

# The Antarctic Sun

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

## Ski-plane crashes at AGO-6

By Aaron Spitzer  
*The Antarctic Sun*

Two pilots escaped injury Sunday when their Twin Otter aircraft crashed during takeoff from an isolated landing site in East Antarctica.

The plane, a deHavilland Twin Otter turboprop owned by Kenn Borek Air Ltd. and chartered to the U.S. Antarctic Program, was taking off around 3:15 p.m. Sunday when it caught a ski in the snow and tipped sideways. A wing hit the ground and the plane suffered extensive damage.

The accident occurred on a temporary skiway at Automated Geophysical Observatory 6, located in Wilkes Land, about 800 miles northwest of McMurdo. The pilots had flown to the site earlier in the day from McMurdo Station to drop off two runway groomers, who were preparing the strip for the arrival of an LC-130 Hercules ski-plane.

On Monday afternoon, another Kenn Borek Twin Otter, chartered to the Italian Antarctic Program at Terra Nova Bay, flew to the site and retrieved the two pilots. They arrived safely back at McMurdo early Tuesday morning.

According to National Science Foundation safety and health officer Harry Mahar, the U.S. Antarctic Program and the National Transportation Safety Board will be reviewing the cause of the crash.

Tom Quinn, the USAP's air operations supervisor, said the wreck was the first Twin Otter accident in the U.S. Antarctic Program. The planes have been

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### Congratulations, it's a helicopter!

A New Zealand C-130 delivers a Bell 212 helicopter to the ice runway last week. The new arrival took the place of the Royal New Zealand Air Force helo used in the first part of the season. Photo by Ed Bowen.

## Testing tainted waters

By Josh Landis  
*The Antarctic Sun*

Most scientists come to Antarctica because it gives them a chance to do their work in the most pristine conditions on Earth. Clive Evans is here for the opposite reason. He's come to Ross Island to look at what he calls one of the most polluted places in the world: Winter Quarters Bay—the area between the ice pier and McMurdo Station.

Evans, a professor of developmental and cancer biology at the University of Auckland, said the bay has one of the highest toxic concentrations of any body of water on Earth. It's a result of oil, fuel and other contaminants the Navy dumped decades ago when it ran McMurdo.

"We come down here to keep an eye on things, to see how the water is looking," said Evans. "There are all kinds of nasty things buried in the hill. The pollution gets pushed down the hill and the various types of seepage ooze into the bay."

Standing inside a multicolored tent on top of the ice on the bay, the odor of

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**Cold classroom / Page 5**

**The great, smoky mountain / Page 8**

**Greatest showgirl on Earth / Page 12**

# To build a better station

By Josh Landis  
The Antarctic Sun

Jerry Marty has a vision. Standing in a temporary two-room construction hut at the South Pole, he sweeps his hand across blueprints and artists' conceptions of what the station will look like in another six years.

Outside the window, the motley collection of buildings, Jamesway huts, cargo piles, snow berms and vehicles that litter the landscape will be gone.

"When you get here in 2005, the only thing you will see is this," the National Science Foundation project manager said, pointing to a simple, efficient drawing looking like something out of a science fiction novel.

summer population of 30 men, the number has risen to more than 200 men and women, thanks to Jamesway huts and other temporary shelters. This winter a record 50 people will spend the long polar night.

In addition, the NSF's work to modernize the station has contributed to the population boom. Construction workers have been pushing the envelope as far as materials transport and resources like water and housing are concerned.

"We're really busy here, practically bursting at the seams," Marty said.

Upon completion, the new station will be able to house 110 people. Of that number, slightly less than 50 percent will be scientists. The rest will be support

sweeping across the polar plateau from burying the dome and other buildings. The new structure will stand on a framework of supports, keeping it up in the air to minimize drift buildup. If the snow ever gets as high as the stilts, the entire structure can be raised.

"It will be a high-quality facility that will support the U.S. Antarctic Program for the next 25 to 40 years," Brier said.

"The only remaining design activity is the computer and communication system," he said. Designers will tackle that challenge starting next year, and the systems will be installed as the building goes up.

Though the people will be living



An artist's conception of the new South Pole Station. Lines in the upper left corner indicate subsurface areas. Drawing by T. Vaughan

It's the future of the \$128 million South Pole Station Modernization, years in the making.

"It will allow the continuation and growth of the science program," engineering projects manager Frank Brier said. "Without new facilities the station would be closed in 10 to 15 years."

Keeping it safe and habitable would become difficult long before that.

Amundsen-Scott Station, constructed in the mid-1970s, was designed to last 20 to 25 years with far fewer occupants than it has had in recent seasons. Originally intended to house a

personnel.

The elevated structure will be modular and, depending on science needs, can be expanded to accommodate 150 people. In addition to housing, it will hold the galley, store, laundry facilities, library, recreation room, medical office, greenhouse, emergency water and power supplies, and heated storage areas.

Current research facilities like the space and clean air observatories will remain where they are.

One of the biggest challenges of maintaining the current station is preventing the snow that's constantly

and working while elevated, a network of sub-snow facilities will be essential to the station's operation.

The old garage shop arch will be completely covered by snow. It will still be used, however, for storage, waste management and cargo. Buried on either side of it will be the new garage shop and new power plant—all of it churning away, out of the wind and out of the way of drifting snow.

Amundsen-Scott Station will be a far different sight than it is now. ●

## Letter to the editors

### Thanks from Weddell World

For the past three seasons, Weddell World was built and supported by many wonderful individuals from Antarctic Support Associates and the National Science Foundation. We thank all of those who contributed directly to supporting us, as well as those who contributed indirectly by making our time at McMurdo Station so pleasurable.

All the best to all of you for a happy holiday season and a wonderful new millennium, from the beakers of Weddell World.

—Lee Fuiman

## The week in weather

### Palmer

H/ 43 F

L/ 28 F

Min Wind Chill: -2 F

Max Wind: 55 mph

### South Pole

H/ -18 F

L/ -31 F

Min Wind Chill: -63 F

Max Wind: 21 mph

### McMurdo

H/ 39 F

L/ 16 F

Min Wind Chill: -13 F

Max Wind: 20 mph

## In brief

### Tourist season gearing up

The Ross Sea tourist season is under way, with last week's departure of the vessel Kapitan Khlebnikov from Lyttleton, New Zealand.

The Khlebnikov, which set sail Wednesday, will be joined in the Ross Sea this summer by three other tourist ships, the Marco Polo, the Akademik Shokalskiy and the Lyubov Orlova.

The Khlebnikov is scheduled to visit the McMurdo Sound area on December 27, but will not actually stop at McMurdo Station until January 20. It will anchor offshore and its 112 passengers will be transferred to land via Zodiac boats and helicopters.

The Shokalskiy plans to arrive in MacTown the next day with 48 tourists on board.

The next docking at McMurdo Station is set for February 11-12, when the

Marco Polo should arrive with between 450-550 passengers. The Shokalskiy will make a return visit February 16, again with 48 visitors on board.

The Khlebnikov is operated by American-based Quark Expeditions and Zeghrum Expeditions, while the Polo is run by the U.S.-owned Orient Lines. New Zealand's Heritage Expeditions operates the Shokalskiy, while the Lyubov Orlova is run by Marine Expeditions of Canada.

### Life in subglacial lake?

Scientists have uncovered a wealth of microbial life in the ice above the surface of the continent's largest known subglacial lake, shedding light on the environment of the lake itself.

According to an article published in the December 10 issue of Science magazine, ice cores extracted near the surface of Lake Vostok have revealed a range of bacterial colonies cut off from the outside world for millions of years.

Lake Vostok is situated more than

two miles under the East Antarctic Ice Sheet, directly beneath Russia's Vostok Station. The body of water is approximately the size of Lake Ontario, and was discovered through radar and seismic studies three years ago.

The microbial samples were found in cores taken about 400 feet above the lake, in "accreted" ice, or ice thought to be refrozen lake water.

According to the article, co-authored by researchers John Priscu and David Karl, the bacteria are biologically similar to known organisms. Their presence in the ice raises questions about how life can exist in such a dark, cold, isolated environment.

It is unclear whether the same microbes, or even more diverse species, exist in the liquid lake itself. Researchers from around the world gathered in England this September to discuss methods of probing the lake without contaminating it.

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**Web address:** <http://www.asa.org>

## New in the Store:

\* Operation Deep Freeze polos and T-shirts

\* 2 new styles of T-shirts

\* A new hat

\* New books:

-Terra Incognita by Sara Wheeler

-Penguins by Jonathan Chester



It's the week before Christmas  
And the Store has new things  
Hop to it and play Santa  
Before you know it  
It'll be spring!

Store hours for upcoming holiday weekends: Closed Saturday, Open Sunday 11 a.m. to 4 p.m.

*"Waters—from Page 1*

that seepage, and the sewage outfall from the station contrast sharply with the clean air sweeping across McMurdo Sound. There is an oily sheen visible on top of the icy water in the hole.

"OK, let's go!"

Evans calls out to Glenn Lurman, a graduate student in toxicology. Moments later, Lurman and Evans haul up a cage made of plastic tubing surrounded by a mesh material, with ten fish flopping at the bottom.

Water sampling can quantify the pollution problem, but there is only one way to find out how harmful it is to organisms living in the area: catch and examine them. Evans focuses on fish, using *Trematomus bernacchi* as aquatic canaries.

First Evans went fishing off Cape Royds, where the water is pristine, and caught 40 fish. Twenty he put under the ice in Winter Quarters Bay, the other 20 he kept as a control group, at a clean site near Cape Armitage.

After two weeks, he pulled ten from each group out of the water. The control group "looked excellent, pristine," according to Evans.

Of the ten he pulled from Winter Quarters Bay, two had liver tumors and one had what he calls "X-cell disease." It's a condition that causes the gills to expand and develop a foamy consistency, interfering with the animal's ability to breathe. The remaining seven fish are being examined for other ailments.

"I'm surprised he saw such a change in the fish after just two weeks," environmental scientist Chuck Kennicutt said. "Usually tumor growth is the last in a series of reactions to

toxins."

Kennicutt and his team are sampling sites in and around McMurdo to assess the level of human impact in the area. Winter Quarters Bay has been hit the hardest. A polychlorinated



*New Zealand graduate student Glenn Lurman hoists a fish pen to the surface of Winter Quarters Bay. Lurman and his professor, Clive Evans, are studying the effects of pollution on the fish. Photo by Aaron Spitzer.*

biphenyl (PCB) count of 6 parts per million has been recorded there. That's 6,000 times higher than most scientists consider even marginally acceptable.

He said the reason the levels are so high has to do with the shape of the bay's floor. It's a natural catch basin, concentrating decades of toxins at the very bottom. While it makes the pollutants stronger in the bay, it's a blessing because it keeps them from spreading.

It also makes the prospect of clean up very complicated.

"The likelihood is, if you stir up sediments they could be redistributed

over a larger area," said Kennicutt.

Microbial remediation—the use of microorganisms to degrade the pollutants—won't work because the climate is too cold.

The plan so far has been to leave it in place, and not do any kind of cleanup.

"But that was based on the assumption that the toxins were contained," said Kennicutt.

If fish could potentially transport the contaminants up the food chain, it may change the way the situation is viewed.

Evans and Lurman aim to shed more light on the situation by repeating their transplant experiment.

"At this point, whether the [tumors are] attributable to the fish being in Winter Quarters Bay we can't really say," Lurman said.

Hydrocarbons and PCBs may be most harmful to fish, but there's another pollutant they have to deal with: the raw sewage churned out by McMurdo Station, which is pumped into the bay. Again, the underwater topography of the bay keeps the waste from traveling.

The biggest threat from the sewage, according to Kennicutt, is a rise in microbial life, which can drive a process that ultimately lowers the

amount of oxygen in the water.

As for the effect of the effluvia, it doesn't seem to harm the fish. In fact, Evans said, they've come up with an adaptive approach to dealing with the waste: they eat it.

It's something he didn't expect when he sampled fish living near the discharge pipe.

"When I opened up their stomachs they were filled with peas and corn and carrots," Evans said. "It was quite a surprise to find out they were, shall we say, vegetarian." ●

# Lessons at low latitudes

By Jeff Inglis and Aaron Spitzer  
The Antarctic Sun

"I was born in the wrong century to be a pioneer," said Jean Roberts, a high school science teacher from Fresno, California. And yet she is an explorer, one of only eight U.S. teachers in this year's Teachers Experiencing Antarctica program.

Sponsored by the National Science Foundation, TEA is a way for information about the polar regions to make its way to America's schools.

Teachers apply to come to Antarctica. Those who are selected, sometimes after multiple tries, are matched with research teams in the U.S. Antarctic Program.

The teachers then become part of the team, performing regular duties for the length of the project's stay on the Ice.



Jean Roberts

"I've been trying to hit as many departments as I can," Smith said. He is working on introducing students back in the U.S. to life around McMurdo Station, as well as to the science.

Sharon Harris, a high school teacher from Cincinnati, Ohio, has a "question of the day" in her journal. Each day she gives the answer to the previous day's question. She also periodically profiles people around the station, talking about who they are and what they do.

## Different reasons

For Roberts, it's exhilarating to come to the Ice.

"Just coming to Antarctica has always been a dream," she said.

Smith too wanted to visit the continent, but held out little hope for being selected. "I didn't think I'd ever get here," he said.

Harris felt a bit differently.

"I knew where it was, but I really didn't know anything else about it," she said. But this remote place has found its

place in her heart, too.

"When we finally landed, I cried," Harris said.

According to Roberts, TEA really isn't about teachers, it's about the kids. "Whatever I learn I pass on to them," she said.

This is the aim of the program. Teachers come to Antarctica and absorb as much as they can. Upon their return to the world, they share their new learning with teachers, students and community groups.

This even begins before they depart. Smith visited 20 schools around his home before coming to the Ice. Roberts has contacted her local Rotary and Kiwanis clubs as well as a museum near her home.

## Ice time reflections

Roberts has been largely a general assistant on Mount Erebus, helping the research at the Mount Erebus Volcano Observatory.

"They will be moving stations around, downloading data, setting up antennas," she said. "I'm a pair of hands."

She realizes, though, that she's a representative for TEA all the time. She doesn't want to give the program a bad name among researchers, who can choose to have a teacher along or not.

"I didn't want to be a burden to them. I wanted to be a working member of the team," she said. She does have a steep learning curve, with new vocabulary and equipment to learn about.



Sharon Harris

Smith is also outside his usual field. A chemist in a palynology lab, he's had to really think his way through making this experience apply directly to his classroom.

"It made me stretch," he said. It also made him understand more of what the professional and academic worlds expect of scientists, helping him be a better mentor for science students in the future.

He has been around a number of high-powered scientists involved with the Cape Roberts Project. All of them are important researchers back home, but



Bruce Smith

See "Teachers"—Page 7

## Our Antarctic Week

### Today

Ross Island Art Show, 1:30-4:30 p.m., Galley  
Crary Lab tour, 2 p.m., Crary Lab  
Sunday Science Lecture: Dr. Chuck Kennicutt,  
"Environmental Monitoring in Antarctica," 8:30  
p.m., Galley

### Monday

Slide show: Alan Stone, "Winter in Antarctica," 8:30  
p.m., Galley

### Tuesday

Crary Lab tour, 8:30 a.m., Crary. Scheduled for night  
workers.

### Wednesday

Christmas Bingo, 8:30 p.m., Gallagher's. Get your  
picture taken with Santa!

### Thursday

Christmas movie, Coffee House, 8 p.m. Grinch, 8:30  
p.m. movie TBA

### Friday

Christmas Party, 7:30 p.m., Heavy Shop (VMF). Choir,  
live band.

### Saturday

Christmas dinner in the Galley  
Christmas dance, 8-10 p.m., Gym

### Sunday

Ski from Pegasus to Williams Field, 11:00 a.m. Sign up  
on Monday.

*If you have an item for the weekly calendar, e-mail us at  
sun\_news@mcmurdo.gov, call 2407, or drop by our office  
in Building 155.*



A Kenn Borek Twin Otter turboprop stops at the South Pole earlier this season. Photo by Cassandra Graber.

### "Otter"—from Page 1

in use on the Ice at least since the 1980s, he said.

Though the Twin Otter was one of only two such aircraft based in McMurdo, Quinn said the accident will not cause a significant disruption to the summer field research season. Twin Otters are used to reach regions inaccessible to the much larger LC-130s.

Another Twin Otter is being sent from Kenn Borek's headquarters in Calgary, Alberta, Quinn said. If weather is favorable, that plane could arrive by December 26, after flying across North and South America, the Drake Passage and West Antarctica.

Until then, helicopters and the Italian Twin Otter are picking up the slack, he said. The Italian plane will soon be retrieving two American researchers working on the summit of Mount Moulton near the Ford Ranges.

"We're managing to take care of all the things we had scheduled," Quinn said. "Nobody's hurting because of it. It's getting done."

He said the Italians and Americans often share aviation resources. The U.S. program regularly uses the Italian Twin Otter at the beginning of the summer and the Italians borrow the American-chartered planes at the end of the season, he said.

The Italian plane is the only other Kenn Borek Twin Otter on the Ice, Quinn said. ■

## Faces on

## What are you doing to celebrate the holidays?



"I'm spending the holidays in Kaikoura and remembering my special friends at McMurdo."

**Lee Fuiman**

Weddell seal beaker



Delivering cookies and Fanta, and singing carols.

**"Fanta Claus," Victoria Miles, Francine Oliver, Gummy**

Recreation staff



"I'm going to walk the Castle Rock loop and have a beer."

**Toby Wood**

Carp shop

# Station and Vessel updates

## Palmer Station

By Bob Farrell

When the R/V Laurence M. Gould called on Palmer Station on December 8 and 9, the station received its first load of fresh fruits and vegetables.

During the port call the station hosted members of the British Antarctic Survey. The RRS James Clark Ross had been unable to reach Rothera Station due to heavy sea ice and came to Palmer to transfer some passengers. Four BAS Twin Otters flew from Rothera to pick up the passengers. They landed on the glacier behind Palmer Station. This was an unprecedented visit, bringing two ships and four aircraft to the station.

Later in the week the cruise ship M/V Explorer visited the station. Their passengers toured the station and enjoyed refreshments in the dining room. The tourism season is just beginning here and it promises to be a very busy one.

Members of the station science community remain busy in the waters around the station. The Adelie penguin chicks in the area have begun hatching, so the researchers will be very busy following their progress.

## South Pole Station

By Tracy Sheeley

The South Pole population remains at a record high while our temperatures continue to break record lows. Station population has been hovering around 200. Out of the first 15 days of December, nine broke low temperature records. Our summer progress continues both in construction and scientific projects.

Construction on the DASI telescope was completed by December 14 and a ceremony was held to acknowledge the efforts and cooperation of construction, engineering and science. The telescope has been handed off to the scientists for calibration, wiring and fine tuning to be completed by the onset of the winter season. Stunning data is predicted one to two months into winter.

The garage shop was dedicated with a ribbon cutting ceremony at an all-hands meeting on December 11. A certificate of occupancy has been issued and mechanics will be moving into their new home soon.

The first two weeks of December have also been dedicated to an annual "snow stake" project, which measures snow accumulation on the polar plateau. This project was initiated in 1992, though measurements have been taken since 1957.

Stakes were placed in the snow, extending out 12 and a half miles in six directions. They are measured each year by Polies in groups of two, who go out on snowmobile or tracked vehicle in full ECW gear to measure the accumulation.

Many other fields of research depend on this contribution for their own studies.

Our solar-heated ski shack has been installed about two miles away from the station for those with a little extra energy or the desire to see the South Pole Station from a new perspective. Holiday preparations are in full swing, with a decorated galley in place, and plans being laid for the "Race Around the World" and the ushering in of the new year. ●

## "Teachers"—from Page 5

they operate as equals in Antarctica.

"It's like having all these chiefs in one room," he said. "I'm just kind of in the middle there."

Harris's work has involved analyzing gases collected in field samples. She spent 14 years as a microbiologist before becoming a teacher, and is using those lab skills again now.

Like most researchers, Harris works long hours but also gets time to relax. Her journey in Antarctica has been very close to her heart.

"It's so personal that it's hard to describe," she said. "I will go back a changed person."

## Onward and homeward

After they leave the Ice their work is not done. All of them will continue their outreach efforts, as well as integrating their experiences into the classroom.

"I'm also responsible for writing some curriculum," Roberts said.

Beyond hugging her 12-year-old son, Harris isn't sure

what will happen when she goes home. She's gained an insight into perspective here, though. She's studying microorganisms living within sight of glaciers.

"Everything is either really big or really small," she said.

Smith is also motivated to learn more after he goes home, about the science and about the people.

"There's kind of a subculture here that the rest of the world is oblivious to, and vice versa," he said. "I didn't anticipate the people that would be here."

He's been warned that thinking he only will come to Antarctica once is a common error. Many of the people he's met and worked with had that same thought, years and years ago.

The intensity of the experience is both rewarding and tough.

"It's probably going to make me a better teacher," Smith said.

Harris echoed that sentiment, and still wants more. "I wish that I had more time to get out and experience things," she said. ●



## Check out the Sun websites of the week:

[www.antarcticconnection.com](http://www.antarcticconnection.com)  
Books, maps, videos, gifts, clothing and more.

[www.adventuroustraveler.com](http://www.adventuroustraveler.com)  
Has a long list of rare books and photographs on Antarctica as well as other locations.

[www.allpointsnorth.com](http://www.allpointsnorth.com)  
[www.maziejane.com](http://www.maziejane.com)  
Products with images by photographers who have been part of the U.S. Antarctic Program.

*The Sun does not endorse the products or services traded by these businesses, and has not received any compensation for listing them here.*

# ON TOP OF OLD SMOKY

By Aaron Spitzer  
The Antarctic Sun

"Give me Erebus for my friend," wrote Heroic-Age explorer Apsley Cherry-Garrard, who for two years lived in its looming shadow. "He is the most restful mountain in the world."

Volcanologist Philip Kyle would both agree and disagree.

Mount Erebus is Antarctica's legendary peak, the Fuji of this cold continent. And Kyle—a rangy, black-bearded, mischievous ex-Kiwi—is the mountain's best friend. He has spent a quarter-century of summers on its upper slopes.

But Kyle befriended Erebus because the peak is restless, not restful. It is, after all, the most active volcano in Antarctica.

As friendships go, it's been rocky at times.

Twice, minor eruptions knocked Kyle unconscious while he worked in the steaming crater of the volcano. Both times he awoke quickly and scrambled out of the caldera to safety.

And just this year, blizzards pinned down a party of his researchers for five days at Fang Glacier on Erebus' northern flank.

But the mountain has also been good to Kyle, disclosing secrets to him that many volcanoes refuse to reveal. Despite its prodigious height—12,448 feet—and isolated location—only 800 miles from the South Pole—the mountain is surprisingly cooperative.

According to Rick Aster, a fellow scientist who has worked with Kyle for the last several years, "This

volcano is an easy one to get close to. It's an excellent natural laboratory for volcanology."

That's why Kyle, Aster and their

explorers sometimes saw a red glow in the clouds above Erebus and suspected that a pool of lava burbled in the mountain's mouth.

But Kyle was the first volcano expert to confirm that suspicion. In 1971 he ascended the mountain and peered over the rim. The crater was a quarter-mile wide and an eighth of a mile deep. Inside, simmering at around 1,800 degrees Fahrenheit, was a lake of molten rock nearly 50 feet wide.

"This makes it a fairly unique volcano," Kyle said. Most volcanoes either erupt or dry up, but Erebus' lava lake has been more or less in stasis for at least 100 years. "It's sitting in equilibrium," he said.

The work Kyle's group is doing this summer is two-pronged, with a focus both on the volcano's seismic activity and its gas emissions.

On solid rock around Erebus' crown they have installed eight broadband seismometers, which perceive motions in the Earth as subtle as a few millionths of a meter.

Every time the volcano quivers, the seismometers know. According to Kyle, their data will help map the

plumbing system of Erebus and explain the mechanisms by which the mountain expels gas and rock. In effect, it permits a peek inside the mountain, making a kind of CAT scan of Erebus.

The seismometers, powered by two-watt solar cells, run for up to two months and log their data on disk.

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Volcanologist Philip Kyle stands before a fumarole named "Harry's Dream." Formed by frozen steam venting from the slopes of Mount Erebus, some fumaroles can grow up to 15 feet high. Photo by Bjorn Johns.

graduate students, all from the New Mexico Institute of Mining and Technology, are spending late November and December at the top of the bottom of the world.

Ancient myth long held it that the poles were openings to the inner Earth. And so, on Erebus, they are.

Back in Cherry-Garrard's day,

*"Erebus"—from Page 8*

Before winter sets in and the slopes become inaccessible, the devices will be collected and their data retrieved.

The team is also gathering gas samples, both from the crater and from vents ringing the mountaintop.

"We're very interested in what the environmental effect of Erebus is," Kyle said. "How much gas does Erebus put into the atmosphere?"

He's particularly concerned with carbon dioxide—a chemical compound widely implicated in theories of global warming. To determine the human contribution of CO<sub>2</sub> to the atmosphere, scientists must first find out how much is given off in nature. Volcanoes like Erebus are potentially major sources of such emissions, Kyle said.

Another gas of interest is lead, which has been found laced through the snows of East Antarctica. Its presence was attributed to the burning of lead-based fuels at lower latitudes, but Kyle suspects the mountain's emissions are a more likely culprit.

Using both portable and helicopter-rigged monitors, Kyle's team will be sampling Erebus' plume. "What we want to do is get to those gasses and fingerprint them," he said.

To accomplish all this work, Kyle and his team are staged out of Lower Erebus Camp: a collection of tents and Ski-Doos huddled around a Jamesway and a squat wooden hut, 11,000 feet up the north face of the peak.

The buildings are nestled in a depression amid a moonscape of frozen lava flows. Yards away, a vista reveals the sweep of the ice-choked Ross Sea and mountains 100 miles distant.

The temperatures at camp are usually below zero Fahrenheit, and the winds are unforgiving, keeping the camp's New Mexico state flag snapping atop its pole.

Living on the shoulders of



*Outside of Lower Erebus Camp, an A-Star helicopter lifts off for a trip up to the caldera of Mount Erebus, 1,500 feet above. Photo by Aaron Spitzer.*

Erebus, it's hard to forget "home" is a volcano. When the wind is right, the smell of sulfur sweeps over the camp. Even minor explosions at the rim echo miles away. And almost always, like a smoking gun, a plume of steam escapes the caldera, a reminder that the mountain is alive.

Between two and six times a day, a blast rocks the rim of the crater as gas and molten stone shoot from the lava pool.

One recent eruption caught master's student Jesse Crain off-guard as she worked near the edge of the caldera. "We heard a large boom and then the bombs were flying all over the place," she said.

In this instance, the phonolitic "bombs" posed no danger. As in most cases, the glassy masses of semi-molten rock shot straight up and plunged right back down.

Sometimes, though, the volcano lobs bombs out onto the rim. And every so often, Erebus really acts up.

On September 13, 1984, the

mountain suddenly became energized, throwing bombs up to a mile-and-a-half from the caldera. Many of the boulders were refrigerator-sized, and some measured up to 30 feet long.

The Upper Erebus Hut, 300 feet below the crater rim and in use since the late 1970s, was deemed too dangerous to occupy. Kyle and his researchers retreated to the present, lower camp.

Three months later, the mountain settled down again, and has continued its lazy ways ever since.

According to the researchers, Antarctica's southernmost active volcano poses no danger to the McMurdo and Scott research stations that have grown up on its flanks.

"It's not a threat," Kyle said. "You can tell what a volcano is going to do from its past." And on grand scale, Erebus hasn't done much. The most recent major eruption seems to have been 30,000 years ago, when the mountain scattered volcanic ash nearly 200 miles away. ●



## **Contribute to McMurdo's Millennium Time Capsule!**

Seeking small mementos, images, journal entries, etc., to commemorate the millennium and to be opened in 25 years. Bring to the McMurdo Historical Society meetings, Sundays at 6:30 p.m. in the Library, or contact Ed Anderson at [andersed@mcmurdo.gov](mailto:andersed@mcmurdo.gov). Deadline is January 20.

"Briefs"— from Page 3

Scientists from NASA are taking a special interest in plans for a probe, seeing Lake Vostok as a test bed for potential exploration of the ice-covered ocean believed to exist on Europa, one of Jupiter's major moons.

**Found: One explorer's wallet**

In a surprise discovery, members of the Christchurch-based Antarctic Heritage Trust found a wallet while doing restoration work at the Cape Evans hut.

Located between two bunks, the wallet held four tram tickets and a workman's ferry pass, all from Sydney, Australia.

The ferry pass is dated November 21, 1914, indicating the wallet's owner was part of Shackleton's Imperial Transantarctic Expedition. One of the expedition's ships, the Aurora, docked in Sydney on its way to the Ross Sea.

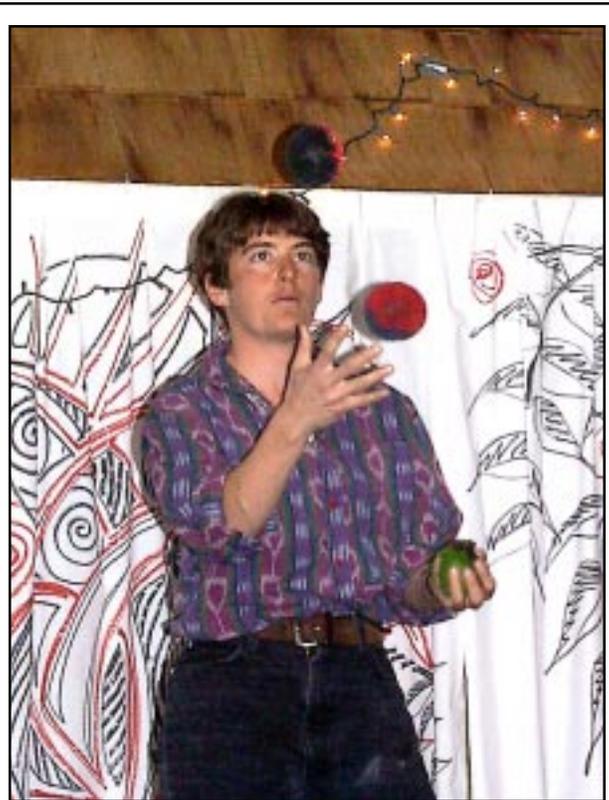
Also in the wallet were several photographs, which may provide clues to the owner's identity. Personal items are rarely found in the huts, as they usually went home with their owners at the end of the expedition.

The Trust suspects that either Rev. Spencer-Smith or Victor Hayward may have been the owner of the wallet. They both used the bunk closest to the wallet's location.

Both men, members of the marooned Ross Sea party, died during the expedition, which increases the likelihood that their personal effects might have been left behind in the hut.

The Trust will contact known descendants of the expedition members to see if any of them recognize the photographs. Conservators will work to preserve the wallet prior to determining its storage location.

The last time a new artifact was discovered in the hut was about five years ago, according to Trust curator Sheridan Easdale. It was a glass-plate photographic negative, also from Shackleton's Ross Sea shore party.



Claire Carpenter juggles as part of her performance at the McMurdo Women's Soiree last Saturday night. Over 200 people attended the event, which raised over \$1,000 for the Christchurch Women's Refuge. Photo by Jeff Inglis.

**Ross Island Chronicles**  
by Richard Perales

Great day for a game of golf.



Nice Shot!!!



Talk about luck.



Looks like it landed in a seal hole.



# Perspectives

## A trip to AGO(ny) 3

By Jess Barr  
Special to the Sun

One day.

One day's warning to prepare myself for the East Antarctic plateau. I guess they don't want to give you more time, lest you change your mind on going out into that great, white, frozen abyss.

In excitement, though, I transformed overnight from a small unworthy GA into a scary looking, down-clad

can get you in, but there's no way out until the Hercules can deliver the big fuel resupply.

Life is simple there. ... Well, at least for the grunts like myself. You crawl out of your frosty sleeping bag, cover every possible inch of your flesh with about five inches of goose feathers, empty your pee bottle, melt snow for the day's water (of course not from where you emptied your pee bottle), eat some fat, stuff your boots and mittens with handwarmers and then



Michelin woman. From saunas and bowling alleys to tents and ice-walled crappers. From 20 F to minus 40 F. And from the great big Ob Hill to, uh, not a single thing.

My job was to build a one-time runway using a Ski-Doo and groomer as my modes of packed destruction. Big air off snow berms is awesome! Until the groomer catches and sends you flying into the dash.

So, why all this work? You see, these AGOs (Automated Geophysical Observatories) record data 12 months unattended. But when that time is up, some lucky souls must waddle in and fire it up for another year. The Twin Otters

hop on for the Ski-Doo rodeo. Yee haw!

At AGO 3, this wasn't an entirely seamless mission. The first runway builder was evacuated for frostbite, the next broke two snow machines, and then my partner Ed and I came in for the third relief.

We were quickly successful, prompted by our anxious engineers Anna and Remy—to get them the heck outta there! I think the secret to our success was eating a lot of chocolate and bacon from a can.

So, would I go back? Oh, I think I'd let everyone get their turn before I bullied my way back in. Just being nice. ●

## COLD HARD FACTS

Compiled by Jeff Inglis

### Ski-equipped airplanes

#### LC-130H

- 4,300 horsepower per engine
- 97 feet, 9 inches long; 38 feet, 3 inches high; wingspan 132 feet, 7 inches
- McMurdo-Christchurch max speed 316 mph

#### Twin Otter DH-6

- 620 horsepower per engine
- 49 feet long; wingspan 56 feet
- cruising speed 178 mph
- range without extra tanks: 600 miles

### Wheeled airplanes

#### C-141B

- 20,250 pounds thrust per engine
- 168 feet, 4 inches long; 39 feet, 3 inches high; wingspan 160 feet
- max speed 500 mph
- range 2,500 miles

#### C-17

- 40,900 pounds thrust per engine
- 173 feet, 11 inches long; 55 feet, 1 inch high; wingspan 170 feet, 9 inches
- max speed 500 mph
- max cargo load 170,900 pounds

#### New Zealand C-130

- 4,910 horsepower per engine
- max payload 45,000 pounds
- range 2,393 miles

### Helicopters

#### Bell 212

- max sling load 3,000 pounds
- top speed 138 mph
- carrying capacity 5 passengers, 750 pounds of cargo
- range 98 miles
- endurance 1 hour, 42 minutes

#### A-Star (AS-350 B2)

- carrying capacity 900 pounds of fuel, 600 pounds internal cargo, 530 pounds external cargo

- range 147 miles

- endurance 2 hours, 20 minutes

#### Coast Guard HH-65A "Dolphin"

- carrying capacity 1,200 pounds internal cargo with full fuel load

- max sling load 2,000 pounds

- max speed 190 mph

- range 345 miles

- endurance 3 hours, 30 minutes



# PROFILE

## From the big top to the bottom of the world

By Aaron Spitzer  
*The Antarctic Sun*

Growing up, most everyone dreams of running away and joining the circus. But one McMurdo electrician really did it.

"I just have such wonderful memories of the circus," says Irma Hale, a bright-eyed 46-year-old Floridian spending her first season on the Ice.

These days, a Carhartt-clad, utility-belted Hale can be most often seen mending the intricate wiring systems that keep McMurdo lit and powered.

But for a year of her life, she earned her living high above a bedazzled crowd, dangling from an ankle or an arm, wearing an elaborate sequin- and rhinestone-studded costume in "the Greatest Show on Earth."

It was the mid-1970s, and Hale was in the middle of her college career, training to become a classical pianist.

The Ringling Bros. and Barnum & Bailey Circus had come to town, and she found herself seated in the stands, daydreaming about joining the showpeople and living on the open road.

"And then I thought to myself, 'Either do it or shut up,'" she said.

That evening she tracked down the circus' performance director, who offered her an audition the next day. When she showed up, he pulled down a rope and asked if she could climb it. Hale had no idea, but she scurried up and was offered a job on the spot.

She would have signed on immediately, but the pleas of her parents prevailed. Hale stayed in college, earned her degree, and then—two years later, this time after numerous auditions—was given a role as an aerialist and showgirl in the most famous circus in the world.

For more than a century, the Ringling Bros. and Barnum & Bailey Circus had been wowing ladies and gentlemen and children of all ages. The show was a stupendous operation, comprising a cast of 150, including comical clowns, charismatic ringmasters, death-defying acrobats and iron-hearted animal trainers, including famous tiger-tamer Gunther Gebel-Williams.

Backing them all up was an army of roadies and technicians, wardrobe workers, make-up artists, accountants and

managers.

No circus would be complete without a magnificent menagerie, and Ringling had it all: dogs, chimpanzees, horses, zebras, lions, tigers, bears and a herd of 30 elephants.

Hale and her fellow performers traveled aboard the circus' own train, a mile and a half long, riding the rails across America.

One of her happiest memories, she says, was waking up early, pouring a cup of coffee, opening the train car vestibule and dangling her legs over the side as the world whizzed by.

The train would stop at little towns and large cities, wherever there was an arena big enough to serve as a modern-day big top. After a few days or a week's worth of shows, they would parade the animals back through town to the rail yard and pull out for the next destination.

Hale played a range of roles in the show—from doing dance numbers, to riding on the backs of horses and

elephants, to dangling perilously from a rope far above the crowd.

Every night she wore four different costumes, each more fantastic than the next. Encrusted with rhinestones, the heaviest weighed 40 pounds and was so constricting that if she fell down she couldn't stand up on her own.

Once, during the opening act, she tumbled over and was stranded in the path of the oncoming elephants. The animals, ever wary of where they stepped, carefully avoided her, but the crowd went wild with excitement.

Hale's fondest memories of that year in the circus were of her co-workers. "They were wonderful people, really wonderful people," she said. "In a sense it was like being down here ... If anyone was ever in trouble you had 300 people to back you up."

Many of the performers hailed from exotic corners of the world. Some were only short-timers like her, but others were circus folk for life, living permanently aboard the train, passing down their acts to their children.

Hale remains in contact with many of them, and she regrets that it only lasted for a year. "In hindsight I should have stayed longer," she said wistfully. "It was one of the best jobs I ever had." 

