The Antarctic Sun

Published during the austral summer at McMurdo Station, Antarctica, for the United States Antarctic Program

December 5, 2004

‘Sir Ed’ pops over the hill for a visit

By Brien Barnett
Sun staff

The man dressed in mountaineering clothing carried his ice axe up to the rocky hillside, then bent over and said, “Excuse me while I cut a few steps here.”

The 84-year-old Kiwi who used the climbing tool to draw laughs earlier this week at Scott Base was none other than the man for whom the highest steps in the world are named: Sir Edmund Hillary.

Hillary and Sherpa Tenzing Norgay, his partner in the 1953 epic climb, will forever be etched in the annals of mountaineering as the first to reach the summit of Mount Everest, the world’s highest peak at 8,847m. Hillary encountered and climbed a difficult rock face just 30 meters below the summit. That cliff is now called the Hillary Step.

Much lower and farther south is a place called the Hillary Coast. The area on the west margin of the Ross Ice Shelf was named in his honor in 1961, three years after he lead the successful 1,900km traverse from Scott Base to the South Pole. With the dedication of the Hillary Field Center at Scott Base his name will be synonymous with the future exploration of Antarctica.

The Hillary Field Center is an important next step for Antarctica New Zealand, which oversees Scott Base, just “over the hill” from McMurdo Station. The board of Antarctica New Zealand and

See Hillary on page 9

“South Pole, South Pole, can you hear me?”

Photo by Brien Barnett / *The Antarctic Sun*

Sir Edmund Hillary places a high-frequency radio call to South Pole Station from MacOps, the communications center at McMurdo Station. During the call Hillary talked about his tour of McMurdo Station with South Pole operator Tracy Sheeley, and gave well-wishes to those living and working in what he called “the far beyond” in the unplanned call arranged by MacOps staff. Hillary was the leader of a team that was the first to reach the pole by vehicle to the Pole in 1958.

INSIDE

DON’T RUN OUT OF TIME!

The Antarctic Sun **Photo and writing contest entry deadline is Dec. 12.**
E-mail your entries to antsun.mcmurdo@usap.gov
(for more information see www.polar.org/antsun)

Jelly-like salps fill the sea menu

Nearly transparent animals plentiful, but a meager meal

By Kristan Hutchison
Sun staff

If krill are the meat of the Southern Ocean menu, then salps are the Jell-O salad — plentiful but with little substance.

“Salps are sort of the flip side of the krill foodweb and they haven’t been studied very much,” said biological oceanographer Pat Kremer, who, with Larry Madin, is currently aboard the research vessel *Laurence M. Gould* for five weeks for the first study aimed specifically at Southern Ocean salps.

Much more is known about krill, because the shrimp-like zooplankton have been the focus of many studies, including the Long Term Ecological Research project out of Palmer Station. Krill seem to be in decline because of warming trends along the Antarctic Peninsula and a decrease in the winter ice cover, Kremer said.

With the drop in krill, Kremer suspects salps may be filling the gap, as well as the guts, of many hungry Antarctic animals.

“It leaves the door open for salps to do well,” said Kremer.

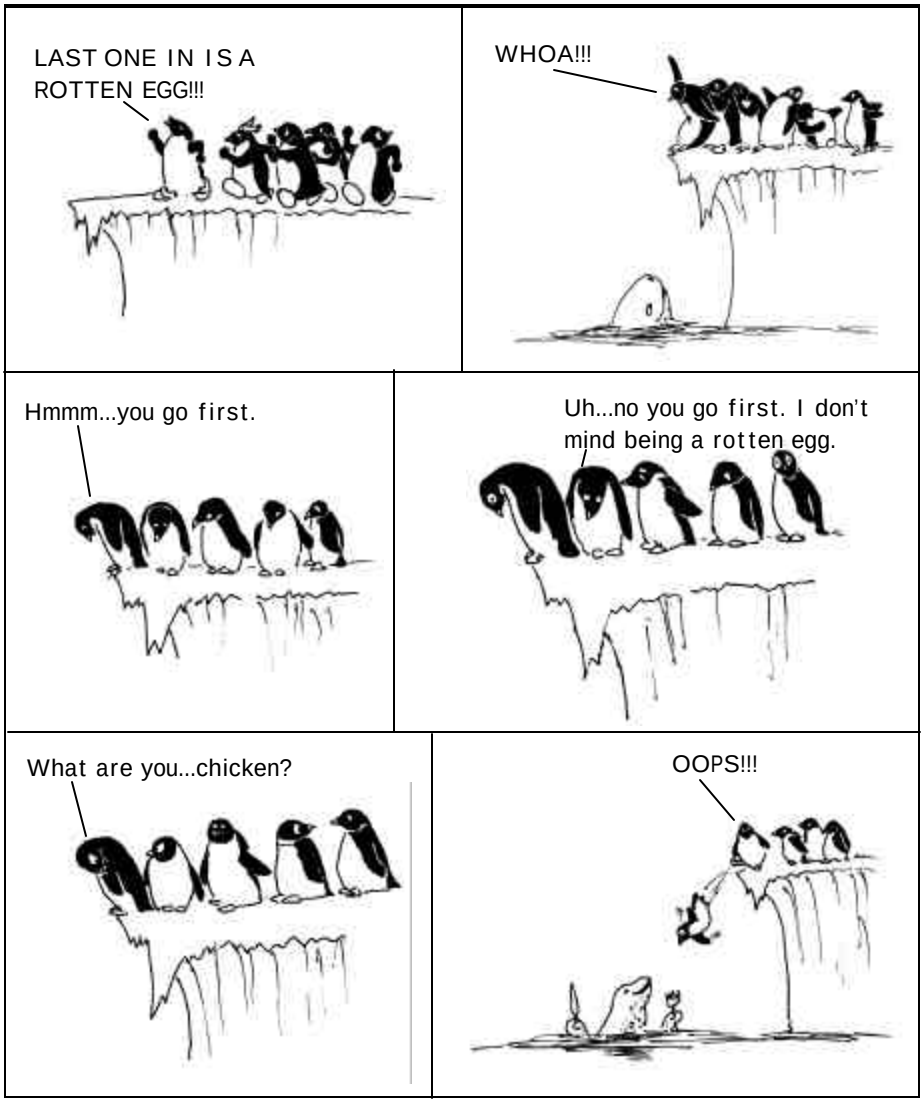
Filling up on salps could leave birds undernourished though, like a diet of melons.

“Would you like steak or boiled onion? Salps, for their size, have relatively little nutrition,” Kremer said.

It’s difficult to tell how many salps may be eaten by penguin and albatross, because there’s not much to the jelly-like animals. Their semi-transparent, barrel-shaped bodies

See Salps on page 8

Ross Island Chronicles By Chico



Cold, hard facts

Gondwanaland

What it was: **A mass of land largely in the southern hemisphere**

Continents and areas it broke into: **Australia, New Zealand, Africa, South America, India, Antarctica**

Formed: **About 200 million years ago**

What it was before that: **Part of Pangea, the super-continent**

South Pole then: **In what is now Africa**

South Pole now: **In Antarctica**

Broke into continents: **About 190 million years ago**

Drake Passage opened: **About 70 million years ago**

Antarctica settled at present position: **About 40 million years ago**

Plate movement: **Average 19mm a year**

Sources: Handy Science answer book, Lonely Planet Antarctica, Webster's New World Dictionary of Science.

The Antarctic Sun is funded by the National Science Foundation as part of the United States Antarctic Program (OPP-000373). Its primary audience is U.S. Antarctic Program participants, their families, and their friends. NSF reviews and approves material before publication, but opinions and conclusions expressed in *The Sun* are not necessarily those of the Foundation.

Use: Reproduction and distribution are encouraged with acknowledgment of source and author.

Senior Editor: Kristan Hutchison

Editors: Brien Barnett, Emily Stone

Copy Editors: Hunter Slaton, Amanda Barnett

Publisher: Valerie Carroll, Communications manager, RPSC

Contributions are welcome. Contact *The Sun* at AntSun@usap.gov. In McMurdo, visit our office in Building 155 or dial 2407.

Web address: www.polar.org/antsun

It's a harsh cartoon — Matt Davidson

Dry Valleys better protected under new guidelines

By Emily Stone
Sun staff

A 15,000-square-kilometer swath of the McMurdo Dry Valleys, already an area with strict environmental guidelines, will be better protected after it recently became an Antarctic Specially Managed Area.

The Dry Valleys were one of two areas on the continent approved for ASMA status by the Antarctic Treaty members in June. The U.S. and New Zealand Antarctic programs jointly submitted the proposal. The other area granted ASMA status in 2004 is an Australian historic site at Cape Denison.

The status creates guidelines for both scientific and tourist activity in the area. Many of the rules codify existing practices, and some scientists in the field may feel little effect on their day-to-day operations. However, the ASMA designation will coordinate the various environmental practices that were already in place, and increase the level of protection for the entire area.

"It's the holistic approach to management," explained Polly Penhale, environmental officer for the National Science Foundation. Penhale noted that a Management Coordination Group will be formed this year by countries conducting research in the Dry Valleys. The group will coordinate activities in the area and facilitate the exchange of information among scientists working there.

The Dry Valleys are the largest relatively ice-free area in Antarctica, with about 30 percent of the ground free of ice and snow. The area is of great value for studying climate change, and contains unusual biological communities and geological features.

Robert Falcon Scott and his men first discovered the Dry Valleys. The area remains an important scientific site, and has been home to a Long Term Ecological Research project (LTER) since 1993.

Robert Wharton, the first principle investigator for the LTER and former executive officer in the NSF's Office of Polar Programs, said the designation is a model for managing the impact of scientific research conducted in large, fragile areas. It's particularly important to have such a plan for the Dry Valleys, he said.

"The Dry Valleys are very sensitive to damage," said Wharton, now the chief research officer at Idaho State University. "When you walk up and down the Dry Valleys you leave footprints that you see five and 10 years later."

Berry Lyons, with Ohio State University's Byrd Polar Research Center, is the current principle investigator on the Dry Valleys LTER project, and has worked in there for much of the last 20 years. He said that the number of people in the area has increased during that time, but so has their level of environmental consciousness.

Photo by Kristan Hutchison / *The Antarctic Sun*

Members of a science team working near Lake Fryxell in the Dry Valleys return to a helicopter after collecting samples. The Dry Valleys are an area of great scientific interest because of the area's unique biological communities and geological features.

"I think the people who work out there, more than perhaps most, recognize how unique scientifically it is and how fragile it is environmentally," he said.

An advantage of the new designation, Lyons said, is that it stresses how important the whole area is to many different scientific disciplines, and coordinates their activities there.

"Before people kind of dealt with smaller units of landscape," he said. "And now we're looking at the Valleys as one united, interconnected piece and I think that's going to lead to better stewardship."

The ASMA management plan establishes three types of zones within the Dry Valleys: facilities zones, special features and tourism zones. These are in addition to four existing Antarctic Specially Protected Areas in the Dry Valleys.

The facilities zones are areas with semi-permanent human activity. The goal is to minimize the footprint of facilities and materials within the zones. The zones must incorporate plans for the use of alternative energy and waste management, and will be periodically assessed. These include the camps at lakes Bonney, Fryxell and Hoare. The Management Coordination Group will evaluate the creation of additional facilities zones if the need arises.

Special features zones are areas of high scientific value, which are particularly sensitive to human activity. There will be minimal sampling and research inside the nine designated special features, and helicopters must land at least 50m away from them. These include Don Juan Pond and Explorers Cave.

The tourism zone is located in the Taylor Valley near the Canada Glacier. Tours must be restricted to small, guided groups that use designated paths and campsites, and avoid streams and ponds whenever possible. About 200 tourists a year visit the area, roughly half of them American, according to Rebecca Roper-Gee, Environmental Advisor to Antarctica New Zealand.

Each country decides its own penalties for breaking any of these rules, which fall under the Antarctic Conservation Act. In the U.S. the penalty is up to a year in prison and an $11,000 fine. In New Zealand it's up to six months in prison and a $100,000 NZ fine.

Both the U.S. and New Zealand will rely heavily on education, and not enforcement, in making sure the rules are followed, Penhale and Roper-Gee said.

"Most people down here want to do the right thing," Penhale said. She explained that scientists and support staff working in the Dry Valleys take special precautions to avoid altering the fragile environment, including separating and removing all waste and graywater from the area and using secondary containment devices for all fuel and chemical transfers.

The U.S. is also starting to collect GPS data from each place where scientists are working in the Dry Valleys. This information will be consolidated in a central database to see if any sites are being overused, or if one science team's research might be affecting another's.

Perspectives

Little hut on the big glacier

By Scott Freeman

It sounds like a bizarre new twist in the reality TV genre: put two guys in a 2m by 3.5m shack, at 1,600m elevation on a cold, windy glacier in Antarctica and see who breaks first. Think Laura Ingalls Wilder meets "Survivor."

That's life on Odell Glacier, 160km north-northwest of McMurdo Station, where my field partner and I tend an emergency ice runway on the flight path from Christchurch to McMurdo. But even in Antarctica, real life is less dramatic than reality TV.

I'd been told, and had been telling people, that I have the least demanding job on the continent. All we have to do is put in a blue ice runway, keep it free of snow using a small tractor with snow-blower and tiller attachments, and call in weather three times a day. In one of the drier parts of the driest continent, how hard can that be? I now know the answer to the first part of that one: pretty dang challenging.

Problem number One: we can't make the Alp One Ski-doo run. Can't say that I blame the snowmobile. After all, it's 25 years old and –25 C. There's one just like it in the Christchurch museum. So, for starters, you have the 2.5km commute to the runway every day, on heavily sun-cupped blue ice. I experimented with various ways to stick to the ice: crampons, stable-icers (a studded strap-on rubber sole), and sheet metal screws in the soles of my boots. The crampons broke the second day, and the stable-icers and sheet metal screws weren't sufficient for the steep hill to the lower glacier. I finally settled on a slightly longer overland route that avoided the ice hill.

Over four days I packed down a tent, stove, food, and fuel for an emergency shelter; a cordless drill, screws, and flags to mark the runway; and a gas powered drill and bit for putting in the bamboo marker poles. Add to this food and water, as well as the extra clothes that I carried back and forth every day, and suddenly it's a pretty hefty pack. That's just to get to work. Next start man-hauling bamboo poles, both drills, and markers down the 2km-long runway to replace markers that were destroyed over the winter. This is Antarctica in the finest British tradition.

Photos by Scott Freeman / Special to *The Antarctic Sun*

Scott Freeman and Kevin Killilea with the Kubota tractor at Odell Glacier, where they groom an emergency runway. At upper right, the one-room shack they share. Lower right, an intricate painting decorates the hub of the tractor.

Eventually, with the help of a yellow 1940s-style heater called a Herman Nelson and a little isopropyl alcohol in the fuel, the Ski-doo was persuaded to start. The tractor proved to be even more, shall we say, intractable. Made by Kubota, but dubbed the Kubuda by someone with a paintbrush and some creativity, the red tractor is a Tonka-toy version of a Caterpillar tractor. Its 36-horsepower engine barely matches the 1959 Volkswagen Bug I used to drive.

First we encountered several coolant leaks, including one at a stripped manifold bolt. This required parts and tools that had to come out with a mechanic (thanks Brady) on a future supply flight. Since then we've had more coolant leaks and a hydraulic leak, broken a half dozen welds and two cotter pins on the snow blower chute, and sheared a bolt on the power take-off universal joint. Using parts robbed from wherever we could find them we've managed to cobble the tractor back into life.

As for clearing snow from the runway, this has proven to be a fairly difficult task. First, there is a lot of it, in the form of drifts as much as a meter high. Second, the snow is rock-hard after a winter of wind and cold. The routine is to drive the tractor over the drift, break up the surface snow with the tiller, then remove this top layer with the snow blower. Repeat this procedure once, twice, half a dozen times until you are down to the ice. Just be sure not to get stuck or tip over. Seventy-four tractor hours later and the runway is good enough to call it done. Good enough that our third Sunday in camp will actually be a day off.

I see many more Kubuda hours in my future, touching things up on the runway. Then there is a long list of camp chores that we've been putting off while we've been working on the runway. So we will definitely be busy for the foreseeable future. But then I didn't come to Antarctica to lead the easy life. I came for the challenges. I wouldn't have it any other way.

around the continent

SOUTH POLE

Dinner, music and the origins of the universe

By Katie Hess
South Pole correspondent

Everyone at the South Pole Station pitched in to help with preparations for South Pole's Thanksgiving dinner. Polies signed up to peel potatoes, make pies, decorate the dining hall, set tables and cleanup. The kitchen staff put in a bunch of extra work as well. The meal, enjoyed by the entire station, was served in three back-to-back shifts, using nearly every seat in the new dining hall.

Earlier Thanksgiving weekend, the South Pole rock band Squeaky Meat rocked the Summer Camp lounge. Band members include Tom Woods on vocals and guitar, Dave Benson on guitar, Mark Eisinger on bass, Christian Gils with percussion and Catherine Graciano and Katie Hess serving up back-up vocals. The band is scheduled to give a second performance in a few weeks.

A "command performance" of films from last year's First Annual South Pole Film Fest was well attended on Sunday afternoon. Would-be moviemakers of the 2004-2005 season are already fired-up for the 2005 festival, which will be held in mid-January.

"It was great. It was awesome. It was better than I ever expected," filmmaker and chief festival organizer Brian Land said, referring to the original event in January 2004.

Other filmmakers included Tom Piwarwoski, Mike Boyce, Tyler Regan, Holly Carlson, Dave Carlson, Joe Speidel, Keros Johnson and Jack Giacalone.

The past week's South Pole summer Sunday science lecture, titled "Very Long Period and Other Seismic Signals from an Open Conduit Strombolian Volcano (or, What's Shaking on Mount Erebus)" was presented by Rick Aster. He and Rhett Butler visited South Pole Station this week to work on the South Pole Remote Earth Sciences and Seismology Observatory project (SPRESSO). Aster's presentation described their instrumentation and research

Art by Ken Keenan

on Mount Erebus that reveals unique characteristics of this Antarctic volcano.

Out in the Dark Sector portion of the station, the telescope formerly known as DASI (Degree Angular Scale Interferomteter) is taking on a new look as QUEST (Q and U Extra-galactic Submillimeter Telescope) moves in — clearly competing for muscle with BICEP (Background Imaging of Cosmic Extragalactic Polarization) to determine polarization in the cosmic microwave background. It was an exciting week for QUAD (QUest At DASI) researchers who were installing their new 135kg dewar (a tank holding liquid elements such as helium or nitrogen used to cool things) under the new set of lenses that will look back in time toward the beginning of the universe.

PALMER

For the birds: penguin, skua and turkey

By Kerry Kells
Palmer correspondent

Preparations for Thanksgiving began with a community pie-baking, followed by our traditional community dinner and two full days of rest. On Wednesday, visiting artist and writer Jude Nutter gave a poetry

Photo by Robert Schwarz / Special to *The Antarctic Sun*

Above, Christian Reichardt, Mountain Miller, Roselie Rasmussen, Rebecca Comley and Dennis Barkat peel beets, carrots and apples for Thanksgiving dinner at the South Pole. Left, a poster for the Thanksgiving performance by the South Pole band.

reading. She asked the group to write a poem to be voluntarily read at a gathering next week.

Strong winds opened up the sea ice and the scientists were able to take the Zodiac boats out to two of the sampling sites for the first time this year. The researchers have been busy in the field when the ice conditions allow.

The seabird researchers under Bill Fraser on station now are Brett Pickering, in his fourth year with Fraser's project, Dan Evans in his second year and Peter Horne in his first year, with two previous seasons in a different Long Term Ecological Research project. Throughout the season, they will study seabird species, including giant petrels, blue-eyed shags (cormorants), south polar skuas, brown skuas and kelp gulls, with a strong research focus on Adelie, gentoo and chinstrap penguins. On Tuesday morning Kelsi Giswold, a first-year carpenter's helper, and I were the lucky ones chosen to assist the "birders," as they are known, for the day. Throughout the season, everyone will get a chance to help the birders at some of the islands with their research.

Our first stop was at the southern island of Cormorant where we assisted Pickering in measuring snow depth along different transects of the island as Evans and Horne

See Palmer on page 6

the week in weather

McMurdo Station
High: 33F / 01C
Low: 14F / -10C
Max. sustained wind: 38 mph / 61kph
Windchill: -15F / -26C

Palmer Station
High temperature: 44F / 7C
Low temperature: 24F / -5C
Max sustained wind: 30mph / 48kph
Precipitation: 11mm

South Pole Station
High: -11F / -24C
Low: -33F / -36C
Peak wind: 26mph / 42kph
Max. Physio-altitude: 3,117m

Palmer From page 5

counted the cormorants and Adelie penguins. Our next stop was at Christine Island, just a few minutes' Zodiac ride from Cormorant Island. Here we measured snow depth at different points around the island. Evans and Horne counted the Adelie penguin populations at indicator colonies (colonies or sites where long-term data has been collected). The birders visit Cormorant and Christine islands every five days.

Every two days the birders visit Torgersen Island, closest to the station, and Humble Island, a few minutes to the north of the station. At these islands they again track the nests in indicator colonies. Certain nests are tracked in some colonies and within these nests they count the number of eggs present. At this time, the males were alone on the nests, as most females had left to feed. If a couple was still present at the nest site, the most likely explanation was that the female had not yet laid her second egg, so had not left yet to feed. The chicks that hatch from these islands will be weighed and measured as they fledge in the fall.

Torgersen Island, the last one we visited that day, is unique as it has a control side (where visitors are not allowed to go) separated from a human side (open to visitors). The bulk of human impact is on Torgersen, as more than a thousand tourists visit the island each year. Penguin populations have been studied there for many years. The birders counted the number of birds in each colony on the island and tracked certain nests within those colonies. Most of the penguins on the nests were males with a few remaining couples. If the male was the only penguin present, the birders checked to see if he had two eggs. If a nest had only one egg, a skua had likely stolen the other one. The researchers also counted the number of freshly eaten eggs, which lay scattered about on the snow and rocks.

After counting the birds, we returned to a couple of colonies to measure and weigh 50 penguins and their eggs. From these colonies, Evans or Horne measured the beak length and depth, and the weight of the male penguin. Pickering measured the length, width and weight of each egg from the penguin's nest. The penguin would then be released to return to its nest. The average penguin weight is somewhere around 3.5kg. The eggs weighed around 100 grams.

Photo by Kelsi Giswold / Special to *The Antarctic Sun*

Cormorants on an island near Palmer Station.

The field team of birders will continue throughout the summer season to make trips to the Adelie penguin colonies scattered around Palmer. Long-term studies indicate that local Adelie penguin populations are declining. They will continue to study how local ecosystems, climate changes and humans affect Adelie penguin numbers. During the month of January, Pickering and Horne will leave on the Long Term Ecological cruise and study the Adelie populations on a grid all the way to Avian Island, almost 400km south from Palmer Station.

SHIPS

NBP turns north

Compiled from reports by Karl Newyear

After reaching the southernmost point of the cruise 75.24 south on Nov. 26, the *Nathaniel B. Palmer* slowly returned north.

The researchers continued to sample seawater, observing traces of water melted from the ice shelf in it, as cold as –1.99C

The weather was moderate. On one afternoon several orca whales appeared near the ship and the researchers attempted to approach them in a Zodiac for photographs, under a permit held by researcher Deb Thiele. However, the whales moved quicker than the boat and were gone without allowing any approaches.

On Nov. 30 the researchers took their 142nd and final measurement of conductivity, temperature and depth, then packed up their instruments and secured their labs for the open water transit. Other samples and measurements are being done as the *NBP* steams generally northward toward Lyttelton, NZ.

Amy West presented a slide show on her travels around the world, from Gabon to the Arctic.

Gould samples plankton

Compiled from reports by Skip Owen

The *Laurence M. Gould* departed Punta Arenas Nov. 23 and began science shortly after, collecting plankton samples off the coast of Argentina for a study of the genetics of marine invertebrates. Led by Kenneth Halanych from Auburn University in Alabama, the researchers are trying to discover if there is a breaking point in the genetics of the invertebrates as they sample them from Argentina down to the Antarctic Peninsula.

Some water sampling had to be skipped because of high winds, with gusts up to 50 knots. However, a number of other techniques were used to collect water and marine life, and the work of sorting the variety of fauna found kept everyone busy.

"The winds have been up and down, and we have been working operations around them somewhat," wrote marine projects coordinator Skip Owen.

The winds turned moderate, with sunny conditions on Nov. 28, and scientists had a productive day of diving and sample-collecting. On Nov. 30 the *Gould* headed for the Elephant Island area of the peninsula, where the scientific focus switched to salp research *(See story on page 1)*.

Continental Drift | What is your favorite item of cold weather gear?

"Balaclava. I'd never heard of it and didn't know what it was."

Christina Hammock
South Pole research associate from Annapolis, Md.
first season

"The insulated Carhartt bibs. They are two sizes too big but comfy."

Tonya Edwards
Palmer Station carpenter's helper from Atlanta, Ga
first season

"Bunny boots, because they're so cool, they're hot."

Heidi Hausman
McMurdo general assistant from Falls Church, Va.
first season

Big focus on miniscule life forms

By Kristan Hutchison
Sun staff

The microscopic outweigh and outnumber the rest of us.

Now researchers studying microbes in the McMurdo Dry Valleys have officially joined a network of projects studying this "silent majority."

The Dry Valleys microbial research project received a five-year grant starting in June 2003 from the Microbial Observatories and Microbial Interactions and Processes program under the National Science Foundation, a program separate from the Office of Polar Programs that funds most Antarctic research. The microbial program supports integrative studies that explore novel microorganisms, their interactions and aspects of their physiology, biochemistry and genomics in relationship to the role they carry out in the environment.

"What makes Antarctica particularly attractive is that we have a lot of unexplored territory with very unusual physical and chemical parameters for novel habitats," said Matt Kane, program director for the NSF Division of Molecular and Cellular Biosciences. He noted that the McMurdo Dry Valley Lakes Microbial Observatory offers fascinating science, a long history of research already conducted at the site, a diverse research team and the application of new tools. The Dry Valleys have already been a Long Term Ecological Research project for more than a decade.

Microbes are the oldest and most abundant form of life on the planet. They purify the air and water and regenerate the soil.

"Ultimately, we live on a microbial planet," Kane said. "It is activities mediated by these life forms that drive the atmospheric and biogeochemical and other elemental cycles of the planet."

New evidence indicates that the mass of prokaryotes living in the subsurface of the planet may outweigh all other life on the surface, Kane said. A similar comparison could be drawn in Antarctica, where carbon-based microbes have been found living in the ice sheet itself.

"There's as much carbon in the Antarctic ice sheet as there is in all the world's fresh water," said John Priscu, a microbiologist and limnologist from Montana State University who's worked in the Dry Valleys since the 1980s and is the lead of the observatory project. Priscu will work with three other principal investigators, Brian Lanoil from the University of California-Riverside, Mike Madigan from Southern Illinois University and Steve Giovannoni from Oregon State University.

Photo by Kristan Hutchison / *The Antarctic Sun*

A helicopter lands at a research camp on the edge of Lake Bonney.

About a third of the sites funded by the microbial observatory program are in extreme environments. So little is known about the microbial world that new bacteria might be discovered in any backyard puddle, but the ones living in extreme environments have more to teach us, Kane said.

"NSF wants to maximize the impact of the exploration and discovery that it funds," Kane said. "By looking at the breadth of conditions under which life can live, we feel we have a much greater chance of identifying the most interesting and new forms of life that are most likely to revolutionize our view of the biological world."

With an average mean annual temperature of –26.7C and usually only about six days a year above freezing, the Dry Valleys qualify as one of the most extreme climates.

"It really is a desert," Priscu said. "I've left a baloney sandwich out and I've found it the next year and could still eat it. There's not much going on out there."

While there's little visible life at the surface, the lakes house entire microbial ecosystems. In fact, the water within them is so still that different depths in Lake Fryxell contain completely different chemical profiles and corresponding types of organisms.

"We've got multiple different communities within that lake," said Lanoil. "I think it's due to stratification."

For the next five years the Dry Valleys microbial observatory will focus on four different depths of Lake Fryxell and the two lobes of Lake Bonney.

Water at the bottom of the east lobe of Lake Bonney is about –1C and heavily laden with salt crystals. The west lobe of Lake Bonney has a beachy smell from world-record levels of dimethylsulfide in its water. At the same time, all of Lake Bonney is very deficient in phosphorous. One question the researchers have is whether some of the differences in the water chemistry are caused by the kinds of microbes living at that level or whether the kinds of microbes resulted from the chemicals within the lakes.

Beyond that, the researchers expect to identify some completely new microbes. The possibility of finding sources of new and beneficial pharmaceuticals and biotechnological products is one of the reasons for microbial research, Kane said.

Priscu's group already discovered some microbes of interest to biochemical companies, including a prokaryote from Lake Fryxell that produces a substance to inhibit ice and an algae that produces chlorophyll in the dark.

The Microbial Observatory program started five years ago to meet the pent-up demand of scientists, Kane said. Though the NSF has more than 50 programs across several different directorates that in some way fund microbial research, this was the first to focus on environmental microbe biology and microbial diversity. In the inaugural year, nearly 50 proposals were submitted. Since then the program has handed out $24 million to cover about 40 different sites, ranging from Yellowstone National Park to Costa Rica to the Kamchatka Peninsula. This year, scientists submitted 195 proposals.

"It's very rare that you see an area of emphasis grow four-fold in that kind of timeframe," Kane said. "That's a direct indication that this program was community driven."

The collaboration between the two NSF programs benefits both, said Polly Penhale, the NSF Office of Polar Programs science representative at McMurdo Station when Kane visited.

"It helps us understand the polar regions and helps them in their study of new microbes and new processes, so it's a good partnership," Penhale said.

Eventually another microbial observatory may be established in the Arctic as well, another area overseen by the Office of Polar Programs, Penhale said.

Kane visited McMurdo Station for a week in November, including a two-day site visit to the Dry Valleys. He was impressed by the facilities there, and at the Crary Lab.

"Really, I know of no other place where that kind of support is available," Kane said. "Crary Lab itself is about five times bigger than I expected it to be."

NSF-funded research in this story:
Dry Valley Lakes Microbial Observatory, http://mcm-dvlakesmo.montana.edu/

Salps From page 1

are mostly water, with about as much substance left after digestion as a spoonful of Jell-O.

"The problem with something that's gelatinous is that it doesn't have this nice hard body that appears in the gut, so there may have been more salps consumed by birds, fish and mammals than we realize," Kremer said.

The *Gould* will cross to either the northwest Weddell Sea or to the Bransfield Straits, depending on sea conditions. Six divers from the Kremer and Madin team will descend into the –1C degree waters, carrying quart-size plastic jars. Clipped into a central vertical line with 30-foot tethers, the divers will spread out to herd salps into their jars.

"This technique, called bluewater diving, is something we have used for over 30 years to collect gelatinous plankton" said Madin. "But we've almost always done it in temperate or tropical waters, and the Antarctic adds a whole new dimension to the diving."

The manner of collection is important so that the salps arrive on deck whole and unstressed. Not a fan of cold water, Kremer will stay above deck, measuring the salps' rate of respiration, defecation, fertilization, growth and feeding in the ship's lab.

"You do the experiments right away so the animals are in great shape," Kremer said.

The group will be able to compare the rates of Salpa thompsoni found in the southern Ocean with Salpa aspera, a closely related species Kremer and Madin have worked with in the North Atlantic. They expect the southern species will have lower rates, but not much lower, as they are adapted to both low temperature and a short season of abundant particulate food.

Determining the rate at which salps are born, feed, defecate, reproduce and die will help researchers understand how they fit in the ecosystem of the Southern Ocean. For example, salps use mucus nets to catch phytoplankton, particles and single-celled creatures to eat.

> "They are really the little self-propelled vacuum cleaners of the sea."
>
> **- Larry Madin,**
> *biological oceanographer*

"Salps have an amazing way of feeding" Madin explained. "They form a net inside their body, like a little plankton net but made of mucus, and pump water through it to filter out all the phytoplankton and other small particles. They are really the little self-propelled vacuum cleaners of the sea."

The fecal pellets coming out the other end sink to the seafloor, enriching it. Determining how much the salps are eating and how much they eject will give Kremer and Madin an idea of how much carbon is being transferred to the bottom, and how effectively salps can compete with other grazers, like krill.

Salps also have a remarkable means of reproducing, alternating between an asexual stage that makes hundreds of baby salps at a time, and a sexual stage that produces a single baby.

"It gives them the best of both," Madin said. "Rapid population growth and sexual recombination to keep the gene pool under control."

The first dives off the tip of Tierra del Fuego turned up another salp species, allowing the team to practice all their methods and get new data in the process.

"This species is also poorly known, and finding it was a great way to start our trip" said Madin.

Other finds by the divers included big comb jellies and an unusual swimming snail.

Although weather crossing the Drake Passage was unusually calm, seas were rough by the time the *Gould* reached the first station near Elephant Island.

"We're standing by to dive," said Madin, "and hoping things calm down soon."

In the meantime, the team has worked with salps brought up in nets, gathering new information about their diet and reproductive capability. Salpa thompsoni seems able to produce far more offspring than more temperate species, perhaps allowing it to exploit phytoplankton blooms rapidly.

They won't find all the answers on the first trip though. The cruise is the first of two for the project. Madin and Kremer will return in February 2006, when they expect an even larger abundance of salps.

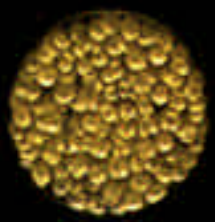
NSF-funded research in this story:
Pat Kremer, University of Connecticut,
http://www.marinesciences.uconn.edu/faculty/pkremer.html

At a glance: sea star life cycle

by David Ginsburg

Odontaster meridionalis is a small (about 4 inches from tip to tip) sea star found in McMurdo Sound that feeds primarily on sponges. Reproduction in this species occurs from approximately August to October during which time adults release either eggs or sperm into the ocean. Once fertilized, the resulting embryos drift with the currents and live among the plankton where they develop into feeding larvae. Eventually, these larvae will settle and change into a juvenile sea star.

Two-day old embryo



Three-day old multi-cellular embryo

44-day old larvae

adult

Embryo and larvae photos by David Ginsburg
Adult sea star photo by Rob Robbins
/ Special to The Antarctic Sun
For more underwater sea life images and information, visit:
http://scilib.ucsd.edu/sio/nsf/fguide/index.html

At left, Hillary talks about his Antarctic expedition during the lecture at the McMurdo Station dining hall. Above, shuttle driver John Deaton asks a question. Below, people play Scrabble, read and talk while waiting in line to see Hillary.

Top and bottom left photos by Brien Barnett / *The Antarctic Sun*
Bottom right photo by Kristan Hutchison / *The Antarctic Sun*

Hillary

From page 1

the country's Foreign Minister Phil Goff were on hand Monday to witness the dedication of the building, which is still under construction. When it's finished sometime late 2005, the center will be used to store and care for equipment used by scientists and staff in the field.

The dedication was part of a busy but somber week-long trip to the Ice. Over the weekend, Hillary and the other officials commemorated the 25th anniversary of the crash of Air New Zealand Flight 901.

The plane struck Mount Erebus on Nov. 28, 1979, killing all 257 people aboard. It has been called the worst peace-time tragedy in New Zealand's history. Those who died and those who labored on the mountain to recover the remains were remembered in ceremonies over the weekend.

On Sunday, Hillary popped over the hill to McMurdo Station to talk about his 1956-58 expedition to Antarctica as a member of the Commonwealth Trans-Antarctic Expedition organized by British geologist Vivian "Bunny" Fuchs.

It was standing-room only for an estimated 500 people who wanted to join this once-in-a-lifetime opportunity to see Hillary at the American station. Some waited nearly two hours in a queue that meandered through the halls and up and down the stairs of the main building.

"What person gets the chance to see him in Antarctica," said Allison Barden, a prep cook from San Francisco. She passed the time in line playing Scrabble with a small group of others at the front of the line. "He was one of the few to see McMurdo with nothing here."

The word "legendary" was on the tips of many tongues.

"He's a name you always hear," said Deborah Roth, who makes her home in New Jersey and works in McMurdo as a field coordinator at the Berg Field Center. "I expect him to be like a grandpa and tell some stories."

Hillary fit the part, dressed in a casual suit coat and no tie, his salt and peppery hair behaving on its own. He already was seated at the front of the dining hall when the doors opened 35 minutes before the presentation. Tables had been removed and extra chairs set up in a theater-like setting.

People streaming in to find seats paused to take snapshots while a few brave souls went straight for a handshake with the living legend. Hillary's cordial smile and extended hand turned the seemingly brazen act into a warm endeavor.

Once officials from both stations had their say, the former beekeeper, soldier, mountaineer, ambassador and Antarctic explorer read from a script, occasionally straying, to tell his story about crossing the Ross Ice Shelf, climbing the Skelton Glacier and traversing to the South Pole

See Hillary on page 10

"We're having a most interesting time touring McMurdo Station, seeing more strange fish than I've seen in many a day."

- Sir Edmund Hillary,
in a radio phone call to South Pole Station

At top, Hillary leaves Building 155, the main building on station, after lunch in the dining hall. At right, Hillary examines an Antarctic scallop inside the Crary Lab. Below, lab manager Steve Alexander shows Hillary a fish in the aquarium.

Photos by Brien Barnett / *The Antarctic Sun*

Hillary

From page 9

across the Polar Plateau.

The New Zealand Ross Sea Party, lead by Hillary, was to lay depots for the main team lead by Fuchs, who was making his way from the Weddell Sea to Scott Base by way of the South Pole. The goal was to complete the task of crossing Antarctica. It was a goal set by Ernest Shackleton, whom Hillary admires greatly. Shackleton was forced to abandon his quest during the *Endurance* expedition after he lost his ship. A second party coming from the Ross Sea labored in vain and tragedy to establish depots that would never be used.

Two world wars later, the New Zealand party undertook the role using underpowered Massey-Ferguson farm tractors equipped with tracks over the wheels. Hillary's team drove south from Scott Base, frequently finding crevasses the old-fashioned way: they fell into them.

"All of a sudden there was a terrific 'whoompf,' and the whole tractor sinks down and if you're lucky you just claw your way out the other side with your heart pounding," Hillary noted in a recording from several years ago.

An airplane would supply Hillary's traverse team with fuel to run their tractors along with more fuel, food and other supplies to be cached along the way. As they neared their final depot in mid-December 1957, Hillary contemplated his instructions.

Fuchs had charged Hillary with laying depots, not with reaching the Pole. But with less than a few hundred miles to go across the barren Polar Plateau, simply waiting for Fuchs wasn't an attractive option for Hillary.

On Dec. 20 Hillary called his team together to discuss whether to continue. They had stockpiled enough fuel to reach the Pole, but there were many more crevasses and other dangers along the way. It was a question of prudence versus glory. If they waited, they would be safe for now and Fuchs would be the first to reach the Pole overland by vehicle. It really was no question for Hillary.

"I was fairly keen," Hillary said with his characteristic laid-back but earnest attitude. "If the engineers didn't carry on they could fly back to Scott Base and we would carry on with one or two of our tractors. Well this put them in such a tizzy they decided to carry on."

The team left that day with three of the tractors. Within the first 50 miles, they struck a number of large crevasses and had to walk ahead, probing the snow by hand. Then they hit deep, soft snow and had to stop and shed items to reduce weight and regain focus.

See Hillary on page 11

Above, a scrimshaw cue ball features scenes from Hillary's life. The ball was designed and donated in person by Tina White, an artist and production cook at Mcmurdo Station. At right, Sir Ed removes a cloth covering a rock bearing a plaque dedicating the Hillary Field Center.

Above photo courtesy of Tina White
Right photo by Brien Barnett
/ *The Antarctic Sun*

Hillary

From page 10

"For three months we had been grinding our tractors across the Antarctic Plateau," Hillary recounted. "Our nerves were a little frayed from constant battles with constant crevasses, deep, soft snow and a desperate shortage of gasoline."

Hillary navigated with a sextant, but it was failing and doubts began to creep in about whether he could find the South Pole station, which was erected on the snow and ice just two years earlier.

"We decided that we would drive grimly on until we reached the Pole or reached something," Hillary said.

Twenty hours later, out of the corner of his eye, Hillary caught sight of something moving in the vast nothingness. The movement was a marker flag, signaling the station was near. Soon the welcome mat was put out for the weary team. It was Jan. 4, 1958, and the first party since Robert F. Scott had reached the Pole by land.

The party dined on steaks, watched a western — which Hillary says they found absurd after having faced real dangers on a true frontier — and rested. Weeks later, Fuchs rolled in, scolded Hillary a bit, then the two charged back to Scott Base, reaching it in time to board a ship for home before the winter set in.

"The trip to the Pole had been an exciting extra," Hillary recalled. "At least it had shown that if you were keen and resourceful enough you could even get a trio of farm tractors across 1200 miles of snow and ice, crevasse and sastrugi, soft snow and blizzard to reach the South Pole."

The talk captivated the hundreds in attendance at McMurdo that Sunday. Hillary received several standing ovations from an audience showing appreciation as much for his lifetime of achievement as for his speech.

He encouraged them to explore.

"I still say to the young who bemoan the fact that there's nothing left to do, 'Don't you believe it. There's plenty left to do, but you have to look for it.' "

> "There's plenty left to do, but you have to look for it."
>
> **- Sir Edmund Hillary,** *to young people on adventure*

The popularity of a man such as Hillary was underscored by requests for autographs, which were funneled through a central office. Hillary's image appears on the $5 Kiwi note and it was high on the wish list for many signature seekers, but tracking the cash proved to be too much and the bills were not accepted. In the end, about 250 items, including books, postcards, maps and photos were submitted for his signature. Late word was that the knighted adventurer was diligently signing them all.

Hillary is now an older man and was accompanied by his personal physician. He made his way on a tour of McMurdo Station with a Leki cane and sat often, preserving his strength for the long day that included a bus tour, meet-and-greet moments, Powerpoint presentations about various station activities and many photos.

Inside the aquarium at Crary Lab, dozens of scientists, lab staff and media people crowded around Hillary as he walked from tank to tank, looking at various kinds of fish. The creatures that live beneath the sea ice fascinated him and he took time to talk with the scientists about their research. In one tank, a giant fish — *Dissostichus mawsoni* or Antarctic cod — swam slowly in circles, rising as it neared Hillary and settling again. Later he peered through a microscope at embryos, then posed with everyone for a group photo.

Perhaps the most endearing moment came a bit later during a tour of McMurdo's communications center. Hillary had finished listening to the explanation of how things worked and was shaking a few more hands, when one of the operators asked him if he'd like to make a special call. Instructions relayed, Sir Ed picked up the phone:

"South Pole, South Pole. Can you hear me? This is Ed Hillary, down at McMurdo Sound, calling South Pole Station, can you hear me?"

A person crackled through on the other end. It was Tracey Sheeley, a operator working in the communications shack under the Dome at South Pole Station, and yes, she could hear him.

"We're having a most interesting time touring McMurdo Station," Hillary said. "Seeing more strange fish than I've seen in many a day."

"Copy that. We haven't seen any fish obviously," Sheeley said. "We've heard rave reviews about your lecture …"

"Thank you. It was a very nice group of people who all seemed to laugh at the right time," Hillary said, as usual putting credit on others. "Best of luck to you all, out there in the far beyond."

"Thank you," Sheeley replied. "You've certainly been an inspiration to many of us."

"This is Ed Hillary, over and out."

Profile Looking past the pretty pictures

By Emily Stone
Sun staff

When Connie Samaras arrived in Antarctica last month she found herself in an unusual position for a professional photographer — she had to force herself to look beyond the beauty of the place.

"It's very hard not to go Ansel Adams," she said.

Samaras was not here to photograph landscapes, no matter how photogenic the continent is. She spent three weeks at the South Pole photographing the buildings, focusing particularly on the contrast between the harsh place and the buildings that allow people to live there.

"I'm really fascinated by the intersection of extreme environment and life-supporting architecture — the contradiction between those technological developments that allow the South Pole Station to exist and the extreme environment," said Samaras, a professor in the Department of Studio Art at the University of California, Irvine.

Samaras guesses she took about 500 pictures during her stay. She will look through her film now that she's left the Ice to compile the images into an exhibition that should be ready in about a year. She was here on a National Science Foundation Antarctic Artists and Writers grant.

The contrasts of Antarctica intrigued Samaras on many levels. There's the idea that people are living in the most remote spot on Earth, yet many work for a large American corporation; that there is tourism in this nearly inaccessible spot; that you have a village-type community where everyone looks out for one other yet just outside is a world that can kill you in minutes.

"The danger that you're constantly in here is not a joke. You can't take anything for granted," she said. "The very existence of (the South Pole) lends itself to utopic visions and dystopic realities."

Her project was originally titled "Vast Active Living Intelligence System," after the title of a Philip K. Dick's science fiction novel. She changed the title during her time at the Pole to "Le Reve," which means "the dream" in French. She said her time at Pole was like a waking dream. "Le Reve" is also the name of a new casino in Las Vegas, a city that Samaras has photographed often. Vegas, too, is a place of contradictions and disorientation, and what she calls "psychological and geographic dislocation."

Few of her pictures have people in them. Samaras doesn't want the viewer to make assumptions about a space based on the race, age, status or other characteristics of people in the photo. Her style, she said, "allows for a kind of deeper identification with the actual physical space."

Photo by Gabrielle Walker / Special to *The Antarctic Sun*
Photographer Connie Samaras at the South Pole, where she spent three weeks photographing the buildings.

She likes taking pictures that disorient the viewer. Some of her shots are from under the new station looking up, a vantage point that she said makes the station look like a cross between the Starship Enterprise and LAX airport. In some pictures, it's hard to tell where the snow and ice are supposed to be.

Photo by Connie Samaras / Special to *The Antarctic Sun*
One of Connie Samaras' photos from the South Pole. The ice on the polar plateau reminded her of an ocean, and she often thought the buildings there looked like they were drowning in the water.

Some are close-ups of architecture, which she said are disorienting because people never look at architecture close up.

Samaras said the final body of work will likely include diptychs, which are two separate images put together, that show a landscape and buildings visually linked by a common geometric shape. Despite her plan to shoot mainly buildings, she said it was impossible not to be drawn to the landscape. She was particularly amazed at the way the flat polar plateau looked like an ocean.

There were some obvious challenges with shooting at the South Pole. It's cold and windy. Her equipment lasted only 20 to 30 minutes outside. She wouldn't have lasted much longer, she said, and was surprised by how much her thinking slowed down.

Samaras also was challenged in choosing her pictures.

"It took me a while to quiet down and not look to the obviously dramatic," she said.

Antarctica is so heavily photographed, Samaras said, that most people already have a vivid picture of it in their head before setting foot here. This was true for her, to a point.

"The Dome has been photographed so much," she said, referring to the former station. "Before I walked into it, I knew what it would look like. But I didn't." She said she wasn't prepared for the quality of light in the Dome or the eerie feeling of standing in a space that feels simultaneously as if it were inside and outside.

There also were some unexpected childhood associations for Samaras. She grew up in New Mexico, and said the light of Antarctica reminded her of the light in the desert. She is the descendant of a long line of Greek peasants and said living in the small community at the Pole made her recall her parents' and grandparents' stories about village life, both the good and the bad.

Samaras said the theme of illusions in Antarctica — the safety, and community inside a building compared to the dangers outside — began the moment she stepped off the plane. Samaras saw a fata morgana, the mirage created by the Antarctic light and air that distort mountains and structures in the distance.

"The first thing I saw was a fata morgana, an illusion," she said. "I said, 'thank you for this greeting.'"