

The Antarctic Sun

www.polar.org/antsun
January 13, 2002



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

All tied up in Palmer



Photo by Dan Naber, Palmer Station

The judges declared this photo by Dan Naber as "Best in Show" in the photo segment of the Antarctic Sun Photo, Poetry and Prose Festival. It was submitted in the Other category. Naber took this shot of the Laurence M. Gould at Palmer Station with Ilford black and white 100 speed film in March 2001, and developed and printed it at the station during the winter.

"It was early in the winter and the rocks next to the shore had a nice coating of ice after some windy weather. It made for a great effect," Naber said.

Other winning photos and writing starts on page 6, or go to www.polar.org/antsun to see more photos from the contest in color.

Some of the authors will also be reading their work at Spoken Word Night Friday in the McMurdo Library, where color copies of the photos will be on display.

Little AGO on the big plateau

By Kristan Hutchison
Sun staff

The scene at the Automatic Geophysical Observatory is straight from Laura Ingalls Wilder, as translated by aliens.

An orange box of a cabin sits alone on a sweeping snow prairie. At odd angles from it is a matrix of posts and wires, like a clothesline waiting for washday. And in the field on the other side, someone pulls a small plow back and forth all day long behind a snow machine.

Scott Freeman, part of the team maintaining the AGO sites, even calls himself a snow farmer, for all the hours and days he's spent towing the groomer.

"You're just out in this flat, white plain with lots of time to think," Freeman said. "There's very little evidence of the hand of humans."

Humans are hardly ever at the six AGOs scattered across the most remote regions of Antarctica. Teams of three to four people visit each AGO for a few weeks to do

See AGO on page 10

Time capsule celebrates new South Pole station

By Mark Sabbatini
Sun staff

The new South Pole station isn't finished yet, but it's already history.

A time capsule intended to be opened January 2050 - a few years beyond the station's expected life span - was placed in one of the building's support beams Friday. The wooden box contains literature about the South Pole and U.S. Antarctic Program, a poster of the new station signed by Pole employees and other items designed to capture life in 2002.

See Time on page 6

Quote of the Week

"We weren't in a strong negotiating position."

- Visitor stuck at the South Pole bargaining for a flight home

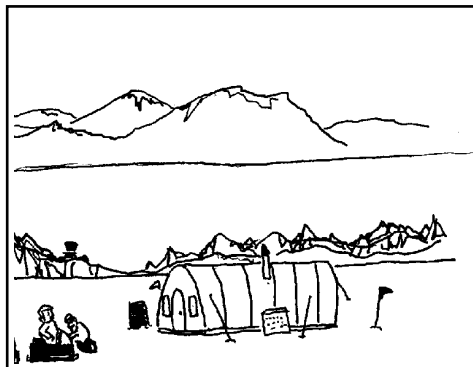
INSIDE

Scouting out Antarctica

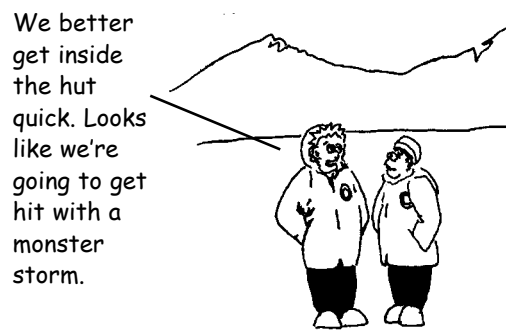
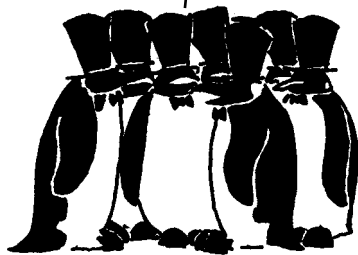
Mini-monsters in McMurdo Sound

Ross Island Chronicles

By Chico



I just saw some scientists putting a new camp on the sea ice. Let's go mess with their minds.



Cold, hard facts

Fill 'er up

Fuel carried on tanker headed to McMurdo this month: 6.5 million gallons.

Fuel to be unloaded at Marble Point: 35,000 to 40,000 gal.

Fuel for McMurdo: 4 million gal.

Fuel use of Kodiak snowblowers 425 horsepower engines while working: 18 gal. per hour.

Fuel use of the R/V *Gould* and *Palmer* in open water: 4,000 gal. per hour and 6,000 gal. per hour.

Palmer when breaking ice: up to 10,000 gal. per hour.

Fuel use by the *Polar Star* while breaking sea ice on the way into McMurdo this year: 30,000 gal. per mile.

Sources: April Brown, Coast Guard; John Van Vlack VMF; Tim Bjokne, RPSC; Scott Taube, fuels supervisor.

The Antarctic Sun is funded by the National Science Foundation as part of the United States Antarctic Program. 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: Melanie Conner
 Mark Sabbatini
Copy Editor: Lynn Hamann
Publisher: Valerie Carroll,
 Communications manager, RPSC

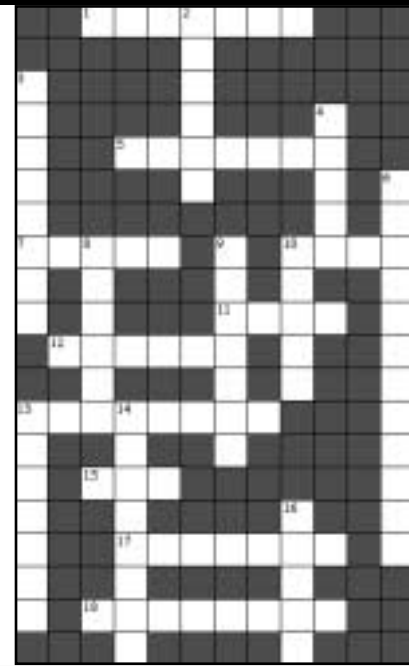
Contributions are welcome. Contact the Sun at AntSun@polar.org. In McMurdo, visit our office in Building 155 or dial 2407.

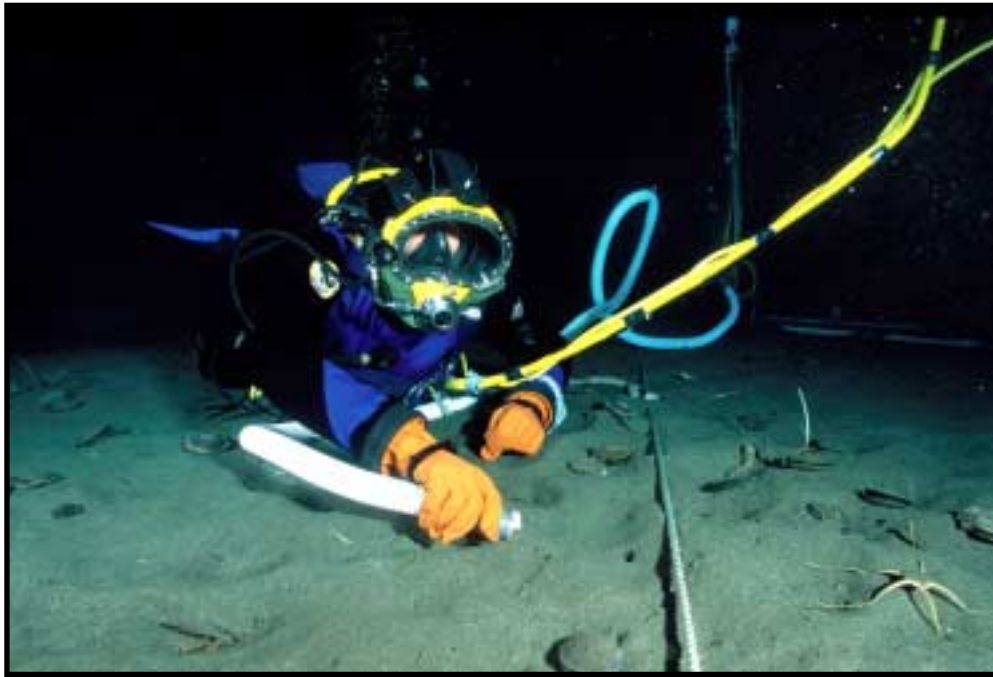
Web address: www.polar.org/antsun

Eat up

answers on page 6

- Across**
- 1) Rations for human consumption
 - 5) Common term for polar-region fish
 - 7) This and tea were the favored hot drinks
 - 10) How to eat elephants on the Ice
 - 11) Amundsen drove them, then ate them
 - 12) The fattening part of a basic ration
 - 13) The cracker-like bread of explorers
 - 15) Common name for toothfish, mawsoni
 - 17) Milk protein added to sledging rations
 - 18) Also known as rock lobster
- Down**
- 2) The state of almost any food on the Ice
 - 3) Dried meat mixed with fat
 - 4) A big meal, if you can take the political heat
 - 6) Australian term for a beer
 - 8) Made with joints of albatross or mollymawk chicks
 - 9) Meal served to workers at midnight
 - 10) The sweet part of basic rations
 - 13) Whale or seal fat; only for the desperate
 - 14) A snack; sometimes a meal
 - 16) Expedition stew made from meat, biscuits...





Phil Forte, an Alvin pilot, vacuums the floor of McMurdo Sound for samples of foraminifera, a single-celled creature with gruesome eating habits.

Photo by Steve Alexander/
Special to The Antarctic Sun

Foraminifera

Rulers of the bottom-dwellers

By Melanie Conner
Sun staff

Giant foraminifera could star in a B-grade horror flick, "Single-celled Monsters from the Ocean Deep."

But scientists discovered them before Hollywood producers.

The scientists are trying to determine how the pinhead-sized omnivores, which are visible to the naked eye and could rank among the most abundant organisms, fit into the ecosystem of the ocean bottom, said scientist Sam Bowser, of Albany, NY. They know the foraminifera, or "forams" for short, are capable of devouring organisms three times their size. But what eats the forams is a mystery.

Typically forams carpet deep-sea floors, thousands of feet below the ocean surface. The only way to sample those depths is with a research vessel or submarine and samples are often damaged on their way up as the temperature and pressure change, said Steve Alexander, a biologist working with Bowser's team.

Fortunately for researchers, the forams also emerge in the shallow waters of Antarctica, where the cold water creates conditions similar to the deep sea. Antarctic waters are nearly the same temperatures at the surface as they are at the bottom, which minimizes the risk of damaging the samples during extraction.

"You can watch its heart beat for days as it is being slowly ripped apart."

Researcher Sam Bowser

Thus, in McMurdo Sound divers can collect samples of forams from as shallow as 60 feet (18 meters) deep, allowing scientists easy access to them for study.

"It's like having a window into the deep seas," said Alexander.

Modern researchers in Antarctica have been studying forams for over 30 years. However, Bowser said members of Robert Falcon Scott's expedition brought back samples of forams almost 100 years ago. Now, among other areas, they are charting the genetic diversity of forams in McMurdo Sound.

A sample of forams from any square meter of sea floor would probably have the diversity in population of any major city in the U.S.

"They are about as closely related to each other as you are to a fruit fly," said Bowser.

But the scientists can't tell just by looking. Last year molecular geneticist Jan Pawlowski of the University of Geneva discovered some of the forams that appear

completely different are the exact same species underneath their varied shells.

"Some people may wear a green hat and a red coat, others wear a red hat and a green coat, but they are still the same species underneath," said Alexander.

This summer Bowser, Alexander and others are collecting more varied samples than previous years as their research was extended to include the late summer months, providing scientists with a chance to collect data from different seasons.

"We've never sampled past January," said Steve Alexander, who is staying until February this year.

The rare data will allow the team to study the effects of summer behaviors and seasonal changes in forams, a phenomenon that may be exaggerated in Antarctic breeds.

"The neat thing about the system here, is that the organisms have to go through six months of darkness," said Alexander. "During that time, there is no plankton, no algae, no food."

When the sun emerges in the spring, algae blooms on the sea ice and falls to the sea floor, where the forams devour them using their sticky, web-like appendages that grow like tree branches to extend outside their shells. Large appendages can

See Forams on page 4



Photo by Melanie Conner/The Antarctic Sun



Photo by Melanie Conner/The Antarctic Sun

Biologist Steve Alexander, at left, tests an underwater microscope that they will use to view forams in their natural environment. Above, a foraminifera from McMurdo Sound rests on Alexander's fingertip.

Forams From page 3

grow up to one inch tall, but even forams with smaller limbs are capable of savagely destroying their prey.

Besides consuming algae, forams collectively capture and devour multi-celled animals three times larger than themselves.

"Baby starfish, for example, make a tasty meal for these forams," said Bowser.

They prey upon small crustaceans, such as shrimp, and the juveniles of large invertebrates, such as sea urchins and starfish, as they crawl around on the ocean floor.

"They hold their prey in the web and any opening is penetrated," said Bowser.

Bowser wanted to know if forams responded to the life-cycles of its prey by waiting for organisms to reproduce and then eating their young to trigger their

own reproduction, or if they simply cast their webs blindly and wait for a victim all the time.

Bowser's team found both types of predators; one that sits and waits and one that grazes the ocean bottom for food, like a cow would a field. However the method, the resulting consumption is horrific as it devours its prey, slowly and deliberately ripping off chunks of flesh while the still-living creature witnesses its own dismemberment.

"It's gruesome," said Bowser, "You can watch its heart beat for days as it is being slowly ripped apart."

According to Bowser, the forams could also be the rulers of the terrain. They have the ability to control the abundance of larger creatures. Usually the creatures in

the food web eat something a size smaller than themselves, but forams eat in both directions of the food web, destroying larger animals as well as smaller bacteria.

The scientists say they are not sure what creatures prey upon the forams to achieve ecological equilibrium. Starfish crawl all over them, perhaps even hungry juveniles, but won't eat them. According to Alexander, evidence suggests forams might have a chemical defense system guarding against potential, large prey.

"There is nowhere else in the food web where food is available but nothing is eating it. The food chain cannot end there," said Alexander. "It's like a field of strawberries and no one's eating them."

Continental Drift

What's a creative use for an Antarctic patch collection?



"I don't have a patch collection, but I've made display cases for them."

George Prehn Carpenter, South Pole, from Great Falls, Mont.



"I'd give it to my grandfather, because he's never going to get to Antarctica."

Brett Miller
Fireman, McMurdo Station, from Hermosa Beach, Calif.



"My Antarctic patch collection, dating back to 1979, normally can be found beneath a glass-plated table top in the guest room of my home."

Maggie Amsler
Research assistant, Palmer Station, from Pelham, Ala.

around the continent

PALMER

Testing glacial winds

By Tom Cohenour

Palmer correspondent

It takes about 45 minutes to walk the two-mile flagged route up the glacier and back to Palmer Station. Usually hikers take longer because the constantly changing colors reflecting between moving clouds and shifting sea ice mesmerize viewers. "It looks alive," comment many visitors from the top of the glacier as they gaze over the shimmering water speckled with brash ice. Colorful clouds racing overhead add to the effect.

The glacier, officially known as Marr Ice Piedmont, completely covers 38-mile (61-km) long Anvers Island. At the center of Anvers Island, the glacier is 2,000 feet (600 meters) thick. The ice front is 180 feet (55 m) high above sea level and 115 to 130 feet (35-40 m) below sea level at its deepest point. The ice front has been retreating since at least 1965 at a rate of 10 meters a year, mainly by calving.

Thunderous roars announce calving in nearby Arthur Harbor nearly every hour in the austral summer. Sometimes the calvings are car sized. Other times they are the size of a house.

Reeling with the impact, the ocean spits back a surging 3 to 4 foot (1 - 1.25 m) wave in return. The sheer face of the glacier funnels the sound waves toward Palmer Station. Some calvings are so intense you can feel the sound waves hit your body. Occasionally, calvings a mile to the northwest in Loudwater Cove can be heard.

The prevailing northwest wind coming off the ice piedmont blows directly onto the rocky spit of land where Palmer Station is situated. That's exactly what Dr. Rebecca Dickhut wants. She's part of a 5-member team conducting research on the Transport and Fate of Persistent Organic Pollutants in Antarctic Coastal Seas (BO-045-P). With two air sampling instruments, Rebecca is looking for evidence of pesticides and other organic pollutants that volatilize under the relatively warm austral summer sun and enter the air.

The BO-045-P group is also looking for traces of organic pollutants that enter the water from glacial runoff and snowmelt. In a process known as biomagnification, organic pollutants such as pesticides like DDT and Lindane affect the ecology of organisms by first being picked up by phytoplankton. Krill feed on phytoplankton, which in turn are eaten by seals and whales.

The receding glacier is key to the process of biomagnification. Pollutants released into the atmosphere in warm climates over the last 50 years condense in the cold Antarctic air, fall to earth, and build up in snow and ice. Melting snow and glacial ice release the pollutants into the water column where the process of biomagnification begins.

SOUTH POLE

Polies welcome visitors from Raytheon, Russia

By Tracy Sheeley

Special to the Sun

The South Pole has had the honor of hosting some visitors this week. Dan Burnham, the chairman and CEO of Raytheon Company, visited, accompanied by Ashok Kaveeshwar, RTSC senior vice president of IT and Science Services, and Tom Yelvington, RPSC USAP program manager. Weather conditions ended up shortening their trip, but they enjoyed a quick tour of the new construction.

Additionally, a Russian Antonov-3 aircraft (a biplane) arrived from Patriot Hills on Tuesday, Jan. 8. The 14 passengers represented Russia and several other nations. Adventure Network's DC-3 is enroute at the time of writing with a group of tourists to Pole - they will also pick up some of the group that arrived on the Antonov-3. The

ANI marathon is still scheduled to occur within a few weeks, although the specific date is weather dependent.

Outside of these notable events, progress continues on new station construction, and some milestones are being passed. The steelwork on pod A-3 is complete, and the panel work should be finished by the end of the week. We anticipate that the steelwork on B-2 will be completed by the end of next week. Pod A-3 will house medical and science facilities, and Pod B-2 will be more science. Watching the constantly changing scene is fascinating.

Tunnel E of the Utility Tunnel was completed Jan. 9.

The work on the new Rodwell continues... The well provides the water for South Pole station, and we are currently in the certification process to put it into use. We hope to use it in the upcoming winter season, and all indications are that this will happen. The old Rodwell has the distinction of being in the longest continuous use in the world, and was specifically designed for the South Pole station.

In science news, work continues in a smooth manner - in the words of Eivind Jensen, manager of science support, "No news is good news" and all moves forward according to plan in preparation for the winter season, when South Pole science shines in the long dark night.

Classes on a variety of topics continue - a German language class has been added to the offerings.

We have recently enjoyed a bit of a heat wave - including a record-breaking temperature of minus 1.3F (-18.5C) on Jan. 7. This broke the all-time record for the day, and was the warmest temperature recorded at South Pole since January of 1990! No complaints around here...



Photo by Mark Sabbatini/The Antarctic Sun

Raytheon CEO Dan Burnham gets the traditional hero shot at the South Pole with Station Manager Katy Jensen.

the week in weather

McMurdo Station

High: 47F/9C Low:21F/-6C
Wind: 22 mph/35 kph
Windchill: -9F/-23C

Palmer Station

High: 46F/8C Low:30F/-1.3C
Wind: 61 mph/53 kph
Precipitation: 0.5 in./21.9mm.

South Pole Station

High: -4F/-20C Low:-16F/-27C
Wind: 36mph/57kph



Photo by Andy Martinez/Special to The Antarctic Sun

Officials at the South Pole, above, place a time capsule into a protective case during a ceremony Friday. The capsule, at left, contains documents about the new Pole station being constructed and other mementos from the U.S. Antarctic Program.



Photo by Mark Sabbatini/The Antarctic Sun

Time From page 1

Officials originally hoped to place the time capsule in 2000 or 2001 to coincide with the new millennium, but the length of the planning process prevented that, said Jerry Marty, the National Science Foundation representative at Amundsen-Scott South Pole Station.

"There was a lot of debate about what to put in it," he said.

This is the South Pole's second official time capsule. The first was placed on New Year's Day 1957 by the construction crew that built and occupied the first South Pole station. The capsule was a cylinder from a Caterpillar tractor donated by the city of Peoria, Ill., which contained a newspaper and other materials from the time. The capsule was supposed to be opened in the year 2000, but Marty said records are sketchy and many of those who helped bury it are deceased.

"We don't know where it is," he said.

Marty said he is unsure of all the steps that will be taken to ensure the time capsule's recovery. But he said he hopes media accounts about the capsule, a plaque describing it that will be placed in the new station and the memory of current employees who want to return for its opening will be sufficient.

"One may have to dig for it, but it will be a confirmed location," he said.

The capsule - which is only somewhat bigger than a breadbox - was built by Gary Rochford, a carpenter from Seattle who is working his third season in Antarctica. He said some hardwood arrived in a shipment earlier this season "so I just pulled out some red oak and fashioned a box."

"I felt quite privileged to work on it," he said. "It was just a neat shop project. They don't come along that often."

There was some debate among officials about the size of the capsule due to questions such as how much would be placed in the capsule and whether items such as posters would be rolled or folded, said Katy Jensen, the South Pole station's area manager. She said they eventually decided to go with a smaller design.

"We wanted to limit the amount of stuff we put into it," she said.

Among the items in the capsule:

- A poster of the new station signed by Pole employees.
- A copy of this year's Science Planning Summary, which provides details about all of the U.S. research bases and ships, plus descriptions of every science project occurring this year and who is participating in the research.
- A patch from the past winter showing what part of the station was being worked on at that time. Also included is a second patch given to all employees from the past winter and others who helped with the high-profile evacuation of Dr. Ron Shemenski. Jensen said only 100 of the patches were made.
- A baseball cap with a Facilities, Engineering, Maintenance and Construction acronym (FEMC). The design was selected over a

more generic Antarctic or South Pole theme because "those are the folks who built the station," Jensen said.

- A copy of the station guide for the current season, which provides extensive details about the station's facilities and employee policies. Jensen said amusing historical details can be found by going back only 17 years to the 1985 guide, which bragged about the station's two computers (for scientists only) and the ability to send teletype messages.

- An issue of National Geographic from 1957 that focused on the establishment of a permanent base at the South Pole. The issue included the final article by Antarctic explorer Richard E. Byrd, who made the first flight over the Pole, and another article by Paul Siple, who established the station and was its first scientific leader.

Employees at the station had plenty of other ideas about what could be included.

"You could freeze-dry some of the meals and you could have little descriptions of what we ate because pretty soon (this galley) will be gone," said Mike Toomey, a first-year dining attendant from Colorado Springs, Colo.

Rochford, the capsule's builder, said "I think for sure a photo CD. They issue one to us at the end of every season." But, he added, in 50 years the technology to read the disc of photos from the station might not exist any longer.

Some said reminders of the ironies and difficulties of life at the Pole needed to be included.

"Flight schedules with crosses through all the ones canceled just to remind ourselves how slow it was back then," said Tony Travouillon, a scientist from Sydney who is spending his first season on the Ice.

Answer to puzzle from page 2

Among the other suggestions from employees were pay stubs, a vial of air from the clean air sector (an area so pure that even people are banned as a possible pollutant) and a piece of the South Pole dome, which will be dismantled when the new station is complete.

Jensen is encouraging employees to return in year 2050 for the opening of the time capsule and a number of workers interviewed said they'd be interested.

"It would be great to see how this place has changed in 50 years," said Craig Isenberg, a first-year communications operator from Yosemite, Calif. "Also, it'd be nice to still be alive then."



Feet of Clay

I could spend my time knee-deep in the wild grass,
 Waves of wind separating the strands of my hair
 Seeds clinging on to me with the hope of life
 Don't you know
 We can walk
 Wherever we like
 To places that give us what we need
 To places where the soul of the earth
 Breathes through our eyes
 We must all go sometime
 To a wild place
 And grow new roots.

Cherie Wilson won first place with this poem. Another poem of hers, "Zen Garden," received an honorable mention. Wilson is an administrator for Facilities, Engineering, Maintenance and Construction at McMurdo Station in her first season on the Ice. She will be wintering at Palmer Station. Wilson was formerly an educator in Denver and a chemist at Biosphere 2 in Arizona.

Letting Go

The wind is blowing hard against my hands
 and shoulders
 As I cling to you for all I am worth.
 I have held on for so long now as you have
 climbed higher
 And I can no longer see the ground.

Finally I realize that I must let go
 Or be carried into those rarefied reaches to
 asphyxiate
 Where the sky is no longer blue
 And the sun no longer warm.

So I give in to the wind
 And I am falling, your wings
 A dwindling white cross
 Against the blue above.

The wind no longer trying to rip me away
 But cradling me as I sink
 While I try to summon the strength
 To pull the cord.

Daren Blythe won second place with this poem. He also received an honorable mention in the prose category for his story, "The Deserter." This will be Blythe's second winter as science technician at the South Pole. He is from Fredericksburg, Va.



Wildlife 20 entries

First place- "Weddell" by Galen Schlich, carpenter at McMurdo Station.

Second place- "King of the Hill" by Geoffrey Gilbert.

Third place- "Dragonfish Attack" by Henry Kaiser.

Honorable mention- "Guess who's coming to dinner" by Jeff Gustofson, Palmer Station.



Scenic 31 entries

First place- "Lake Hoare" by Galen Schlich, carpenter at McMurdo Station.

Second place- "Midnight Sun" by Steve Alexander, scientist at McMurdo Station.

Third place tie- "Arthur Sea Ice Marr Glacier" by Doug Fink at Palmer Station and "Barne Glacier" by Eric Coplin at McMurdo Station.

Flight

He watches the worry lines of his pale, middle-aged face blur in the vibrating rear-view mirror of a Greyhound bound to forget everyone. He's been on this bus, this road before, but then only during daylight, and only to return home that evening. But tonight he's taken care of everything: necessities in the small suitcase he smuggled to work this morning; telephone call to his wife telling the lie that tonight he'll work late. Now that there's nothing left to arrange, nothing to do but ride, he can recline his seat, close his eyes.

He remembers how soundly he slept last night beside his wife, but how he woke earlier than usual because of a sharp pain behind his left ear, a pain so sharp he had touched it with a fingertip to see no blood was drawn. Something in his pillow, he had thought. Now he dreams it was the quill-tip of a feather long, broad, and rigid enough for flight somehow mixed in with the warm, soft down of his pillow - an image he wakes with upon arriving at the station.

He phones his wife, pretends he's still at work: he won't be home for another hour, two hours; she shouldn't wait up. He asks if the kids are asleep; they are. He buys a ticket for the next bus home.

He sits on the edge of the bed in the dark, gently, so as not to wake his wife. He runs his hand lightly over his pillow, then feels it firmly for the feather he has in mind, the feather meant for flight buried deep within soft down. He doesn't find it. His wife doesn't wake. He flips his pillow over for the night.

Andrew McCarter won first place with this story. He is a solid waste technician in his first season at McMurdo Station. He has lived in the New England area since graduate school and spent a few years writing questions for educational testing companies.

The judges

Photo

Robert "Zim" Zimmerman, science support equipment operator at McMurdo Station. He has attended the Maine Photographic Workshop for two years and has been making photos since 1994.

Writing

Nevada Jane Hanners is a GA and poet at McMurdo Station. She holds a masters in English literature with a creative writing emphasis.

Kristin Van Konynenburg is the Palmer Station physician and a writer.

Alejandro Rubio works as an administrative assistant/scheduler at McMurdo. He started taking photography classes when he was 16 and has continued to learn and make photographs ever since.

Ben Murray was a writer for Monster.com and several newspapers before coming to McMurdo where he drives a shuttle.

Thomas Kuhn, a poetry-only judge from the South Pole, has a bachelors in classic literature.



People 20 entries

First place- "Sculpture" by Doug Ruuska

"This is the most uniquely seen photo of the three (top photos)," said judge Robert "Zim" Zimmerman. "Someone saw something here that nobody else saw."

Second place- "MEC Rave" by William Sutton

Third place- "Jeff's face" by John Sale.

Dustin Clelen works as a general assistant at McMurdo. He says his interests in photography and poetry helps link him to the creative world.

Melanie Conner, from McMurdo Station has a masters in photojournalism.

Salvatore Consalvi is a carpenter's helper and unpublished author at McMurdo Station.

Jeremy Townsend, a prose-only judge from South Pole, has a masters in literature and English.

Other 21 entries

Twenty-one photographs were entered in the "other" category, including the judges' overall favorite, seen on the front page.

Second place- "Ice" by Shad O'Neel at McMurdo Station.

Third place tie- "Hut Point Window" by Robert Ricketson at McMurdo Station and "Old boots in Scott's Hut" by Galen Schlich, carpenter at McMurdo Station.

In a Roman Amphitheater

The tragedy performed daily
between ruins, their shadows,
and a rising and falling sun.

Andrew McCarter won third place with this poem. McCarter is a solid waste technician in his first season at McMurdo Station. He has lived in the New England area since graduate school and spent a few years writing questions for educational testing companies.

Other winning writers

The following writers also scored well with the judges. Most of their poems and stories can be found at the Antarctic Sun Website www.polar.org/antsun, along with the photos in color. The writing will be read at Spoken Word Night Jan. 18 at 7:30 p.m. in the McMurdo Library.

Shandra Cordovano won third place for her story "Ad Infinitum." Cordovano is a dining attendant at McMurdo Station. Her story can't be published because it contains mature content. It will be read at Spoken Word Night. If you want a copy e-mail sabbatkr@mcmurdo.gov this week.

Anne Dal Vera received an honorable mention for her essay "Wind." Dal Vera works as an equipment operator for waste management at McMurdo Station. From Bayfield, Colo., she first came to Antarctica in 1992 as a member of the American Women's Antarctic Expedition. This is her sixth season in the USAP.

Trace Wright received an honorable mention for her poem, "A Day Down South." Wright is a first-season construction worker at the South Pole. She stores her belongings in Tacoma, Wash.

Sue Vittner received an honorable mention for her poem, "It is January on the Coast of Maine." Vittner is a janitor at McMurdo Station.



Off-Ice

First place- "Seranno in the Mist" by Dan Naber, Palmer Station
Taken along the banks of the Seranno River in Torres Del Paine National Park in southern Chile and developed and printed at Palmer Station.

Naber wrote of his entry, "I had spent the night on the little island that the bridge goes to. The bridge continues on the other side of the island. I woke up to frost on my sleeping bag and a beautiful shroud of mist in the broad valley surrounded by hills and mountains in the background, including the Torres. It was magical!"

The off-Ice category received too few entries for judges to select more than one winner.

Bonaparte Point

The scientist's zodiac weaved its way through the icebergs in Arthur Harbor and dropped us off at Bonaparte Point. It was a Sunday afternoon in January at Palmer Station on the Antarctic Peninsula. Most of the snow had melted and we hopped from one lichen-covered boulder to another. Orca whales spouted in the distance. The odor of elephant seals wallowing in their excrement was strong. Add to that the chattering penguin colony on Torgesen Island and our senses were overwhelmed.

Icebergs littered the bay. Sometimes these bergs would drift in and hang around for quite some time. We gave them names and took bets on when they would calve and collapse. Two such bergs floated just offshore. One slowly started turning over, exposing its brilliant blue undersides. As it calved, a huge explosion of ice shot out from the side. The resulting wave sent us frantically running towards higher ground.

We had been told to bring walking sticks with us to ward off aggressive fur seals that can move quickly overland when so inclined. These poles proved useful at keeping away the

dive-bombing skuas that were protecting their nests. I raised the sticks high in the air so the scavenger birds would strike those, rather than my head. Scenes from Alfred Hitchcock's "The Birds" flashed through my mind and I was happy that sunglasses covered my eyes. Skuas have been known to peck out the eyes of their disabled victims.

We hauled ourselves back across Hero Inlet on the trolley. Later, we relaxed in the hot tub overlooking the glacier. An incredible sunset illuminated the ocean, creating the illusion that the icebergs were buttes in a desert. The sun quickly disappeared below the horizon, flashing green in a final farewell.

Janet Huddleston won second place with this story. Another of her stories, "The Whale," received an honorable mention. This is her fourth season at McMurdo Station, where she currently works in an electrical supply warehouse. She also worked at Palmer Station as a general assistant. Originally from Nashville, Tenn., she now lives in Golden Bay, New Zealand. In the real world she is a park ranger and an English teacher.

AGO

From page 1

the maintenance needed to keep the unmanned observatory working. The rest of the year the AGOs sit alone, taking photos of the sky, listening for changes in cosmic radio noise and measuring fluctuation in the magnetic fields around the Earth.

The AGOs are basically looking at the space environment just outside the atmosphere, from 60 to 300 miles (100-500 km) in altitude and beyond, said Mark Engebretson, a researcher at Augsburg College in Minneapolis and one of six principal researchers on the AGO project headed by Ted Rosenberg of the University of Maryland.

"The main purpose of the AGO program is to advance our understanding of the electrodynamics of the polar upper atmosphere at very high magnetic latitudes," Rosenberg wrote. "Specifically, we are looking to understand the role that this region plays in the transfer of energy and mass from the solar wind to the Earth's magnetosphere and ionosphere."

The true crop is harvested from a small black box inside the AGO building, where data from the instruments outside is collected and stored. The clothesline is actually a relative ionospheric opacity meter, or riometer, which measures how much the Earth's atmosphere is blocking cosmic radio noise. Nearby what looks like a spiderweb between two stakes is a receiver listening for electromagnetic phenomena. A few yards from that a flux-gate magnetometer records changes in the geomagnetic field at one-second intervals. On the roof of the AGO building a digital camera points up to take photos of the sky every two minutes through the winter, recording the auroras in red and blue.

The data records the results of a process that starts with particles flowing away from the sun in a solar wind. Explosions on the sun's surface change the intensity of the solar wind, which collides with the Earth's magnetosphere like a gust hitting a hot air balloon, causing one area to dent and another to bulge. What people see are undulating colors in the sky, the northern and southern lights.

"We're essentially seeing the results of the solar wind striking the magnetosphere of the Earth and it's fairly dramatic," said Noel Petit, a computer science professor in charge of downloads and distributing the AGO data.

Besides causing vibrant displays of aurora, the interaction between the solar wind and interplanetary magnetic field with the Earth's plasma and magnetic field can create upper atmosphere ionization and lead to variations of electric currents and geomagnetic fields, wrote Rosenberg. It also disrupts radio communications and power grids. Since 1992 the AGO data has helped scientists understand the phenomena. They have similar instruments set up at the South Pole, Arrival Heights at McMurdo Station and at some locations in the Arctic. They also compare the data to measurements taken by satellites.

"It's helpful to get multiple sites to look at the aurora and everything else because it's a spatially distributed phenomenon," Engebretson said. "To a certain extent, it's like blind men looking at the elephant. You have a pretty big animal, so if you just look at one corner you might not get a reasonable picture."

Each year 12 disc drives, two from each AGO, are delivered to Petit at Augsburg College in Minneapolis. He sets his students to work downloading the 5 to 7 gigabytes of data from each drive with a warning, "don't blow it because this is a million dollars

worth of data in this disk. If you blow it you're going to be paying taxes for a long time."

Within a few days the data becomes available on the Website, www.polar.umd.edu. Typically two or three people a day download the data, Petit said.

"It's a fairly active set of data," he said. "There's probably 20 or 30 groups outside of our group who are using the data."

Members of the AGO group write 30 to 40 science papers a year based on the data, Petit said. An equal number of papers by other scientists reference the data, he said.

"It's very good, quiet data because it doesn't have humans around to make other magnetic or radio signals," Petit said.

The AGOs project has produced some unexpected findings. Space scientists were surprised when the data showed that the auroras extend nearer to the poles than thought, Engebretson said.

AGOs have given scientists a better understanding of the cause of several phenomenon, including short-lived magnetic impulse events, Rosenberg wrote. New AGO results indicate one type of radio wave emission, called chorus, is turned on and off by the pressure of the solar wind on the Earth's magnetosphere, Rosenberg wrote.

Some of the most interesting studies have compared data from the AGO sites with similar data from the arctic, giving insight into whether auroral activity is a local phenomenon, or involves the entire magnetosphere, the magnetic fields surrounding Earth, Petit said. The northern and southern lights displays generally seem to be connected, Engebretson said. For studies the AGO group also uses data from 20 instrument sites in villages along the

arctic coasts of Greenland, Iceland and Canada.

"We usually visit them once a year, but it's a lot easier to visit," Petit said. "You can just buy an airline ticket. It's a lot harder to visit someplace in Antarctica."

The six AGO sites in Antarctica are 565 to 909 miles (1,264-2,033 km) from McMurdo Station. The sites were chosen in order to develop a spaced array in magnetic latitude and longitude to match up with South Pole and McMurdo stations, as well as where the least electromagnetic interference occurs. AGO 3 sits only 245 miles (394 km) from the Pole of Relative Inaccessibility, the point on the continent farthest from any coast and therefore most difficult to reach. Even AGO 1, the most accessible, is a three-hour flight in a Twin Otter, over the mountains and across the plateau to land at the lonely outpost.

"If you're on the AGO team you're literally getting a million dollar tour of Antarctica, and you're getting paid for it," said Tom Barfield, technical services manager for Raytheon Polar Services. "In fact, I don't think you could buy what we do."

The catch is that all the tour stops look the same. The AGOs are all identical orange buildings on a flat, white terrain, with equipment placed in the same way at each site. Even Barfield couldn't tell them apart if the number beside the door was obscured. The only differences between the sites are the snow and altitude. AGO 4 and 5 have pressure altitudes of 14,000 and 13,500 feet (4,267-4,115m) respectively, so just walking around causes heavy breathing.

"Out there, the snow is so fluffy that you sink up to your ankles," Barfield said. "It's like walking along a very dry, sandy



Photo from Todd Johnson/Special to the Antarctic Sun

A winter's worth of snow waits to be shoveled away from the front door of AGO 6.

See AGO on page 11

AGO From page 10

beach at high altitude."

AGO 6 is nearest the coast and gets about three feet of snow a year.

"The biggest game we have out there is called dig-a-hole, and keep digging until you find something," said AGO engineer Todd Johnson.

Usually another storm comes in while the team is working at AGO 6 and they get stuck there an extra week or more. The record was 27 days last year. By the time they leave, the team members have dug so much they all have arms like Popeye, Barfield said.

Left at an AGO with food and gear, the maintenance team is stuck until they prepare a runway for an LC-130 to land with a year's supply of propane. With a long-handled shovel, a pick mattock, a snowmobile and a sled, they smooth down an area two miles (3.2 km) long and 150 feet (46 m) wide, plus a 2,000-foot (607 m) taxi strip.

"We're basically cutting 12 miles (19 km) of road out of the ice sheet for every AGO," Barfield said.

The team members take turns on the sled and snowmobile, plowing the snow in four-foot (1.2 m) swaths. At one AGO they put 400 miles (644 km) on the snow machine. Each inch of the runway is crossed four times before it's smooth enough for landing. Until then, snowmobiling across it feels like a combination of rodeo, jet skiing and motor cross, Johnson said. The snowmobile smashes into sastrugi or runs up and over them like a ski-jump.

"It's pretty much like a bronco ride," said Gina Signori, another AGO team member. "You've just got to hang on like a mad person."

Both the driver and the machine suffer. The AGO teams ruin one snowmachine at each site per year, either blowing the transmission or the engine, Barfield said. More minor problems are fixed in the field, but not easily. There's no way to get replacement parts and the cold slows everything down. At AGO 3 Freeman repaired the runway grader, which looks like a small plow, with bamboo flagpoles.

"What would take you five minutes in a shop would take half an hour out there, and lots of cussing," said AGO team member Ryan Smith.

Typically AGO teams work 12 hours, have dinner, read a little bit before sleep, then wake to start all over again, Barfield said.

"It's just eat, sleep and work. What better life is there?" Barfield said with a grin.

The team members share the four-bunk orange cabin. With a space just 3 by 8 feet (1 by 2.5 m) to move in, it is politely called cozy, but it's a place to warm up. A thermo-electric generator fueled by 1,000 gallons of propane produces almost 40 watts of power to run the experiments and keep the station from freezing. In the summer, four solar panels help out. Winter winds and temperatures down to minus 80F (-62C) occasionally overwhelm the heating system and most winters about three AGOs shutdown. But the cabins are generally warm in the summer when the maintenance crew is there.

"I've never felt unsafe out there, just because you have that shelter," Johnson said. "The aspect of that going away is very uncomfortable."

But the shelter itself became a danger at AGO 6 this season, when the stove began giving off fumes.

"It's a total conflict mentally to turn off your only source of heat for cleaner air," said Signori, after having to do just that.

The AGO life isn't for everyone. Until this year the AGO



Photo from Todd Johnson/Special to The Antarctic Sun

Eric Barnes, above, rides the ski-doo over the large sastrugi at AGO 2 as he tries to smooth out a runway. Tom Barfield connects propane tanks to power the equipment at AGO 1 through the winter. Below, a Very Low Frequency receiver listens for electromagnetic activity not far from the AGO 1 building.



Photo by Kristan Hutchison/The Antarctic Sun



Photo by Kristan Hutchison/The Antarctic Sun

farmhands were pulled from the Berg Field Center. Typically someone from McMurdo would agree to go to an AGO, then come back and say never again, Barfield said. This year he hired four dedicated AGO workers to plow the runways and tend the stations. He looked for people who appreciate being alone.

"You have to have ways to entertain yourself," Freeman said. "Some people do and some people don't."

Most people bring books and CDs. The teams traded off a DVD player to watch movies. Smith's team carried harmonicas and had daily lessons together from the "Idiot's Guide to Harmonica." Freeman's team laid \$1 bets on when the LC-130 would actually return to take them back to McMurdo Station and tallied their cursing in an effort to improve the language at the site.

"You just do dumb things like that," Freeman said.

When they're really bored, the teams go "shopping" in the boxes of frozen food left at the AGO sites. They make a game of finding the oldest still-edible item. At AGO 1 they found, and ate, a chocolate bar from 1994.

"There's so much there you could last for months," Freeman said. "We've been trying to figure out if you could winter over. It was unclear unless you killed a couple of your compatriots."

That would be a truly alien twist to the Little House stories.



Profile

By Kristan Hutchison
Sun staff

Boy Scout earns Ice badge

Last New Year's Eve Boy Scout Tim Brox slept under the stars, telling his friends in their tents that he was preparing for Antarctica.

"I said it for the shock effect," Brox now admits.

He was cold that night, of course, and his high school friends thought he was crazy. Neither he nor they really believed he'd spend the next New Year's in Antarctica, but he did, along with Christmas and Thanksgiving.

"It was the best substitute for not being home for Thanksgiving," Brox said of the traditional turkey and mashed potato feast he shared with new friends at Lake Hoare in the Dry Valleys. Then he returned to McMurdo Station for a second Thanksgiving meal.

That's the life of a Boy Scout in Antarctica, getting everywhere and doing everything.

"The objective, as far as I know it, is to give them as broad an experience as possible," said Field Support Manager Steve Dunbar, who's in charge of scheduling Brox's visits to field camps and stations.

Since the 1970s, the National Science Foundation has brought a Boy Scout each year to visit the United States Antarctic Program. Now the Boy Scouts alternate years with Girl Scouts. Brox was chosen from 167 Eagle Scouts who applied last February.

"It's no wonder," said Troy Nave, a South Pole fuelie and friend of Brox's. "Not only does he embody the Boy Scout ideal - character, citizenship, outdoor life and service to others, he is probably the most pleasant 19-year-old young man I have known."

Brox's high school science project probably helped too. For it he experimented with bioremediation, using microbes to clean up oil spills. It won him a gold medal at the California state science fair and third place in the international competition.

"I was a science nerd basically," Brox said.

That's helped him in Antarctica because he understands the scientific process.

"The comments that I've gotten back from the field from the grantees are that he's been great to work with," Dunbar said.

Brox first field assignment was at New Harbor helping divers collecting samples of foraminifera for Sam Bowser's research. He also chopped and carried sea ice for water, moved barrels, refueled the huts and did other chores around the camp.

"He's supposed to experience everything,



Photo by Tina King/Special to the Antarctic Sun

Boy Scout Tim Brox drives an all-terrain vehicle at New Harbor.

so we just threw everything at him," Bowser said.

That helped prepare Brox for later field experiences, he said. Overall he found camping in Antarctica to be easier than in the Sierra Nevadas, where Brox has camped most of his life, he said. In the Sierra Nevadas he had to hang his food to keep animals out of it and deal with bugs, dirt and heat.

"In Antarctica you've got no bugs to worry about and except for the Dry Valleys you're camping on snow and ice, so there's nothing to get you dirty," Brox said. "You can go a week without a shower."

But Brox's Boy Scout training didn't always translate to Antarctica. He chose to sleep in a tent at New Harbor rather than in the main buildings, rationalizing that it was a unique opportunity to sleep outside in Antarctica.

"It was surprisingly warm in my tent and I had no problems sleeping," Brox wrote in his online journal at www.scoutonice.org.

Then a heavy wind came up and blew Brox's tent down the beach. Diver Rob Robbins' tent stayed put nearby with the larger rocks Brox had courteously offered him. That brought Brox a little teasing.

He got even more teasing when Bowser's group arrived at Lake Hoare for Thanksgiving to find Brox and the rest of the Dry Valleys crowd decked out in wigs and nail polish.

"He's a good kid and he survived our abuses," Bowser said.

In the Dry Valleys Brox was hiking around with the Long Term Ecological Research Stream Team. For the first time in his life, the California kid put on crampons and walked across a glacier, marveling at the blue and white ice falls. Crossing the

lake ice they all stopped and got down on their hands and knees to admire the crystalline structure of cracks through the otherwise glassy ice.

"The ice was amazingly crystal clear and there you could see right down to the sediment," Brox said. "In some places you couldn't see through the ice, but the ice was shattered like snowflakes inside the ice itself."

A few weeks later Brox joined Mike Cameron's team of biologists investigating the population dynamics of Weddell seals around McMurdo Sound, and was immediately recruited to help count the seals.

"The very first day they had me doing work and it was actually not looking over someone's shoulder, but part of their research team," Brox said.

That day he checked the identity tags on 100 seals, but cautiously because he didn't know how the 1,000-pound (500 kg) seals would react. By the end of his tour with the seal group Brox was more brazen, helping throw bags over the heads of seals in order to tag them.

"Camp chores, restraining an adult male for tagging, or assisting in a necropsy were all met with the same cheerful attitude," Cameron wrote in an e-mail.

Brox also visited the South Pole. Though it wasn't assigned, he jumped in to help out with the less-glamorous jobs at both the stations, mopping floors with the night janitors at McMurdo Station and turning wrenches in the heavy shop and de-fueling planes at the South Pole, Nave said. The work Brox puts in is only part of the picture.

"Tim brings the same listening skills and eager participation from work to every activity, whether it be Happy Camper school, playing pool, or clowning around the South Pole," Nave said.

Brox leaves McMurdo Jan. 14 and will take a three-week break in New Zealand. Then he goes to Palmer to work with the Long Term Ecological Research group there until mid-March. He hopes that won't be the end of his Antarctic experiences, and it may not be. He's talked to the Palmer LTER group about continuing to work with them as an undergraduate research assistant back at Scripps Institute of Oceanography in La Jolla, Calif. He plans to start college this fall and pursue some kind of science degree.

"I want to come back however I can," Brox said.