principal supporter of the expedition. Sponsor of the project was the Oceanic Research Foundation, a nonprofit organization I had established in 1977 for study of all aspects of earth's seas.

On December 12 we cast off in Sydney Harbour and headed south for what was to be a 4,500-mile voyage lasting three months. We had organized a ship's pool on when we would spot the first ice, and with unaccustomed luck

(Continued on page 556)

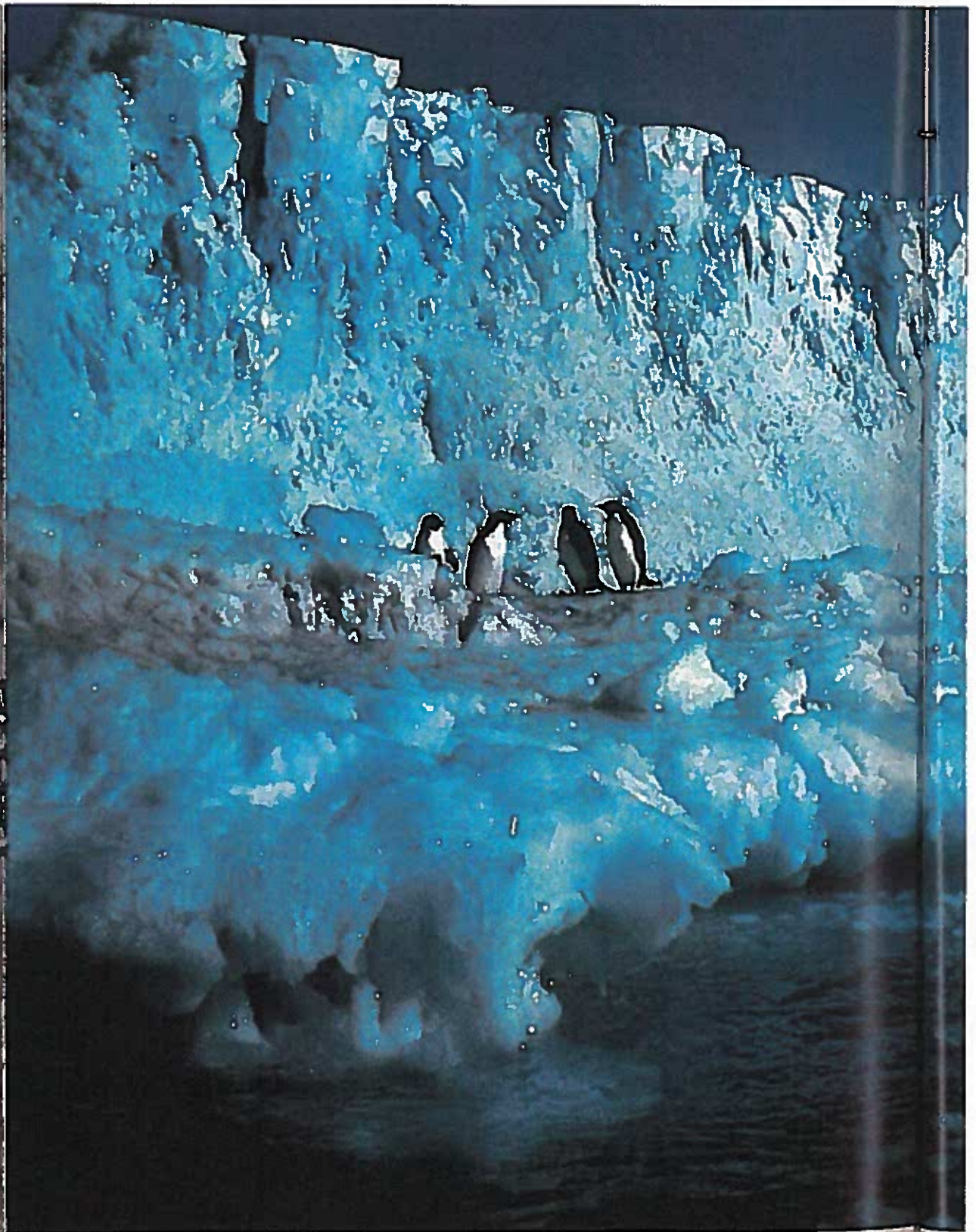


It's a mild day compared to some gales they endured but still too rough to measure icebergs, so the crew reconnoiters them instead (above). Relaxing in the galley, from left: Dick Heffernan, geophysicist and justice of the peace, who during the expedition married geochemist Harry Keys and field assistant Karen Williams; Jeni Bassett, marine biologist; Dot Smith, antarctic veteran; and Paul Ensor, marine biologist. Author Lewis had made three prior antarctic voyages, including two solo trips.



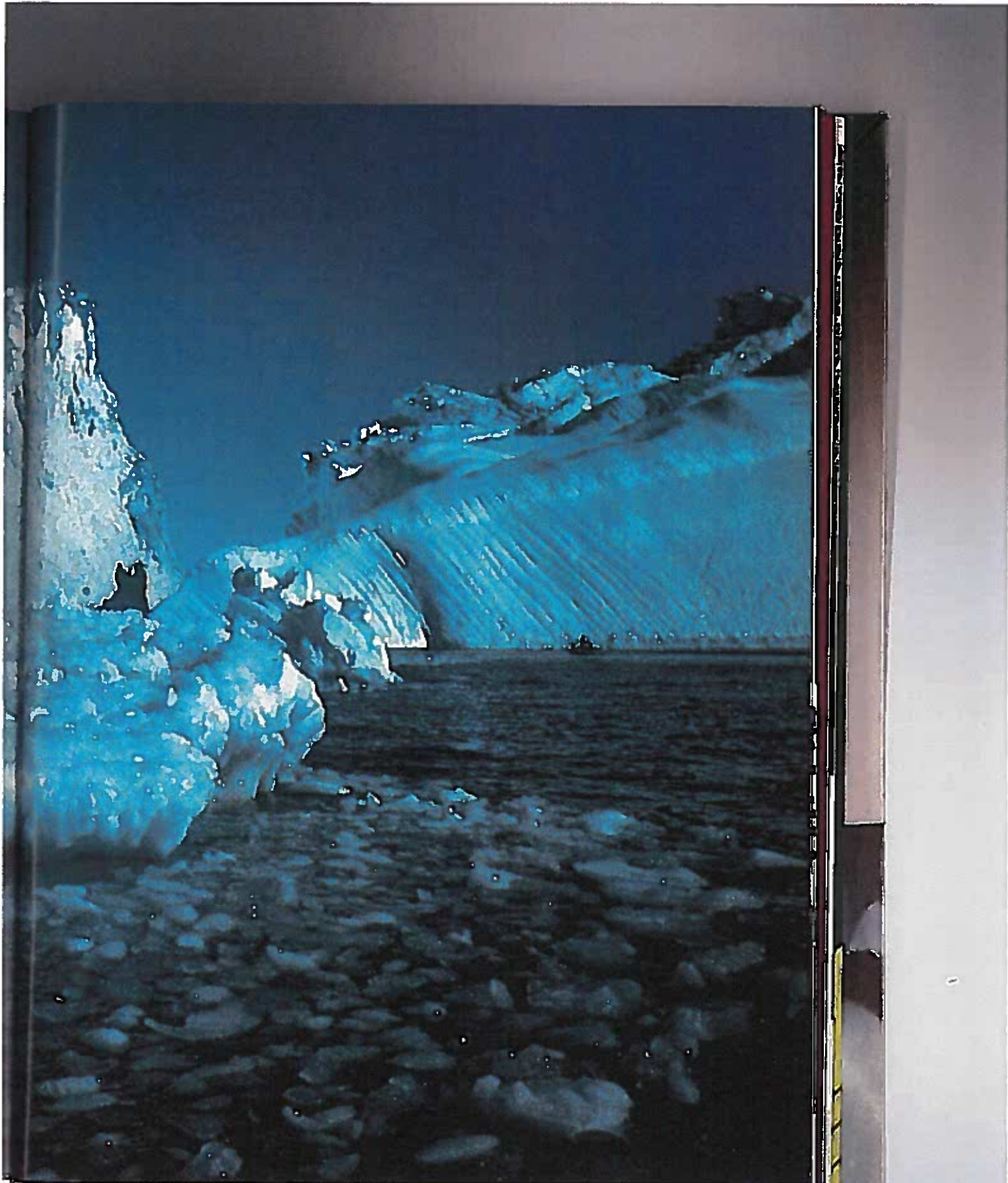
BARBARA MUYVICH, SYDNEY SUN-HERALD (BELOW); KAREN WILLIAMS





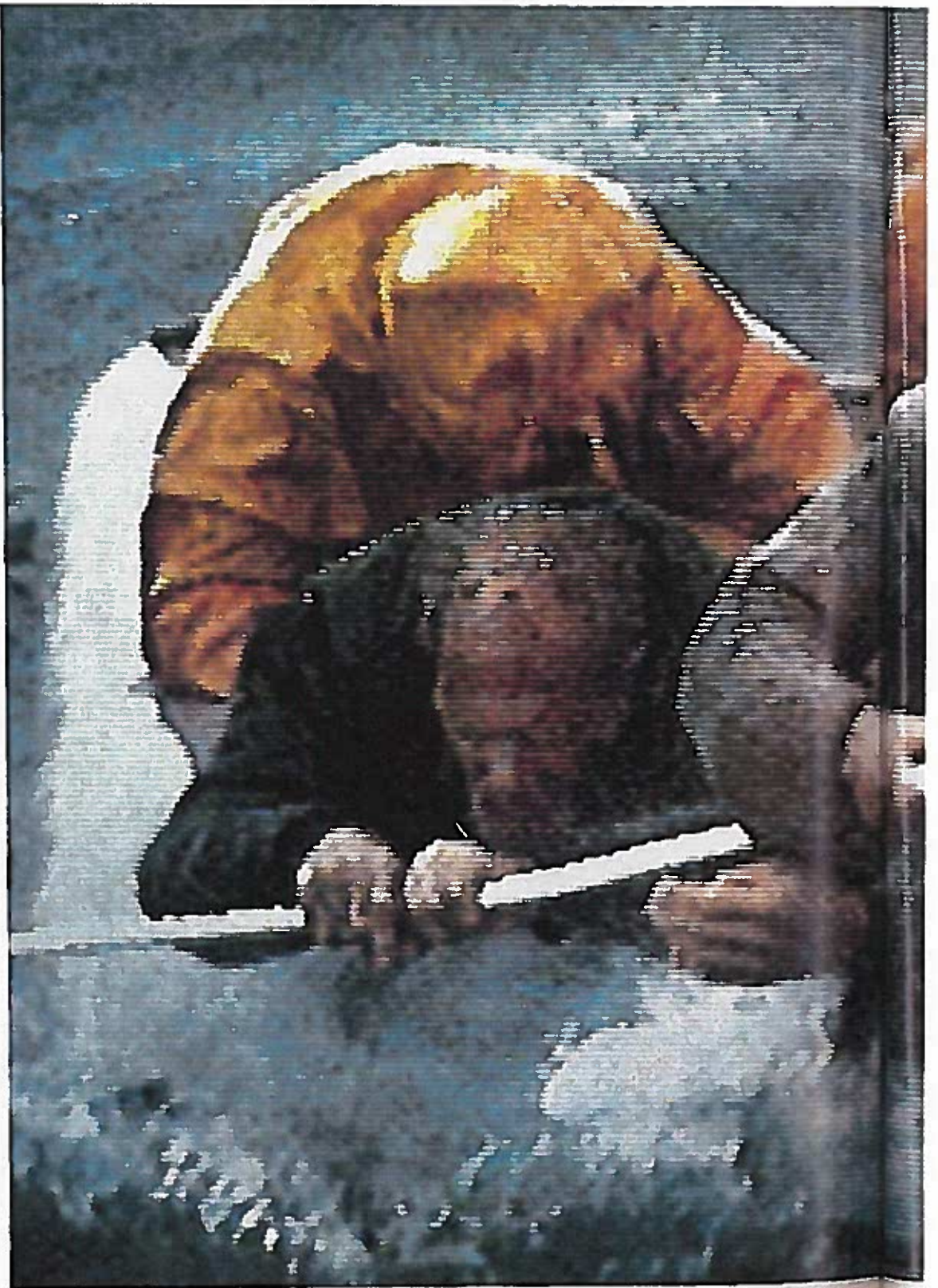
Statuettes in a stark tableau, Adlie penguins off Dumont d'Urville were among the species censused by the expedition for an international program called Biomass. It seeks to

National Geographic, April 1983



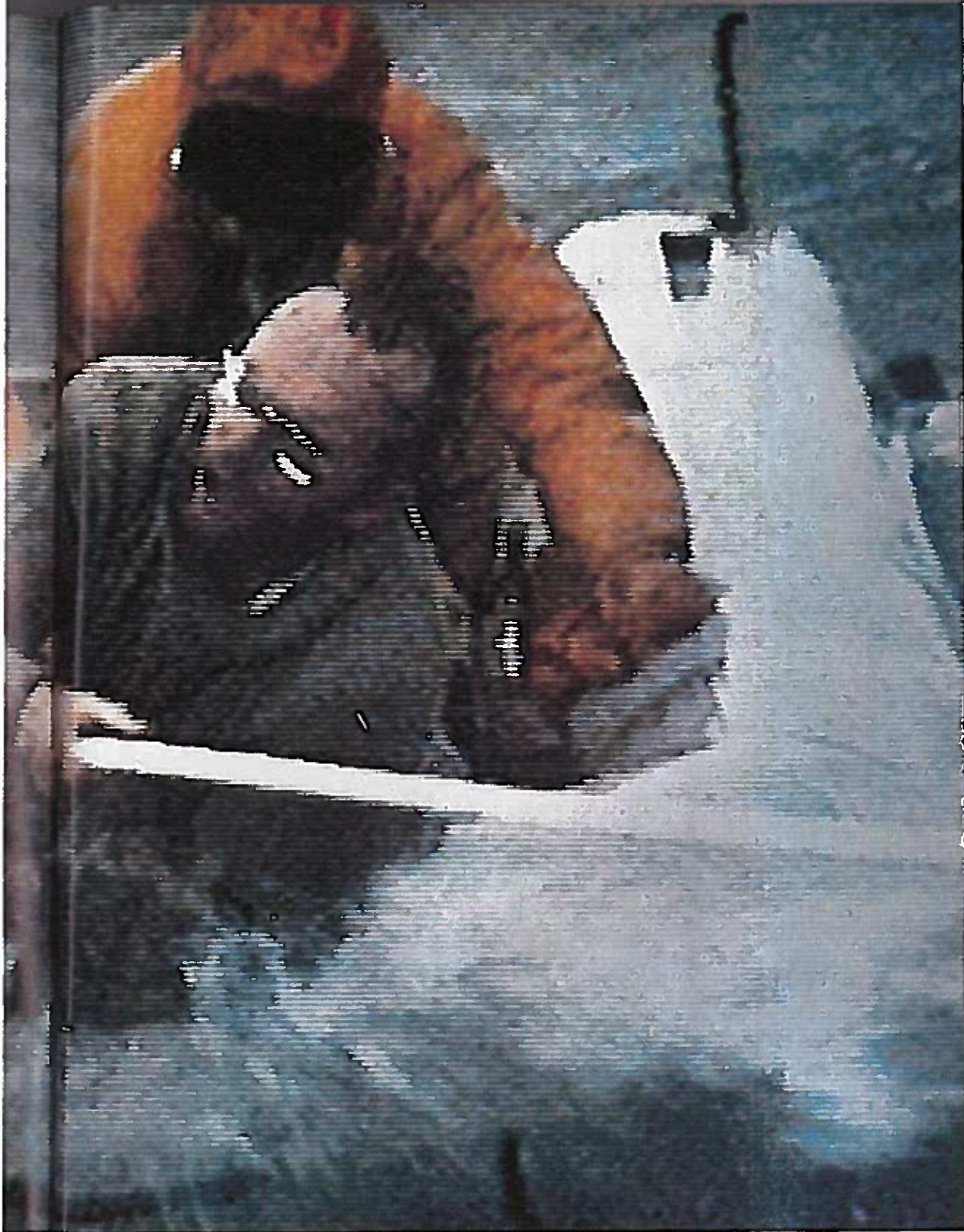
KAREN WILLIAMS

learn the relationship between krill—shrimplike crustaceans that form the main link in Antarctica's food chain—and the other marine animals that prey on them.



Racing against hypothermia, the author, left front, and Dick Heffernan haul in the rubber dinghy they used to rescue Harry Keys, left rear, his wife, Karen Williams, helpless on the floor, and Margaret Huenerbein, right rear, after heavy

National Geographic, April 1983

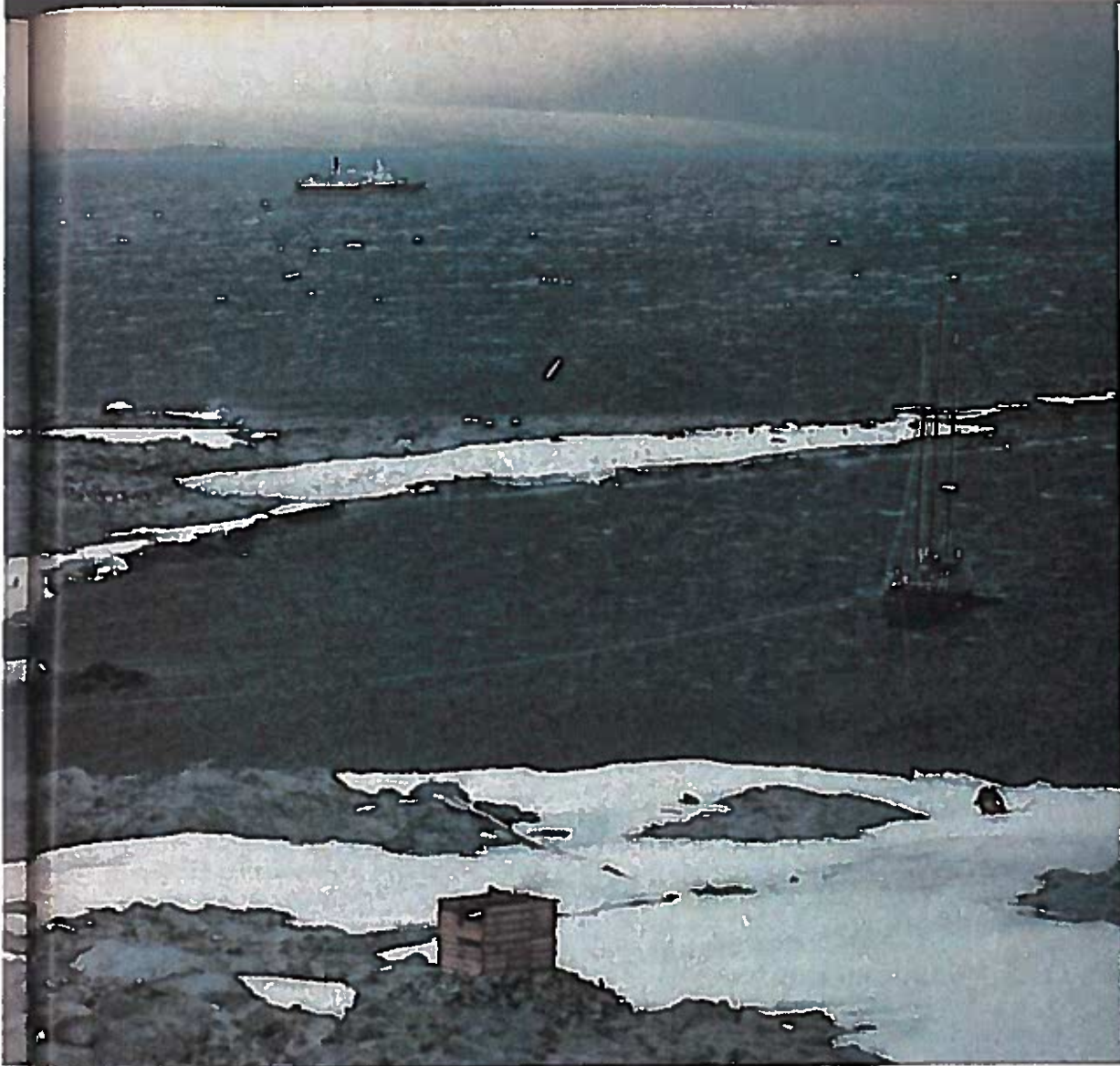


MALCOLM HAMILTON

waves swamped their catamaran. Its fourth passenger, Jeni Bassett, clad in a flotation suit, reached the Explorer herself. A video camera preserved the moment. "It took about three months for my fingers to come back," says Lewis.



Whipped to a frenzy by a phenomenon called katabatic winds, roaring down from the Antarctic Plateau, Commonwealth Bay feels gusts of 80 miles an hour, keeping the cruise ship Lindblad Explorer offshore (above). The Dick Smith Explorer rides mooring lines from shore near the battered hut that Mawson's party built in 1912. On that expedition, his second to the Antarctic, he saw two companions die



PAUL ENSOR (ABOVE); FRANK HURLEY (FACING PAGE), FROM THE MAWSON EXPEDITION; BARBARA MUYTICH, SYDNEY SUN-HERALD

and had to endure two winters before rescuers arrived. During Mawson's ordeal, colleagues brave a blizzard outside the hut to gather ice for water (facing page). Vividly he described "A plunge into the writhing storm-whirl . . . We stumble and struggle through the Stygian gloom. . . ." Tunneling into the hut through ice and snow, the Explorer crew found such memorabilia as condiments (right).



(Continued from page 548) I won: The first ice appeared almost exactly where I had predicted, at 65° South. Soon icebergs were a common sight, and the smaller they were, the greater the danger they presented for us. The larger masses of ice were easy to see and avoid, but the low-lying bergy bits, as they are called, were practically invisible in white-capped seas until we were right on top of them.

As we pushed steadily southward, the nights gradually dissolved into perpetual daylight. Though the sun dipped below the southern horizon for several hours in each circuit, there was always enough light to steer by.

Upon entering the antarctic environment, we took great pains not to contaminate it with foreign substances. For instance, we were very careful to dispose of our garbage by burning, to avoid infecting sea life with unaccustomed diseases.

On the morning of January 9 we encountered the phenomenon known as iceblink—the reflection of unseen ice fields below the horizon against an overcast sky. That night we crossed the Antarctic Circle amid choppy seas, and despite an icy spray sweeping along the deck, Margaret Huenerbein stationed herself in the bow.

MMARGARET'S DISCOMFORT paid off, for within less than two hours she sang out, "Land!" There was a scramble toward the bow, and Margaret pointed to what appeared at first to be a thin line of cloud along the southern horizon. The cloud quickly materialized into the looming slopes of the vast antarctic ice sheet, which overlies the polar continent with as much as three vertical miles of ice and which contains more than 70 percent of the earth's entire supply of fresh water.

Harry Keys is neither an emotional man nor a newcomer to Antarctica; in fact, he has spent considerably more time there than I have. Yet as *Explorer's* bow swung east by south in the direction of Cape Denison, Harry said to me quietly, "This is the happiest day of my life."

We were all delighted with our landfall. We had reached the antarctic coast dead on target, at a point just west of Cape Denison

and Commonwealth Bay, and we had done it on schedule in less than a month's voyage from Sydney.

Dropping sail and motoring eastward against a brisk headwind, we passed the gleaming ice cliffs of George V Coast, threaded our way through an offshore flotilla of towering icebergs into Commonwealth Bay, and entered a narrow arm of water at Cape Denison that Mawson had called simply the boat harbor. Here Mawson and his party had erected a small hut in which they lived and worked for nearly two years.

In preparation for anchoring, we had to chip away a three-inch-thick coating of ice on the bow gear and the main anchor. Since there were no charts of the harbor, I stationed Paul Ensor in the bow with our homemade sounding device—a length of string with a weight on one end and a knot at the seven-and-a-half-foot mark representing *Explorer's* draft.

After anchoring in the harbor, we ran several mooring lines ashore to hold the ship in place and to serve as guide ropes for our inflatable dinghy as well as a catamaran tender on trips to and from the shore. As it turned out, the lines were to prove the margin between life and death for Harry and Karen.

During the days following our arrival, the Home of the Blizzard belied its name: The skies were sunny and clear, and only light winds ruffled the surface of Commonwealth Bay. We took full advantage of our good fortune. Paul and Jeni immediately began a census of penguins and other marine life at Cape Denison and the Mackellar Islets. Karen and Margaret Huenerbein joined in the count, and the list of species began to grow—Adélie penguins, Weddell seals, elephant seals, leopard seals, skuas, Wilson's storm petrels, and snow petrels.

Harry began photographing the extent of the coastal ice and other features at a score of points where Mawson had previously taken photographs.

Dick Heffernan, Malcolm Hamilton, and Don Richards explored the cape area, assisting Harry to measure the depths and levels of ice-covered freshwater lakes in the vicinity of the coast. In addition, we established a network of safety routes among the various

scientific work sites in preparation for the inevitable return of bad weather.

WITH THE HELP of his wife, Barbara, and Malcolm, Garry Satherley tackled Mawson's hut, which lay choked with ice and drifting snow. The hut had been partially cleared four years previously by a visiting team of the Australian National Antarctic Research Expedition, known as ANARE. The team had also erected a small prefabricated hut of their own, which we used as a temporary shelter and storehouse ashore.

Garry took over where the ANARE team had left off, clearing and tunneling his way into Mawson's hut until he finally reached the explorer's bedroom and study. There Garry and Barbara found a wooden bunk with three broken slats, a still serviceable deck chair, and several mildewed volumes, including a Victorian romance entitled *The King and the Countess (Or Lovers' Trials)*, a battered copy of *The Memoirs of Sherlock Holmes*, and a book entitled *Raffles, The Amateur Cracksman*.

One item spoke eloquently of the simplicity and faith that marked an earlier, and perhaps happier, age than ours. On a shelf near Mawson's bunk Barbara found a bottle of liniment labeled Elliman's Royal Embrocation. Plainly no antarctic explorer should have left home without it, for according to the label Elliman's patent formula worked miracles "for sprains, rheumatism, sore throat, sore shoulders, backs; for capped hocks and elbows; for broken knees, lacerated and punctured wounds, bruises and overreaches; for cracked and sore heels; for simple wounds; for cats, horses, cattle, dogs, birds."

As the initial run of good weather stretched to a week, I grew increasingly uneasy. Such luck was too good to last. Mawson's journals make clear that his term Home of the Blizzard was no mere figure of speech. Time and again he referred to savage winds and plummeting temperatures that developed within minutes. At such times, as experienced antarctic hands know, the penalty for carelessness can be death.

We took all possible precautions, but they failed to prevent the disaster that befell

Harry, Karen, Margaret, and Jeni late on January 20. The weather had finally broken a day or two earlier with a gale whose winds reached a peak of 60 miles an hour before slacking off in midafternoon of the 20th. At 10 p.m., with plenty of daylight still left, Harry and the three women started ashore in the catamaran to stay at the ANARE hut.

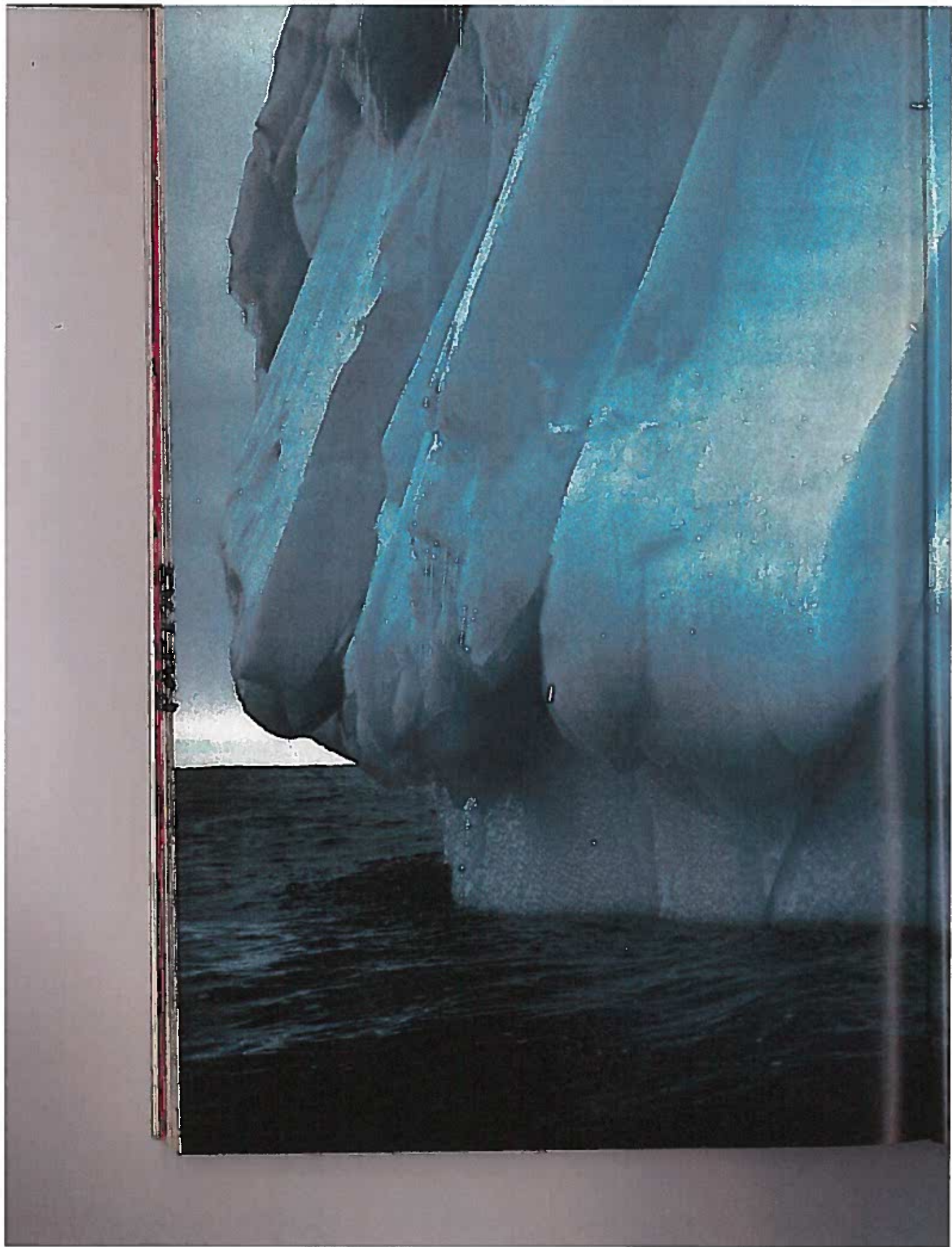
Jeni and Margaret wore their insulated flotation suits, but Harry and Karen had on only waterproof parkas over woolen clothing. As usual the catamaran was attached to one of the mooring lines with a rope and snap link. The system allowed passengers to haul themselves hand over hand along the line a distance of 50 yards between ship and shore.

When the catamaran reached the halfway point, waves whipped up by a savage gust of wind swamped it and threw all four of its occupants into the water, whose temperature was just below freezing. Buoyed by their flotation suits, Jeni and Margaret quickly popped to the surface, but Harry and Karen were barely afloat, being drenched with freezing spray.

BARBARA AND MALCOLM had been watching the catamaran from the pilot-house, and they instantly gave the alarm. With no time to don gloves or extra clothing, Dick and I jumped into the rubber dinghy and hauled ourselves toward the scene of the accident. Jeni meanwhile caught hold of the mooring line and pulled herself back to the ship, where she was lifted aboard. Dick and I hauled Margaret into the dinghy, then reached for Karen and Harry, who were on the verge of sinking from the paralyzing cold and the weight of their sodden clothing.

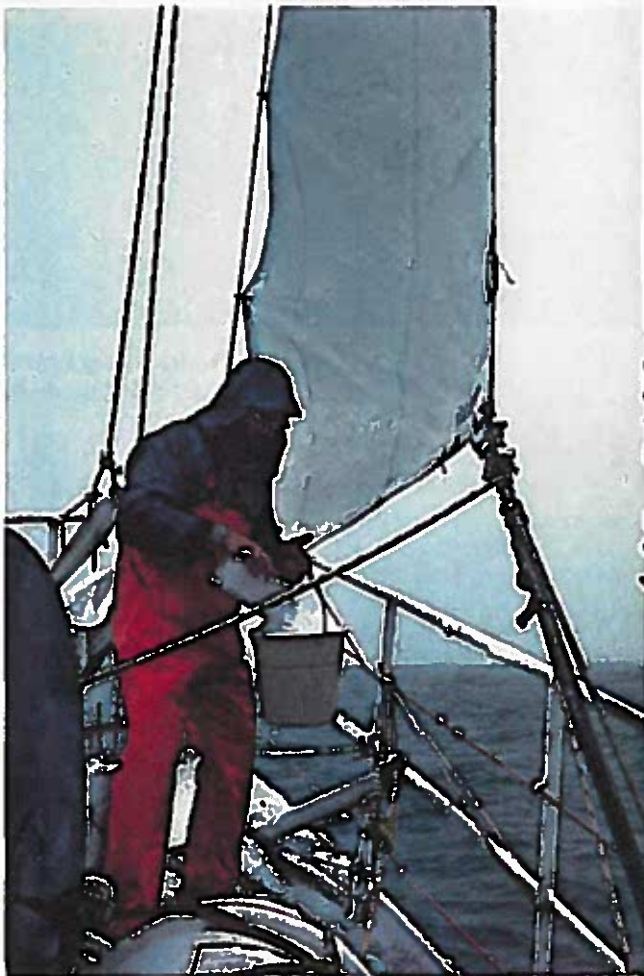
Dick and I grabbed them and pulled them into the dinghy, though by then Karen was a helpless deadweight. Somehow we hauled the overloaded dinghy back to the ship, but I have no recollection of it.

Once aboard *Explorer*, Jeni and Margaret quickly recovered, but Karen and Harry had lost dangerous amounts of body heat. They had been immersed in below-freezing water for four minutes, more than enough time for hypothermia to set in. We quickly poured hot liquids down them and took



Tow an iceberg? The idea has been proposed to bring water to desert lands. But what would happen to the ice en route? Studies by Harry Keys show that melting is only the tip of the iceberg's problem; wave action causes undercutting erosion at the waterline (left), leaving rounded fingers to shear away. A proposed remedy: Wrap a plastic skirt around a berg's windward edge.

Fresh water was also precious to Explorer, as Dick Heffernan shows by scooping up overnight snow (below).



HARRY KEYS (LEFT); BARBARA MUNVICH, SYDNEY SUN-HERALD



Ice palace turned upside down, a berg's rounded pinnacles were smoothed when underwater, before it became severely unbalanced and upended. To continue

them below to their bunks, where each was bundled into heavy blankets with a fellow crew member to supply body heat. Within hours, both had been restored to health.

ONCE THE WEATHER turned bad, it remained that way. Two days after the accident another gale swept down off the Antarctic Plateau with winds as strong as 80 miles an hour. No one could move in such weather, and for the next three days Paul was marooned ashore in the ANARE hut.

Fortunately most of our scientific observations had been made, and it was simply a matter of analyzing the results. I set January 29 as the tentative date for our departure from Cape Denison.

I planned a brief exploratory voyage eastward along the coast to the Mertz Glacier, a distance of some 100 miles. There we would reverse course, following the coast west as far as the French antarctic station

Dumont d'Urville, then turn north and head for Sydney.

By noon on the 29th the wind had eased enough for us to weigh anchor from the boat harbor. Despite Paul's expert handling of our trusty homemade sounder, we charted an unknown submerged rock with our keel as we departed Commonwealth Bay. Our spirits rose as we made sail once more and felt the familiar rhythm of ocean swells beneath us.

Like several other coastal glaciers in Antarctica, Mertz Glacier extends far out to sea in a great floating tongue of ice that rises 150 feet above the water and reaches down some 700 feet under the surface. The Mertz Glacier Tongue measures 40 miles in length by 25 miles across, giving it an area of 1,000 square miles, or roughly two-thirds the size of Long Island.

We reached the cliffs of Mertz Glacier Tongue on February 1 and followed them northward to the tip. At its seaward end the



HARRY KEYS

his studies, the author with a different crew has now returned on the Frozen Sea Expedition, with the goal of remaining through an antarctic winter.

tongue is in effect a vast iceberg factory, calving huge bergs that shed occasional avalanches of ice.

Harry was pleased, for in the lee of the great ice tongue the sea was calm enough for us to approach the bergs through fringing floes of pack ice with reasonable safety.

"But we really need," Harry told me, "a berg we can study at close range for several days, so we can measure the exact rate of melting and erosion."

I would have been happy to oblige him, but our situation was precarious. After we had spent two days in the pack, the wind swung around to the northeast, so we were no longer in the lee of the glacier tongue.

The floes began heaving and grinding together, and it was only a matter of time before we would get caught between two of them. Moreover, during the past week we had begun getting an hour or more of darkness each night, and I didn't really relish navigating blind through moving pack ice.

We turned back in the direction of Commonwealth Bay, but the voyage to the glacier tongue had been well worth it. Paul and Jeni were particularly pleased, for in the course of a few days they had observed, in addition to the birdlife they were censusing, a variety of marine life, including emperor penguins, a crabeater seal, and several pods of minke and killer whales.

AFTER OUR TWO MONTHS aboard *Dick Smith Explorer*, the large French research station Dumont d'Urville seemed a luxury resort. It had unbelievable things like hot showers, clean tablecloths, and superb French cuisine, the latter accompanied by wine.

With barely enough room for its own staff of 67, the station couldn't put us up, but the French kindly made their showers available and regularly invited two of us to dinner on a rotating basis. Our women crew members exchanged impressions of Antarctica with

Dumont d'Urville's lone female, a young glaciologist.

The commander of the station, Robert Guillard, had seen more polar service than all of us put together. At the age of 62 he had spent 34 consecutive seasons doing scientific research in Greenland and the Antarctic.

AT DUMONT D'URVILLE, Harry finally got his chance to study a single iceberg over a period of several days. From among dozens of bergs trapped in Dumont d'Urville's small anchorage, he chose a small, 40-by-40-yard specimen that Dick had seen roll over, exposing formerly submerged surfaces.

From that moment on Harry and the iceberg were inseparable. With several willing helpers he spent many daylight hours with the berg, measuring it, sampling it, analyzing it, and, I suspect, even talking to it. To anyone who would listen, Harry carefully explained the dynamics of wind and wave action on icebergs and how one might minimize their effects.

During the next eight days the team monitored the development of horizontal grooves at the berg's water line. These grooves were formed faster on the upwind side of the berg than on more sheltered sides, and caused undercutting, leading to fracturing and collapse of the overhanging ice. Melting and subsequent collapse on the lee side were slower because there the wave action was virtually nonexistent.

At the end of our study, Harry and Dick, armed with crampons and ice-climbing gear, reached the berg's peak and planted a penguin flag. Made by Karen and Margaret, it bore the words *Merci Beaucoup, Dumont d'Urville*. The next day we headed north.

Antarctica struck a final blow at us on the way home. Ten days out of Dumont d'Urville we encountered a storm with winds up to 60 miles an hour and waves nearly 30 feet high. *Explorer* took a beating along with the crew, but both performed superbly and we

emerged none the worse for wear. On March 15, just three months and three days after our departure, we sailed back into Sydney with pennants flying.

All in all we felt we had achieved some useful science on the expedition. The *Dick Smith Explorer* and the small inflatables had given us the unique opportunity to make a detailed study of icebergs at close quarters. We found that the submerged portion of an iceberg, because it is so extensive, melts more slowly than the exposed part. If an average-size iceberg were to be towed to southern Australia over a two-to-three-month span, then there should still be one half left on arrival, assuming it had not split apart en route. The delivered ice could then be melted in conjunction with a power-generation scheme to yield both water and electricity at competitive prices.

Our ice-margin photographs at Cape Denison showed that there had been little change over the past 70 years. An emergence of bedrock under one ice cliff suggested that a small retreat of about six feet had occurred there, but elsewhere in the area a retreat was not evident. This would suggest that the ice sheet in this area is close to a state of equilibrium.

As for our census of penguin colonies, the real benefit will not be seen for some years. Future counts will be compared with our baseline census to give an indication of population trends as they respond to changes in the marine environment.

UNBETWEEN TO THE CREW, I conducted my own private study involving 11 people of widely varying character, age, background, and experience. I observed the subjects over a period of three months under conditions of overcrowding, stress, danger, and continual discomfort. I have analyzed the data from that study and reached a conclusion:

Australians and New Zealanders are bloody fine people. □

SIX-MONTH INDEX AVAILABLE

As one of the benefits of membership in the National Geographic Society, an index for each six-month volume will be sent free to members, upon request. The index to Volume 162 (July-December 1982) is now ready.