Final issue
The Sun will rise again next summer.

February 4, 2007

The Antarctic Sun

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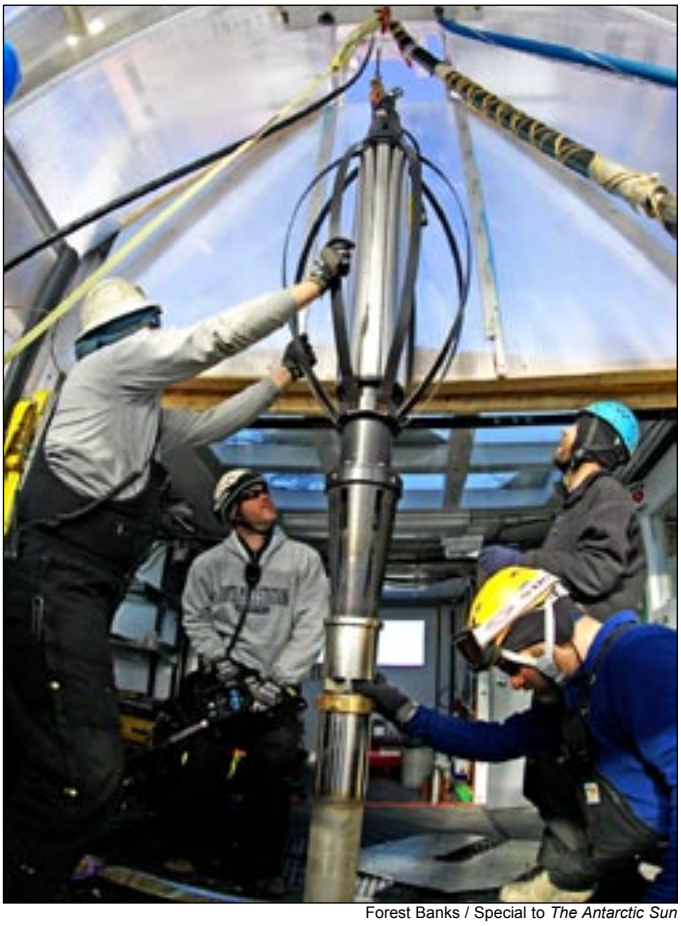


Forest Banks / Special to *The Antarctic Sun*

IceCube drillers at the South Pole adjust a hot water drill above a recently started hole, which was created for a new strand of sensors in the array. The project's construction is due to be complete in 2011.

IceCube hits growth spurt

Lab enhances array as construction surges forward

By Steven Profaizer
Sun staff

In just one season, IceCube has doubled in size.

This is the third year of construction for the detector array, which will search for interactions between notoriously elusive neutrinos and the three-kilometer-thick ice sheet that covers the South Pole.

Although the array is just one-fourth of its eventual size, it already dwarfs it predecessor, AMANDA (Antarctic Muon and Neutrino Detector Array).

"Even just a quarter of IceCube is more than five times the size of AMANDA, so this is already a whole new game," said Francis Halzen, principal investigator of IceCube.

See LAB on page 16

Innovations bristle with possibilities for Antarctic ops

By Steve Martaindale
Sun staff

As George Blaisdell looks around Antarctica, he does not see so much what is here as what might be.

As operations manager in the Office of Polar Programs of the National Science Foundation, his job covers the spectrum of how things get done, from getting electricity to the stations to giving aircraft a safe place to land. While such a job is continually focused on the here and now, he can easily fill a conversation with his images of the future.

Visions such as going from three seasonal airfields at McMurdo Station to just one, adding a wheeled runway at South Pole that would support C-17s, using an electromagnetic sea ice profiler to make projects on the ice safer and quicker, harvesting electricity from the wind and sun,

See RHINO on page 18

Steve Martaindale / *The Antarctic Sun*

A McMurdo truck kicks up machinery-clogging, eye-irritating dust. A test is currently under way for a product to bind road surfaces.

INSIDE

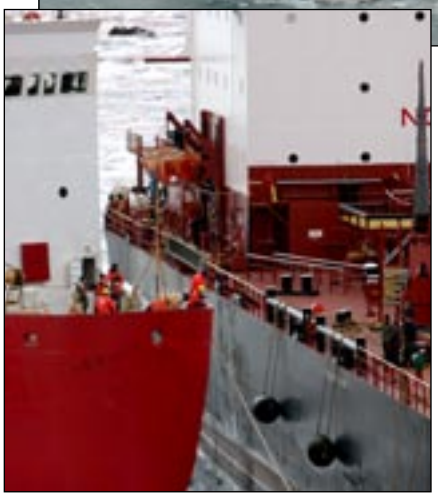
Seals and sea ice **Page 7**

An early retirement **Page 22**

Quote of the Week

"Summer is over. After two weeks of fall, winter will be back."
– McMurdo resident on the dropping temperatures

Coming to port



Photos by Peter Rejcek / *The Antarctic Sun*

The Paul Buck*, at right, sits next to the U.S. Coast Guard's* Polar Sea*. The USAP research vessel* Nathaniel B. Palmer *can be seen in the shipping channel behind them. The* Paul Buck *arrived at McMurdo Station on Jan. 31 to make its annual fuel transfer. This year, the ship was scheduled to deliver 6,818,675 gallons of fuel to McMurdo.*

Cold, hard facts

International Polar Year

Official international opening ceremony: **March 1 in Paris, France**

Fifteen countries will also hold their own launch events for IPY. The United States' launch will be at the National Academy of Science.

The IPY will run from **March 1, 2007, to March 1, 2009**, to allow for two summer seasons of science in each polar region.

More than **60 countries** have committed to IPY activities.

Number of time periods previously dedicated to polar-intensive research: **three** (one beginning in 1882, one in 1932 and one in 1957)

There are currently **228 IPY projects planned**. Of those, 166 are science projects, and 52 are dedicated to education and outreach.

Number of hits on Google for "International Polar Year": **526,000**

Source: IPY.org and Google.com

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Senior Editor: Peter Rejcek
Editors: Steven Profaizer, Steve Martaindale
Copy Editors: Ben Bachelder, Jesse Hastings, Rob Jones, Traci Macnamara, Cori Manka, Melanie Miller, Erin Popelka, Bethany Profaizer
Publisher: Valerie Carroll, Communications manager, RPSC
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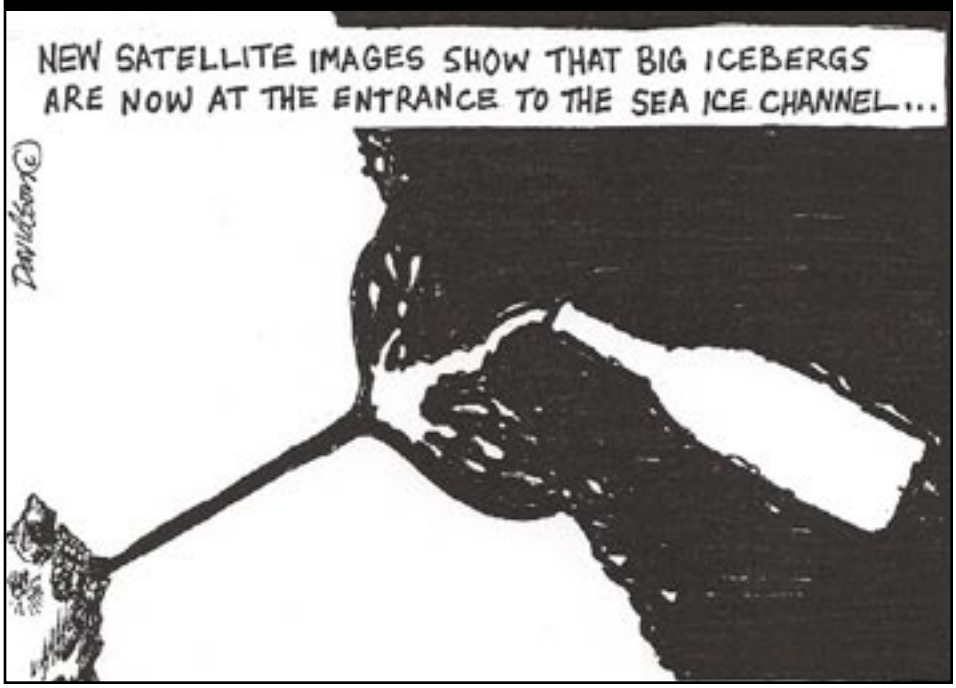
Level 1 Comix **Matt Davidson**



Perspectives

Road less traveled paved with sand and snow

By Mike Green
Special to the Sun

My travels in the last couple of years have taken me from the sand and heat of Mesopotamia to the ice and cold of Antarctica.

No mortars here – just dive-bombing skuas. Helicopters on the Ice carry scientists rather than wounded soldiers. I've traded armored Humvees for PistenBullys and a Kevlar vest for a big red parka. Instead of a direct line to Houston, we have a direct line to Denver.

All of these are extremes in my last two years of employment history. War zone to the "harsh continent"; soldiers to scientists. The reason for going to Iraq was the money and being part of history. On the Ice, it was the excitement and experience of supporting science while working on the seventh continent.

Last year at this time (and the year before that), I was working in Iraq as a Department of Defense contractor. It was an exciting time to be in Iraq.

I first worked as a heavy equipment operator and as an Iraqi crane crew foreman. It was a great job with daily interaction with 60 Shiite Iraqi men. I learned all their names, how to count in Arabic and basic conversation. As we worked together to build up the Coalition Forces base, I knew almost all the workers' life stories and scars of torture – both mental and physical. A surprising number of men had the same basic story to tell of oppression under Saddam.

My crane crew helped fortify the election polling stations. Each man on the crew was very excited to work to ensure the safety of the population. We were setting concrete walls engineered to withstand a blast.

I will always remember the day after the election. Inside the camp, all the Americans and coalition forces (9,000 people) gave the Iraqis a 10-minute ovation, followed by joyous hugs, dancing, tears and posing for pictures with our Iraqi friends, who proudly displayed their dyed digits of hope. (In Iraq, you dip your index finger in ink after you vote.) It was historic, and the first thing, in my opinion, the world press corps got right. It was one of the proudest moments of my life.

But there were many tough moments, too.

Courtesy of Mike Green / Special to *The Antarctic Sun*

Mike Green, center, spent 17 months in Iraq, where he immersed himself in the culture.

In Iraq, you work 12 hours a day, seven days a week (that's 84 hours without overtime), four months straight without a day off! You get 10 days off with pay (not including danger pay) and 21 days away from the project. Only three out of 10 employees have an education past high school. You are fed three meals (no vegetarian) a day and typically live a pretty comfortable lifestyle.

Eventually, you get your own "hooch," a 20-foot by 10-foot living container with a private bathroom. (Before that, you're living in a tent.)

When I first arrived in Iraq, someone told me something that at first I didn't understand. He said, "Most people working here come for the security." Thirteen months later, I understood. I was living a "Groundhog Day" existence. Eat, work, sleep and repeat. You become institutionalized after a while to the safety bubble "inside the wire" from the real world that you left behind – paying bills, relationships and exciting life experiences, both positive and negative.

Your only real excitement comes from a mortar attack, payday or by mail. Eventually, you begin to lose part of yourself. The trick is to get out before you don't recognize yourself or your family doesn't. Your existence is based on the security of money, not on the existence of life's insecurities. Aren't those insecurities and how you deal with them what life is all about?

On the other hand, in Antarctica, we work 54 hours in the name of science support, enjoy labeled and vegetarian meals, and work with highly motivated, educated and interesting co-workers. There are plenty of recreational opportunities. We are treated not as the lowest common denominator of mental ability but as motivated seasonal workers.

McMurdo is a nest of safety for the many different colored birds of personality who are afflicted with wanderlust; we flock together in relative social comfort. Most of us are motivated by the excitement (either real or imaginary in the end) of working on a "harsh continent," coupled by the comfort of understanding, support and encouragement we gain from each other.

It's a lifestyle that most people "in the real world" don't understand or condone. Show them a picture or two and they become detached, uncomfortable, or they want to change the subject.

Thoreau once said, "The mass of men lead lives in quiet desperation." We, on the other hand, rage headstrong into the possibilities that life affords. McMurdo "is as stable as my life gets," uttered an outdoor worker whose candy apple smile of exuberance comes from living life to the fullest. I think many here would agree.

Joy to all who rage into the living of life.

Mike Green works at McMurdo Station as an ATO lead cargo handler. To learn more about his time in Iraq, visit www.green ieoutdoors.com.

Perspectives

Teacher reaching larger class from the Ice

By Glen Schulte
Special to the Sun

Ten months ago, I was sitting at my desk grading papers at the Zoo Academy – a Cincinnati Public School on the grounds of the Cincinnati Zoo where I'm a botany and physics teacher, – when I received a phone call that would change the focus of the next year of my life.

Richard Lee, from Miami University of Ohio, asked me if I would like to join his team going to Antarctica in December 2006. I have worked with Rick for 10 years, teaching in a master's program for teachers at Miami, so we knew each other well.

I was stunned to think about the possibility: leave my family for six weeks, leave my job for six weeks? Was it even possible? My family and teaching teammates assured me that is was possible, and it was an opportunity that shouldn't be missed. My wife and kids, in particular, have supported me throughout this trip.

Rick explained that my job would be to focus on the educational outreach component of the trip, as well as assist in research. This is the third consecutive year he has included a teacher as part of the team. The team includes Rick; David Denlinger from Ohio State University; Mike Elnitsky, a doctoral graduate student in Rick's lab; and Josh Benoit, a doctoral graduate student in Dave's lab. Our team is studying molecular and physiological mechanisms of stress tolerance in the microarthropods (mites, ticks and insects) of the region.

After some investigation, I decided that the best way to reach the most kids was through the Internet. Over the course of the next several months, I worked with the information technology department of Cincinnati Public Schools to develop a plan that would have the greatest impact for the most kids. Lora Folger, IT manager, and Curt Smith, network engineer, at Palmer Station were a great help in getting all of the kinks worked out.

We decided that a Web site would be the way to go and Education on Ice (www.edonice.org) was born. To make the site appealing to kids, we involved a Web design and computer support firm in Cincinnati. Rather than have a specific target audience, the site offers general facts about the trip – packing, deployment process and so on – and then progresses to specific information on the current research we are doing. The format is simple and navigation is easy, with pages dedicated to pictures and video, the trip down, ongoing research, teacher resources, and, most importantly, personal interaction with students and teachers.

Having a Web site to look at is nice, but having a live person to talk with is better. And so we created "Antarctica Live." We incorporated two ways for students and teachers to contact me directly. A dedicated e-mail address was created (edonice@cps-k12.org) so anyone could e-mail questions. There have been questions from second-graders in Las Vegas, seventh-graders in Smithfield, R.I., and high school students from Cincinnati. The students like the immediate feedback, and they like seeing their names come up in the news section of the site.

Courtesy of Glen Schulte / Special to *The Antarctic Sun*

A surprise offer gave Glen Schulte an opportunity to expand his classroom via the Internet and a trip to Antarctica.

The second component of Antarctica Live makes use of the iChat feature of the new Macbook computers. The outcome is similar to a video conference. People around the station have been a little startled to see me walking around talking to my laptop!

The day starts early. I try to be online by 7:30 a.m. Palmer time, so I can post answers from the previous day's questions. That way the students will have their answers when they get to school in the morning.

The rest of the day varies. Some days our research team goes to nearby islands and peninsulas to collect samples. I go if that's the plan. Everyone is needed to make sure we collect enough specimens for the research in the labs, both here and in the States. If it's a "lab day," I may help sort larvae or mites, edit photos and video for the site, go out with other research teams to see what they do, or wander around Palmer to talk to people about what they do and get new ideas for photo and video galleries or future lesson plans.

Responses to the Web site have gradually been building and are now rapidly coming in. People are asking more and more questions and requesting photographs of certain things. One topic that many people ask about is the staff here. Who they are, how did they get these jobs, what do they do, how long do they stay? That's the next photo gallery. With the technology available at Palmer, maintaining and updating the site has been a breeze.

Once the trip is over, the site will continue. More resources will be developed and added. We will write lesson plans, student projects and articles for publication in teaching journals. Articles in refereed journals as a result of our research will be posted on the site for anyone to access. We plan to maintain the site as a resource for quite some time.

Glen Schulte is the team leader at the Zoo Academy in Cincinnati.

around the continent

PALMER

Science expedition arrives

By Kerry Kells
Palmer correspondent

The tourist season keeps on cruising at Palmer Station.

The yacht *Spirit of Sydney* visited Palmer Station last week, as did the Danish Navy vessel *Vaedderen*. The *Vaedderen* hosts the Galathea 3 expedition, which aims to strengthen Danish scientific research and education. A familiar face for some of us was also aboard the *Vaedderen*: scientist Art DeVries, who has studied fish physiology for many years at McMurdo Station.

The Galathea 3 expedition supports 71 research projects in biology, geology, and climate and environment. It carries up to 35 research scientists, just under a dozen journalists, photographers and TV crewmembers, and students and their teachers, in addition to a 50-person crew.

The project uses a direct satellite link to bring natural science research to primary and secondary classrooms in Denmark while the ship is under way. The expedition is sailing around the world, having already traveled to Greenland, South Africa, Australia, the Galapagos Islands, the West Coast of South America and the Antarctic Peninsula. It will continue on to Boston and plans to arrive in Copenhagen in April.

Richard Lee, from the Department of Zoology at Miami University, gave the Wednesday night science lecture this past week. Lee had been to Palmer Station in the summers of 1980 and 1981 as a postdoctoral researcher with the University of Houston. He had traveled to Palmer via the research vessel *Hero*. His photos of Palmer Station showed a very different station with fewer buildings and cargo containers. The photos showed no boathouse or carpenter shop, and the glacier behind station was much closer.

Lee also spoke about the four common Antarctic terrestrial arthropods found in the peninsula area. These include a springtail (*Cryptopygus antarcticus)*, a tiny animal so small that tens of thousands could fit in the palm of your hand. They have a spring-like device in their abdomen to help them move.

Glen Schulte / Special to *The Antarctic Sun*

Dave Denlinger, co-principal investigator for the entomology project at Palmer Station, and Ph.D. student Josh Benoit collect samples of midge larvae on Humble Island. The science team is looking at four terrestrial arthropods found in the peninsula area.

The eight-legged mite (*Alaskozetes antarcticus*) lives in large colonies on relatively dry stones. The circumpolar tick (*Ixodes uriae*) feeds on penguins and many species of seabirds; they are found in both polar regions but not in temperate areas. The midge, a flightless fly known as *Belgica antarctica*, is considered the largest terrestrial animal of Antarctica. This project focuses mainly on the stress tolerances of the midge, which is also the southernmost insect.

The group's research involves many investigations into the animals' physiology. One specific are of research involves cold hardening, in which moderate cold exposure allows an insect to markedly increase its cold tolerance within one to two hours. This is the last field season at Palmer Station for the entomologists – and a busy one as they complete field studies and collect insect larvae for further study in their home laboratories.

More yachts and cruise ships are scheduled to visit Palmer Station until the end of February, when McMurdo and South Pole stations will go into hibernation for the winter with smaller crews. Palmer science teams will change at the next port call and more researchers will arrive.

Scheduled to arrive in February are Principal Investigators Charles Amsler, Bill Baker and Jim McClintock, who will scuba dive in the Palmer vicinity to collect shallow water marine macroalgae and invertebrates. They will look at the chemical defenses of the Antarctic Peninsula sponges to various predators.

See CONTINENT on page 6

the week in weather

McMurdo Station
High: 46 F / 8 C
Low: 12 F / -11 C
Max. sustained wind: 33 mph / 53 kph
Min. wind chill: -8 F / -22 C

Palmer Station
High temperature: 45 F / 7 C
Low temperature: 30 F / -1 C
Max. sustained wind: 33 mph / 53 kph
Melted precipitation: 11 mm

South Pole Station
High: -11 F / -24 C
Low: -26 F / -32 C
Peak wind: 22 mph / 35 kph
Max. physio-altitude: 3,174 m

Glenn Grant / Special to *The Antarctic Sun*

An LC-130 airplane takes off at Amundsen-Scott South Pole Station. The airplanes are flown by the New York Air National Guard, transporting cargo and personnel between McMurdo Station and the South Pole. The last flight of the summer season will be later this month.

Continent

From page 5

Later in the season, Principal Investigator Daniel Costa will come to the station to research how Southern Ocean crabeater and elephant seals use their habitat. Scientists will tag and track up to 30 crabeater seals via the research vessel *Laurence M. Gould (LMG)* as well as near the station.

Principal Investigator Bruce Sidell also returns to Palmer later in the season to investigate the physiology and protein structure of Antarctic fishes that can live with body temperatures at 0 degrees Celsius. Research at Palmer Station and aboard the *LMG* will go strong until the month of June.

All of us at Palmer wish departing summer participants great travels and wintering participants a great winter season!

SOUTH POLE

End of season approaching fast

By Cathy Morrell
South Pole correspondent

The weather doesn't lie. With a mere two and a half weeks before the end of the official austral summer at the South Pole, temperatures have shown a steady decline towards the imminent negative 50 C that will mark the absolute end to summer proceedings.

At the beginning of the week, temperatures dropped to negative 31 C, and there seems to be no sign of a warming trend.

According to the South Pole meteorology department, historical averages dictate that a steady cooling trend will occur in the early weeks of February, bringing temperatures as low as negative 40 C by the second week of the month. Soon after that, the mass exodus of summer employees will dwindle to a lonely few, and they too will then say goodbye to the approximately 60 winterovers until next summer.

The goodbye process at the South Pole is an extended one, as scientists begin to wrap up their seasons, projects are completed and people move on to summer work at home. This year, the farewells will last even longer, as the late season employees gear up for a "soft close." This delayed end to the summer season will allow more time for incoming cargo and fuel, as well as offering more time for scientists to complete their work. A group of up to 25 people, made up of both Raytheon Polar Services Co. employees and National Science Foundation grantees will remain at the Pole past the Feb. 17 closing date. All will be prepared to leave at a moment's notice due to drops in temperature, but the plan is to stay as late as Feb. 23 before heading north.

FEMC (facilities, engineering, maintenance and construction) is working steadily to close out summer projects, as well as clean and organize the station, according to FEMC manager Brad Coutu.

Some of the projects concluding this week include improvements on the new cryogenic laboratory, work on the South Pole Telescope and construction of major portions of the IceCube Lab. An inspection team graced us with a second visit, granting conditional occupancy on much of the new construction that has occurred this summer.

IceCube has completed drilling for the season, finishing off the year by completing 13 new holes and deploying sensor strands in each. This tops last year's record by five holes. (See story on page 1.)

Science in the winter really heats up at the Pole. Meteorological science at the South Pole continues 24 hours a day

See POLE on page 23

Continental Drift

What are you going to do when you leave the Ice?

"I am traveling around the world – well, just four continents."

Etosha Cave
McMurdo Station
UT general assistant
Houston, Texas
first season

"Go to work for the Nature Conservancy."

Rachel Rogers
Palmer Station
chef
Spokane, Wash.
eighth season

"Tramping around as much of New Zealand as possible. I plan to meet locals and soak up the colors and eat lots of New Zealand fruit every day for two months."

Kelly Schermerhorn
South Pole Station
UT apprentice
Yellowstone NP, Wyo.
first season

Extinct Hunt

Extinct Hunt
Extinct Hunt
Extinct Hunt

Vanished elephant seal colonies indicate Ross Ice Shelf survived warmer climate in recent past

At left, Paul Koch examines a mummified elephant seal on Inexpressible Island in the Ross Sea. Above, seal skin is preserved under rock on Inexpressible Island.

Photos courtesy of Brenda Hall / Special to *The Antarctic Sun*

By Peter Rejcek
Sun staff

As a geologist who studies paleoclimate, Brenda Hall generally uses glaciers to help her reconstruct climate change through history.

But the University of Maine researcher and three members of her team spent the month of January picking through the beaches between McMurdo Sound and Terra Nova Bay looking for the remains of long-dead southern elephant seals. Hall believes the presence of colonies along Victoria Land as recently as a thousand years ago indicate the region was warmer than it is today.

"We're interested in them because they shouldn't be there," Hall said during an interview at McMurdo Station shortly before heading into the field for five weeks. "Elephant seals don't live in the Ross Sea today."

The reason they don't call the Ross Sea region home is the extensive sea ice cover now locked to the coast. Simply put: elephant seals don't care much for sea ice. But evidence of colonies existing in the not-too-distant past means there was little or no sea ice during the part of the year when the elephant seals would normally come ashore to breed and molt, according to Hall.

The absence of sea ice tells Hall that it was likely warmer in the relatively recent geologic past. How much warmer, she can't say, but evidence suggests the Ross Ice Shelf was still intact throughout the period that the colonies existed.

"Basically we're able to say: it got warmer, and the Ross Ice Shelf survived," Hall said. "We came to realize these elephant seals can give us a climate indicator."

The connection is an important one for scientists studying climate change and attempting to model how Antarctica's ice mass will respond to warming temperatures in the next century. Some research suggests the Ross and the Filchner-Ronne ice shelves are the keystones preventing the collapse of the West Antarctic Ice Sheet, Hall said. Their disintegration would open the floodgates for glaciers to empty out the marine-based ice sheet.

"If a big ice shelf were to give way, the results could be catastrophic," said George Denton, a University of Maine colleague, in a previous press release from the university on the published findings, which appeared in *The Proceedings of the National Academy of Sciences* in June.

"Through her discovery of elephant seal remains over a widespread area where they do not exist today, [Hall] shows evidence not only that a warming occurred, but that the Ross Ice Shelf survived that event. It's important because it speaks to the staying capacity of the ice shelf in the face of global warming," Denton said.

The most recent warming period occurred between 1,000 and 2,500 years ago, Hall noted. "We have pretty good evidence of that time period," she said.

A second significant warming might have occurred even earlier, between 4,000 and 5,000 years ago with evidence of elephant seal activity as much as 7,000 years in the past. This season, the group is looking for more samples for radiocarbon dating that will help it pinpoint this second period.

When Hall and colleagues first discovered the skin and hair from the locally extinct elephant seal colonies about 10 years ago, she had been on a different mission. She was studying the retreat of ice sheets through the Ross Sea and was literally combing the coast for organic material to help date when the beaches had formed. It took a couple of years before the scien-

See COLONIES on page 8

Colonies may be related to Macquarie Island seals

From page 7

tists could genetically connect the tiny fragments of skin and fur to elephant seals.

Southern elephant seals are sub-Antarctic mammals, with huge breeding colonies on Macquarie Island and South Georgia. Macquarie Island lies about halfway between Antarctica and Australia and is the closest place today to the extinct Ross Sea colonies, according to Hall.

Rus Hoelzel, at Durham University in the United Kingdom, is one of two elephant seal specialists working on the team. He is a molecular biologist performing the DNA work on the samples that Hall and others in the group have brought back from previous trips.

Hoelzel said his initial work in the project involved identifying the remains of the elephant seals. Now his focus is determining what the genetics of the population can tell the team about the colonies' history in the context of environmental change over the last 5,000 years.

"We can use genetic diversity and simulation modeling to estimate the pattern of demographic expansions and contractions over time, and thereby compare population dynamics with patterns of climate change," Hoelzel explained via e-mail. "We will also use the approximately 5,000-year time span to estimate a more accurate mutation rate than would otherwise be possible, and this will facilitate our estimations of population demographics.

"We will also compare the ancient samples with modern populations to discover if seals from the Ross Sea may have dispersed to one or more of the island populations," he added. A genetic link may exist between the Ross Sea seals and the modern colonies on Macquarie Island, he said, but that hypothesis is still being tested.

Hall and Paul Koch, co-principal investigator from the University of California, Santa Cruz, will head as far north as Terra Nova Bay to join Italian colleagues who study Adélie penguins. The penguins serve as another biological indicator for sea ice, Hall said.

Sea ice is a double-edged sword for Adélies. Big sea ice years present foraging problems. However, scientists working in the Antarctic Peninsula have identified a strong link between the abundance of krill, a major food source for Adélies, and the presence of sea ice.

Because they have different sea ice tolerances, the penguins and elephant seals rarely share the same space, which is proving true along coastal Victoria Land.

Courtesy of Brenda Hall / Special to *The Antarctic Sun*

"We're interested in them because they shouldn't be there."

Brenda Hall excavates an elephant seal skull during the science team's field season last year.

"It turns out when you combine different species, because each species has a slightly different tolerance to sea ice, you can get a more complete picture of sea ice extent and duration," Hall said.

This is the second and final field season for the three-year grant from the National Science Foundation. Hall and colleagues will use the third year to crunch the data and see how it fits into the larger picture of global climate change.

Hall said it's difficult to predict just how hardy the ice shelves will prove to be, though she does not believe the Earth has reached the tipping point yet for the type of climate change that would cause major de-glaciation of Antarctica. In the end, it will depend on just how much the temperature really rises over the long term.

"It's hard to tell; you don't know what's going to happen to temperatures," she said. "The Ross Ice Shelf managed to survive warmer-than-present temperatures 2,000 years ago, but its fate in the future may depend on just how warm temperatures get."

NSF-funded research in this story: Brenda Hall, University of Maine; and Paul Koch, University of California, Santa Cruz.

Courtesy of Brenda Hall / Special to *The Antarctic Sun*

A mummified elephant seal lies on an ancient beach fronted by the Nansen Ice Sheet. There would have been open water here in the past because the seals disdain habitats that require extensive travel to the water's edge.

Glenn Grant / Special to *The Antarctic Sun*

Southern elephant seals congregate at Elephant Rocks near Palmer Station in the Antarctic Peninsula area. They are the largest seals in the world. Males will reach 4.5 meters and females will reach 2.8 meters in length.

Organization keeps memories alive for those away from the Ice

By Peter Rejcek
Sun staff

Its membership includes a scientist who first visited Antarctica nearly 60 years ago and officials from the National Science Foundation.

The Old Antarctic Explorer's Association is possibly the largest organization of its kind dedicated to preserving the collective memory of Antarctica, a club of kindred spirits fascinated with life on the Ice.

It doesn't matter whether one worked on the seventh continent in the military or as a civilian, served a single season or 20.

The OAEA wants you.

"The association was founded to keep alive the memory and share the experience of those personnel, both military and civilians of all nations, who served or are serving in support of Antarctic research," writes OAEA President John West on the group's Web site. "Membership in the association is open to all that have shared the 'Antarctic Experience.'"

Billy-Ace Penguin Baker perhaps does as much as anyone to keep those experiences burning bright. Baker is a retired Navy radioman who between 1962 and 1980 spent four winters and 15 summers in Antarctica as part of Operation Deep Freeze, the Navy mission to support research on the Ice from 1955 to 1999. At age 70, Baker is still intensely involved in all things Antarctic, wearing several hats in the OAEA, including historian and editor of the association's official newsletter, *The Explorer's Gazette*.

"It takes a sort of special kind of individual to go down to Antarctica, even when you get drafted into the program like I did, but I kept going back," said Baker from his home in Pensacola, Fla.

"Most people really had a good time down there, so it's the camaraderie and things like that," he said when asked to explain the draw of remaining connected to the Antarctic so many years later.

The OAEA undeniably has its roots in the U.S. Navy, which has long been associated with Antarctic exploration and research. As early as 1839, Capt. Charles Wilkes led the first U.S. Naval expedition into Antarctic waters. In 1929, Adm. Richard E. Byrd established a naval base at Little America I, led an expedition to explore further inland and conducted the first flight over the South Pole. He led two subsequent, smaller expeditions before the beginning of World War II.

The Navy assumed a permanent sort of stewardship over the continent in 1955 as it prepared to support the International Geophysical Year (IGY) in 1957. It continued in that role until 1999, when the mission for the U.S. Antarctic Program was turned over primarily to the U.S. Air Force, U.S. Air National Guard and private contractors.

Thanks to the Internet, people who wanted to stay connected formed an e-mail group the same year Operation Deep Freeze was decommissioned. The group grew into a loosely formed organization that called itself the Old Antarctic Explorer's Association, according to the OAEA Web site. Eventually, it took steps to elect a board of directors, to draw up by-laws and to become incorporated as a non-profit corporation in the state of Florida.

Today, the OAEA has about 1,100 to 1,200 members, according to Baker, with a couple of hundred members just in the Gulf region, primarily around Pensacola. Its roster includes Bill Sladen, a noted ornithologist who first visited the Antarctic in the 1940s. A few National Science Foundation (NSF) officials like Dave Bresnahan and Jerry Marty, who have spent more than their fair share of time here, are also life members.

Writer and historian Dian Olson Belanger, who just published a book on the IGY and Operation Deep Freeze, also signed up. (See the Oct. 29, 2006, issue.)

Belanger was one of the speakers at the biannual OAEA reunion and symposium in Rhode Island last August. The New England Chapter of the OAEA – which includes Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont – hosted the event.

In a previous interview, Belanger said she spoke to the members about why she believed the events of 50 years ago still matter today. "I think people need to know about how they got to where they are now," she said.

An unofficial historian of the South Pole and Ice veteran, Bill Spindler first journeyed to Antarctica in 1972 as a junior Navy Seabee officer assigned to winter, but budget constraints cut his deployment

See OAEA on page 10

Photos courtesy of Billy-Ace Baker/ Special to *The Antarctic Sun*

In the Navy: OAEA President John West, right, and Billy-Ace Baker buff the floor in McMurdo Station's main building in 1975 when the U.S. Navy ran most of the operations.

New Zealander Noel Gillespie signs a copy of his book about the Navy pilots of Operation Deep Freeze during an OAEA reunion last year in Rhode Island.

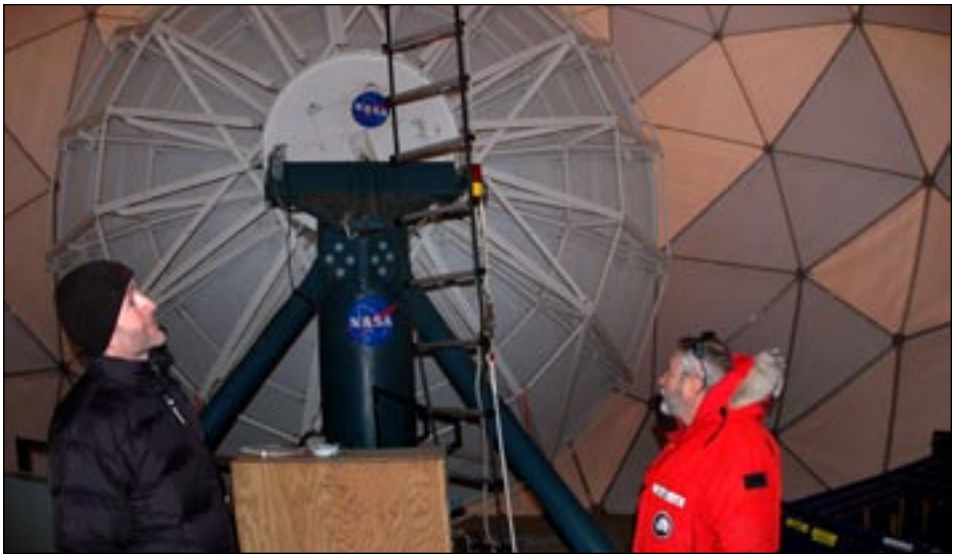
McMurdo to become link for satellite system

By Peter Rejcek
Sun staff

McMurdo Station will be a key link in a new environmental satellite system that will not only benefit meteorological forecasting and climatic research but also triple the local bandwidth for communications by as early as January 2008.

President Bill Clinton initiated the creation of the National Polar-orbiting Operational Environmental Satellite System (NPOESS) in May 1994. NPOESS will merge existing polar satellite systems operated by the Department of Commerce and the Department of Defense. The new polar satellite system will monitor global environmental conditions, as well as collect and disseminate data related to weather, atmosphere, oceans, and land and near-space environments, according to the NPOESS Web site.

"The NPOESS satellite program has been declared as vital to the economic interests of the United States – for example, weather forecasting – and the NSF can leverage its unique role as manager of the national Antarctic program to provide added value to the country from the equally unique, high southern latitude of McMurdo Station," said Pat Smith, Technology Development Manager with the National Science Foundation's Office of Polar Programs.



Steve Martaindale / *The Antarctic Sun*

Anthony Powell, satellite communications tech, and Cleve Cleavelin, McMurdo IT operations manager, look over the old NASA dish that will be used to transmit data for NPOESS on a recent visit.

The Integrated Program Office (IPO), made up of representatives from NASA and the departments of Defense and Commerce, manages the program.

What all that means at McMurdo Station, at least in the short term, is that the bandwidth for phone, e-mail and Internet communications will go from the current 3 megabits per second to 10 megabits by

See NPOESS on page 11

OAEA recruiting new members with ties to the Ice

From page 9

short. The brief stint hooked him, however, and he ended up returning several times as a civilian, including a winter at the South Pole in 2005.

"The Ice is a neat place, with lots of interesting stuff going on, some great people, and a unique social environment. ... I'd go back if I could," he wrote via e-mail. "And off the Ice, I've met many great folks thanks to the OAEA who share my sentiments about the place."

The OAEA can also call itself an international organization, with a handful of members from England, Australia and New Zealand, including another writer, Kiwi Noel Gillespie, who penned a history book about the Navy pilots who flew countless missions in the 44 years of Operation Deep Freeze.

Gillespie's book, "Courage Sacrifice Devotion" pays homage to the men who flew in conditions he called more hazardous than they are today thanks to the advances in aviation technology. "The bond formed between men in Antarctica proved beyond all else that each one depended on his mates," Gillespie wrote via e-mail when asked to speculate on the relationships that have survived over the years.

Baker's involvement in Antarctica extends beyond friendship with fellow OAEs. Like Gillespie, he has a keen interest in the continent's history. His personal Antarctic library numbers about 2,000 books, he said, and he often fields queries from people trying to reconnect with old friends or learn more about the service of deceased family members.

EXPLORER'S GAZETTE

Published Quarterly in Pensacola, Florida USA for the Old Antarctic Explorers Association
Uniting All OAEs in Perpetuating the History of U.S. Navy Involvement in Antarctica
Volume 6, Issue 4 — Old Antarctic Explorers Association, Inc — Oct-Dec 2006

Warwick, Rhode Island GrandePlaza Hotel Resort

3rd National OAEA Reunion Held in Rhode Island
the Third Time was a Real Charm
byMarty Diller with photos by Fred Santini

WARWICK RHODE ISLAND—NEARLY 200 ATTENDEES gathered for the event-packed 3rd OAEA National Symposium/Reunion, held at the Crowne Plaza Hotel over three days in August. An ambitious schedule of tours, meetings, speakers, and activities made for some long days for those who participated in them all, but the 2006 OAEA Reunion Committee kept things running fairly smoothly and on schedule throughout.

Planning for this Reunion—which Don "Squatty Root" Richards, at the November 2002 OAEA Symposium in Pensacola, volunteered to host in Rhode Island—began in February 2004, and the hotel/convention contract was signed in July 2004. Members of the Reunion Committee who attended the 2005 Oxnard Symposium surveyed attendees at that event to determine what kind of tours and activities would have the most interest for attendees at the Warwick Reunion. Armed with those results, the Reunion Committee built a schedule of events for the 3-day period and spent the next 18 months in preparation.

Warwick is a busy, congested area, and the town population is almost 90,000; but the 3rd National OAEA did not go by unnoticed. Three separate Rhode Island newspapers carried feature articles about OAEs during the months leading up to the Reunion and all mentioned the OAEAs big event, culminating with *Providence Journal* Columnist Bob Kerr's 14 August piece about the Reunion: "Remembering their service on the Ice". In addition, both

See Reunion on page 4.

"I have a room that's wall-to-wall books about Antarctica," Baker noted.

Annual and lifetime memberships are open to anyone who has spent time in the Antarctic, whether on the continent, surrounding islands or aboard the various vessels that have crisscrossed the Southern Ocean. The OAEA has recently added Antarctic tourists to its list of people eligible for full membership. An associate membership is also available for those who have no direct Antarctic experience but merely an interest in the Ice.

The OAEA holds meetings like the one in Rhode Island every two years, alternating years with another Ice-related organization, the Antarctic Deep Freeze Association (ADFA), which existed prior to the OAEA and originally consisted mostly of the Navy Seabees from Operation Deep Freeze I and II. Baker is vice chairman with the ADFA.

"I think somewhere down the line we'll just merge into one outfit," he said.

"Tell your friends to join," Baker added before hanging up the phone. "We need more members."

For more information about the Old Antarctic Explorer's Association, visit its Web site at www.oaea.net. Membership applications are available online.

NPOESS will monitor global environment

From page 10

January 2008 if all goes as planned.

The project will involve the installation of two receptor earth stations in the hills above McMurdo for the downlink from the NPOESS satellites. Improvements to NSF's satellite communications with McMurdo are needed to support the large amounts of data that must be quickly delivered to the United States, according to Smith. This requires improvements to the two Black Island satellite communications earth stations.

"The 10-megabit communication upgrade will occur before the receptor installation, allowing NSF an early increase of capability," Smith said via e-mail. "A second, higher speed upgrade to 60 megabits (out) and 20 megabits (in) will occur in time to support receptor operations by 2012. NSF will receive 10 megabits (out) and 19 megabits (in) with the final configuration."

Don Buckalew, the Denver-based Raytheon Polar Services Co./IT project manager, is responsible for executing the project as outlined in a memorandum of agreement between the National Science Foundation and the IPO. Buckalew and members of the NPOESS IPO were here in McMurdo earlier this season conducting site survey work and other needed preparation planning for the project.

McMurdo will be a primary receiver site because of the proximity of the polar orbits, according to Cleve Cleavelin, McMurdo IT operations manager. He said the NPOESS project is a great opportunity for the USAP to upgrade its communications at a relatively low cost to the program.

"The download [from the NPOESS satellites] we have to do is very high speed," Cleavelin said. "The whole project is geared around NPOESS."

The NPOESS satellites will downlink stored mission data to about 15 globally distributed, receive-only Ka-band ground receptor sites at 150 megabits per second, according to a press release from Northrop Grumman, the prime contractor for the project.

Most of the receptors are interconnected and linked to data processing centers in the continental United States (CONUS) by commercial fiber optic networks. The exception is McMurdo Station, which must use a satellite to transmit the data to CONUS. The centers process the raw data and send it to users. The data centers will receive about 77 percent of the raw data gathered by the satellites in less than 15 minutes, compared to the two to three hours of the current systems, according to Northrop Grumman.

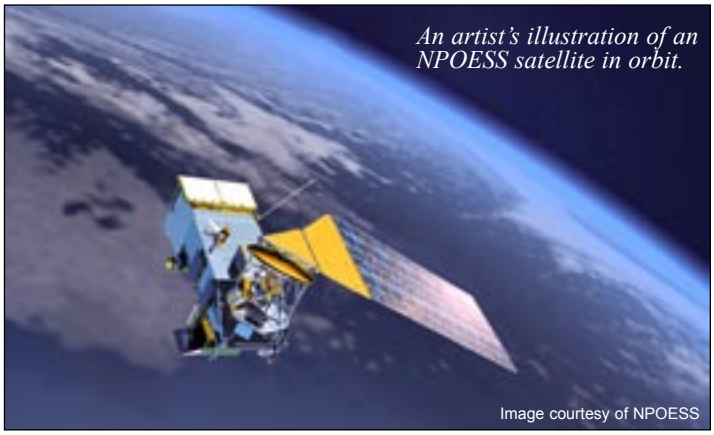
Northrop Grumman is responsible for the overall system design and development. Raytheon Company, the parent of Raytheon Polar Services Co., is providing the ground system for NPOESS and system engineering support.

Initially, two NPOESS satellites, each equipped with different sensor configurations, will orbit Earth in separate polar orbital planes, and will come within range of McMurdo approximately every 100 minutes. The program may add two additional satellites in the future. The European Meteorological Operational (METOP) satellites, provided by the European Organization for the Exploitation of Meteorological Satellites, will also augment the system.

Nine advanced sensors – some new, some improvements on existing sensors – are currently being designed and built by teams of domestic and international companies for the NPOESS satellites. NPOESS will produce 39 separate environmental data records.

"It's coming to fruition, slowly but surely it is," said Matthew Lazzara, a meteorological researcher for the University of Wisconsin Madison, who is familiar with NPOESS.

The university operates a wide-ranging network of automatic weather stations around the continent. These stations measure surface wind, pressure, temperature and humidity. Some of them also track other atmospheric variables such as snow accumulation. The data from the stations are used in weather forecasting, climatology records and general research purposes. The university also manages the Antarctic Meteorological Research Center, which creates and collects a variety of Antarctic and Southern Hemisphere meteorological data for local research, education and operations. Charles Stearns is the principal investigator on both projects.



An artist's illustration of an NPOESS satellite in orbit.

Image courtesy of NPOESS

"The big benefit of NPOESS [to McMurdo] will be this communication capability that's added to the station," Lazzara said.

NPOESS will also have comparable abilities to the NASA Earth Observing Systems, a series of polar-orbiting satellites for long-term global observations of the land surface, biosphere, solid Earth, atmosphere and oceans. Those satellites, Lazzara said, can track winds in the upper atmosphere and even provide information on water vapor features.

"It gives you information that you wouldn't get from a weather balloon otherwise," Lazzara said. "Those kinds of things … we're hoping to do with NPOESS."

Lazzara relies on satellite imagery for his own research, which includes a study on the types of fog that roll through the Ross Island region. "Fog is understudied in the Antarctic. No one is studying it at all," Lazzara said. "It's a big deal when you're a pilot flying here."

The skies seem pretty clear for the next stage of the NPOESS project here. Parts for the first Black Island communications upgrade will be on the re-supply vessel, due to arrive in early February. Next season, the first Black Island communications upgrade will be to an old 7.2-meter-diameter dish formerly used by NASA but transferred to the NSF.

It seems only appropriate that NPOESS make use of the historic antenna as the USAP enters into a new era of communications.

"This was the antenna that first provided Internet and standard phone service to McMurdo and was commissioned in 1992," Smith said. "I believe that McMurdo enjoys the distinction of being the first Antarctic station with a modern Internet protocol … plus it was the farthest south commercial satellite earth station in operation."

Once it is ready, technicians will switch McMurdo's primary satellite communications to the new 7.2-meter antenna and shut down the 11-meter dish that currently provides primary satellite communications for McMurdo, explained Joe Paciaroni, the Raytheon Company NPOESS system engineer.

"This swap will also have McMurdo switch satellite service providers to permit the high communications speeds planned with the size of the existing Black Island earth stations," Paciaroni said.

The changeover should be painless, according to Cleavelin.

"We flip a switch … and it will be a bump in the night," he said, admitting that the feat is more complicated than it sounds. "There's a lot of engineering and work that goes into it."

NSF funded research in this story: Charles Stearns, University of Wisconsin Madison, http://amrc.ssec.wisc.edu.

Garbage haul a year-long project for Waste Ops

By Steve Martaindale
Sun staff

Take almost any town in the United States and watch the comings and goings of its goods.

Most days will find an assortment of delivery trucks dropping off stock at local businesses – copy paper, food, clothing, bandages – an endless procession of possessions. Then, once or twice a week, garbage trucks will comb the streets and alleys, hauling away the castoffs and the spent commodities of day-to-day living.

It is an orchestration of merchandise flow, a harmonizing of production, consumption and disposition.

The same thing happens in Antarctica, but a symphonic representation would be more like Joseph Haydn's "Surprise Symphony," 51 weeks of calm materialistic existence startled awake by the annual unloading and reloading of the supply vessel.

"When that ship comes down here, it's a supply ship," explained Mark Furnish, waste operations manager. "When it goes back, it's just a garbage haul."

The vast majority of all of the supplies that arrive in McMurdo Station, discounting the fuel that comes on another ship, appear on that once-a-year vessel. Then, all of the waste makes its way back north on it.

Furnish said his department will ship back about 420 milvans (containers used for shipping) of waste and 20 to 30 containers of resale material.

Like the homeowner who drops off his weekly garbage at the curb without giving a thought to where it goes, one is likely to do the same as the vessel heads north. However, the vast array of garbage is destined for many different spots around the United States.

"It goes everywhere," Furnish said, "which is good, because they're doing it the right way. When we award our contracts to our subcontractors, we put a certain amount of weight on what are you going to do with this stuff. It isn't necessarily the cheapest; we want to do the environmentally best thing, too."

That includes recycling whatever is possible. He said that 66 percent of the waste was recycled last year.

"Seattle's like 52 percent, something like that," he said. "It's one of the best in the United States, and we beat that. But then, we have a very controlled atmosphere here."

He is quick to acknowledge that recycling success has little to do with his 16-employee department.

"If the people aren't willing to do it right there, at the dorms in those little stations, we couldn't do it. I just don't have the manpower to sort through all that stuff."

Steve Martaindale / *The Antarctic Sun*

Janitors Jenny Hilts, bottom, and Lisa Purvis empty recycling containers in a McMurdo Station building. The highly successful recycling efforts of the U.S. Antarctic Program begins with the cooperation of residents who sort their garbage, according to the program's waste operations manager.

As it is, the waste must be processed to some degree, such as sorting glass by color and inspecting the mixed paper and plastics bins for obvious contamination, but that is a far cry from sorting everything from a common bin.

Some of the waste handled in McMurdo has traveled a long ways to get there.

All waste from Amundsen-Scott South Pole Station and from the field camps supported by the stations is funneled back through the port at McMurdo and placed on the return vessel.

"The solid waste is simply added to the waste streams at McMurdo for processing and consolidation," he said. For instance, the wood waste from South Pole is added to that from McMurdo, where it is run through a wood chipper and pressed into milvans.

Palmer Station, on the Antarctic Peninsula, is an exception in that it handles its waste separately. Furnish said that solid waste from the smallest station is shipped to Chile. The only recycling program available is glass, he said.

The recycling program is not only environmentally responsible, but it can help offset what is an expensive operation, one that spends about $800,000 a year to transport and dispose of waste from all U.S. stations on the continent. Furnish said the mixed paper, aluminum cans and glass categories actually make money. That is, the sale of the materials more than covers the cost of removing them. Meanwhile, plastic, light metals and heavy metals about break even. Totaled, recycling defers about $80,000 of waste management's expenses.

Recognition, meanwhile, was extended to the program last year as Raytheon Polar Services Co. and the U.S. Antarctic Program made the Gold Level list of the Colorado Environmental Leadership Program. Only 20 members are currently on that list.

Yet another form of recycling is resale. Items that are no longer needed on the Ice but have some value are packaged and loaded into milvans. They travel to Port Hueneme, Calif., where the supply vessel operates from, and are sold at auction. Furnish said the auction generates $80,000 to $120,000 a year that is put back into the U.S. Antarctic Program.

In addition to producing income, reselling equipment extends its productive life and means it does not have to be disposed of in some way.

Team probes buried Antarctic lake

By Steven Profaizer
Sun staff

On the frozen Antarctic continent, subglacial lakes are a hot spot of scientific interest, but the information they contain remains untapped.

"The ice sheet in Antarctica can be as much as 5 kilometers thick, and at the bottom point, it can be quite warm, as warm as the melting point of ice," said Sridhar Anandakrishnan, who led a science team to the South Pole this season to learn more about one lake that rests about 16 kilometers away from the U.S. Antarctic Program station.

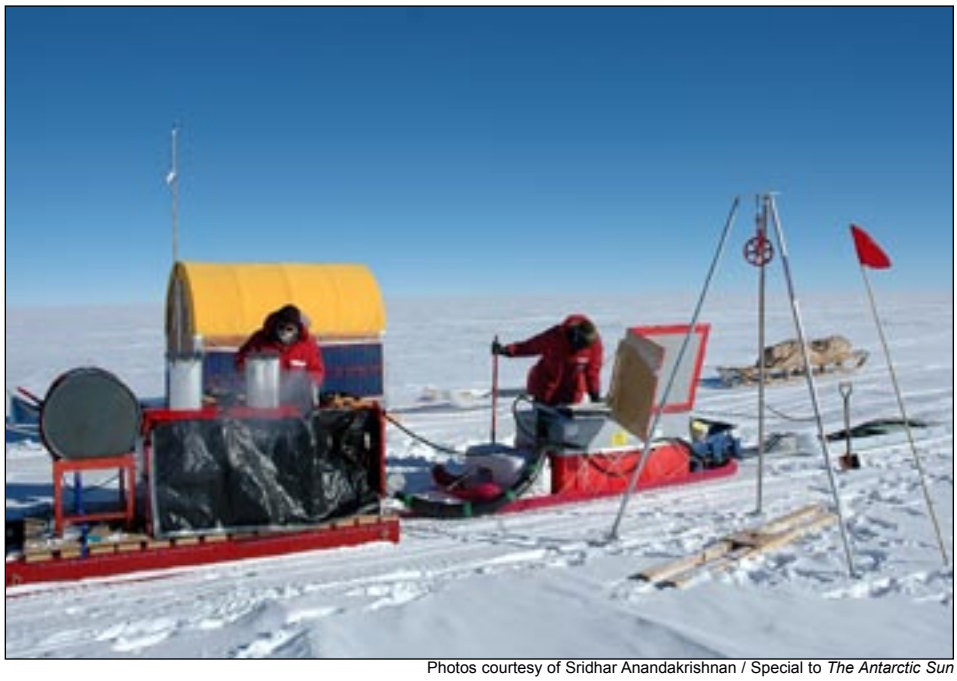
Geothermal activity and the 3 kilometers of insulating ice at Pole can trap heat and melt sections of the ice sheet's base. If some of that water begins to collect in basins, it can form a lake as it would anywhere else on Earth.

"Subglacial lakes are potentially very valuable treasure troves for interesting biota and paleoclimate information," Anandakrishnan said. He added that sediments left in the lakes may give clues as to the history of the ice sheet itself.

Aerial radar surveys have flagged hundreds of lakes with large surface areas dwelling under the ice. The subglacial lake at the South Pole was first identified using this method in the late 1970s.

The largest is Lake Vostok, which sits 4 kilometers beneath Russia's Vostok Station. At 10,000 square kilometers, it is a little bigger than Lake Ontario.

Leo Peters wears a backpack-mounted GPS antenna while getting ready to survey a subglacial lake near the South Pole.



Photos courtesy of Sridhar Anandakrishnan / Special to *The Antarctic Sun*

Two researchers run the hot water drill used to obtain a seismic profile of a subglacial lake near the South Pole. The tripod is the tower for the hose and the sled on the left is the water heater. The sled to the right is the tank with the snow melt.

"Lake Vostok is sort of the crown jewel of subglacial lakes, so we have to be very careful before we try to sample there," Anandakrishnan said of the lake that reaches more than 500 meters deep. "However, there are hundreds of these other lakes. And while we need to be very careful with them as well, we can experiment a little bit with sampling technologies."

But before any sampling efforts can even be proposed near the South Pole, scientists need to get a better idea of the subglacial lake's properties.

"The problem is that Vostok is the only one that has been definitively defined as a lake with significant volumes of water," Anandakrishnan said.

Radar was used to scout out the 15-by-15-kilometer lake near the South Pole as well as the other lakes spread across the continent, but it can only provide a two-dimensional picture because water reflects radar signals. Therefore, radar can provide information on a lake's area, but it can't penetrate the surface to explore what lies beneath.

Depth is crucial in determining the scientific value of a subglacial lake. Deep lakes mean longevity, giving the organisms there time to take hold. Shallow lakes are much harder on any life that does exist there because the water is more susceptible to drying up or refreezing.

Anandakrishnan's team turned to a method called seismic reflection profiling to obtain the vital third dimension.

"Radar kind of gives you indication that there is a lake and seismic really nails it down," Anandakrishnan said. "We don't really know what is there at the South Pole yet. As far as the radar is concerned, water that is a meter or a few meters thick is the same as water that is tens of meters thick."

The team also went back over sections of the lake with ground-based radar, which gives a much finer picture of the lake's shape than its airborne cousin.

"In a way, I think that will be the most valuable thing we have. There's lots and lots of radar data on the rest of the continent, but there's very little seismic data," Anandakrishnan said. "We'll have a seismic record, and we'll have a radar record in exactly the same spot. … If we could do a really good job of identifying what the characteristics of this normal lake are, then we hope all the other normal lakes around the continent would pop into focus."

The principle behind seismic reflection profiling is much more straightforward than its name suggests – make a sound at the surface and listen for the echo.

Anandakrishnan and his team needed an extremely loud sound to make it down several kilometers to the lake and then echo back to the surface again, and so they turned to Pentaerythritol Tetranitrate (PETN) – one of the strongest known high explosives.

See SEISMIC on page 15

Scientists take on Antarctic mold

By Peter Rejcek
Sun staff

Even mold is tougher in the Antarctic.

Microbiologists from the University of Minnesota are still learning just how hardy several recently discovered species of molds are as part of an effort to preserve historic structures around the continent.

Principal Investigator Robert Blanchette and his team at the Forest Pathology and Wood Microbiology Research Laboratory have found that indigenous Antarctic fungi have quite an appetite for wood introduced here by the explorers and expeditions of the early 20th century.

Working with New Zealand's Antarctic Heritage Trust, Blanchette and his team are studying the molds, in part, to understand what makes them thrive in order to stop their advance at historic structures, particularly the huts of Ross Island. (See the Feb. 5, 2006, issue of *The Antarctic Sun* at antarcticsun.usap.gov)

"These organisms tend to be found in extreme environments … in areas that exclude other organisms," explained Blanchette during a phone interview from his office at the university.

One of his graduate students, Brett Arenz, embarked on a special mission in January to remote Stonington Island in the Antarctic Peninsula area. The island is home to East Base, the oldest extant U.S. Antarctic station. Built in 1940, East Base was only used for a couple of seasons, including the privately funded Ronne Antarctic Research Expedition of 1947-48. This was the first expedition to include women to winter over on the continent.

Photos courtesy of Robert A. Blanchette / Special to *The Antarctic Sun*

Benjamin Held, from the University of Minnesota, buries sterilized samples on Humble Island near Palmer Station. These different substrates are used to assess microbial biodiversity at the site.

Three East Base structures still remain, according to Arenz, and include a bunkroom, laboratory and a building used by the base commander. The site is designated as Historic Site and Monument No. 55 under the Antarctic Treaty system.

Arenz joined a conservation team with the British Antarctic Survey (BAS), the United Kingdom's counterpart to the U.S. Antarctic Program. He traveled aboard the HMS *Endurance*, a British Royal Navy research vessel, to assess the microbes at East Base. He also worked alongside the BAS conservators at a number of historic British structures, including Base E, located a couple hundred meters from the American structures and also designated as a historic site and monument.

"It's really a collaborative effort [with BAS]," Arenz said shortly before the five-week cruise.

Based on their work on Ross Island and sites around Palmer Station, the scientists say the same handful of mold species are likely attacking the wooden structures at East Base, perhaps with even more gusto thanks to the climatic ambience that the molds prefer when they dine.

"Since it is warmer and more humid there, there should actually be more microbial deterioration of the wood," Arenz explained, "because the environmental conditions should be more conducive to that, but no one has investigated that up until now."

The last report on the condition of the structures at Stonington Island date back to 1992, according to Blanchette. Some activity took place then to fortify the buildings against the elements.

"In the 15 years since then, there has

See FUNGI on page 15

Certain molds, such as this growing on a boot in the historic hut at Cape Evans, seem to thrive even in the harsh environment of Antarctica. Studies around the continent are trying to find out the molds' secret to success.

Fungi at home in explorers' wood

From page 14

apparently been some extensive deterioration that has occurred," Arenz said, based on information from one of the BAS conservators. "Hopefully, I'll be able to document that in more detail using photos and videos so they'll be able to make a plan about more [conservation] work that needs to be done."

Added Blanchette, "We have great interest, of course, in historic preservation with the work that we're doing with the historic huts in the Ross Sea region, especially on Ross Island."

Scientists do not know much about Antarctic fungi at this point. It appears they live in the nutrient-poor Antarctic soils, feeding on what organic material they can find such as dead lichen, moss or penguin carcasses. The introduction of wood by early expeditions offered the molds something of an all-you-can-eat buffet.

"They started to colonize it and use it," Blanchette said.

The molds cause an unusual decay that the scientists call a "soft rot," penetrating the cell walls of the wood and other materials in the historic buildings such as textiles. They then grow inside the cells, protected from toxic substances, such as salt, that would normally kill them. Similar species are found in the Arctic as well as hot, dry desert regions.

"They seem to be especially well suited for survival in the extremes," Blanchette noted. "They appear to be circumpolar in their distribution."

At the Ross Island huts, the molds become active during the brief summer season, perhaps for only a couple months, and then remain dormant through much of the year. Moisture created by ice melting on the outside of the huts increases the fungal blooms. That's particularly true at Cape Evans, where preservation work involves removing the ice and snow from around the hut and drying out the building as much as possible.

Courtesy of Robert A. Blanchette / Special to *The Antarctic Sun*

Brett Arenz and Joel Jurgens retrieve samples to identify microbes present in the soil on Ross Island. In the background is a test panel of wood treatments, used to evaluate the different compounds' response to the Antarctic environment.

"There's a lot to do at Cape Evans," Blanchette conceded.

While conservationists may view these particular fungi as pests, they do play an important role in the Antarctic ecosystem for decomposing organic material, according to Blanchette. To better understand those processes, the team runs several biodiversity studies on Ross Island and around Palmer Station on the Antarctic Peninsula. The researchers buried sterile wood, cotton and similar materials to see how the microbes in the soil would react.

Any microbes found on the material has to have been since they were buried in the soil, Arenz said. "We've found very high concentrations of the same kind of fungi that we've found in the huts, indicating that these organisms are in the soils."

The studies should help the microbiologists learn more about the organisms' growth, behavior and survival strategies.

"We're just trying to find out what these unusual microbes are and learn more about their biology and ecology in the polar environment," Blanchette said.

NSF-funded research in this story: Robert Blanchette, University of Minnesota, http://forestpathology.coafes.umn.edu/antarctica.htm.

Seismic waves to help build lake's profile

From page 13

The team made 5-centimeter-wide holes 18 to 30 meters into the ice with a hot water drill that spits out 93-degree-Celsius water and lowered an explosive into each one.

Each of the approximately 100 charges was detonated one at a time and ranged in weight from a fifth of a kilogram to almost 5 kilograms.

"At the surface we don't feel very much, but the sound travels down into the ice," Anandakrishnan said.

When the sounds hit the lake's surface, part of the signals were reflected, but part of them continued to the bottom of the lake, where they then bounced back to the scientists on the surface.

The reflected signals were recorded on the surface of the ice by 150 geophones, which operate much like microphones but record vibrations in the ice instead of in the air.

Anandakrishnan and his team are now back in the United States with the seismic records of their month in the field. It takes a lot of data processing to turn the EKG-like seismic graphs into a profile of the lake.

To determine the lake's depth, the team looks at the difference between arrival times of the signal reflected off the surface of the lake and the signal reflected off the bottom.

"In the field, we have limited capability for processing the data," Anandakrishnan said. "We can look at them, see that they are of high quality, and say, 'Yep, that looks good. We got data.' But we can't really interpret them for the properties of the subglacial material until we get home and can do a more thorough job.

"I'm hopeful that we will have an answer soon, but I'm not sure what it is yet."

NSF-funded research in this story: Sridhar Anandakrishnan, Pennsylvania State University.

Lab ushers in new era for IceCube

Continued from page 1

The detector's construction is scheduled to be completed in 2011, but thanks to a new lab facility and an upcoming software upgrade, the detector will soon be running non-stop.

"We should be able to do science with it starting in March," Halzen said. "We should be taking data continuously from now on."

IceCube will be an array made of 80 strands of sensors spanning one cubic kilometer beneath the ice. The large size of the detector is due to the rarity of the neutrino-ice reactions for which it searches, and the team needs to observe the reactions at a high enough rate to be useful for science.

One of the major advantages to running the device while it is under construction is that time can make up for the unfinished size. If the array was to stay at its current dimensions it would accumulate the same amount of data in four years that the completed array would collect in one. In this way, the science team will get more than a year's worth of data from the detector before it is even completed.

"The detector will just keep running," Halzen said. "You deploy a new string, hook it up, just add it to the data and never turn the detector off again. Not only can you run IceCube while you build, but it will grow continuously while it's running. That's the beauty of this detector; you do the science while you're building it."

The new lab will serve as the permanent nerve center of the array with each of the strands feeding into the building, along with a cable from the AMANDA array. The elder array will sit inside IceCube's borders and continue to submit data that will be integrated with its successor's findings.

The facility was adapted from a structure previously known as the Elevated Dorm, a two-story dormitory built in 1992, that was renovated, relocated and reengineered to meet IceCube's specific needs during the past two years.

"It's a really special structure designed so that we can enter 80 cables and connect them to hardware in a relatively small space," Halzen said.

Two barrel-like towers were constructed alongside the building to facilitate this convergence of cords. The cables are routed into the bottoms of the barrels, up through their centers and into the second floor of the building.

The IceCube team has used a temporary laboratory since construction of the array began, and the previously installed strands all had to be powered down while their topside portions were redirected to the new lab.

Photos by Forest Banks / Special to *The Antarctic Sun*

Above, two IceCube workers make adjustments to equipment used as part of the project construction effort at the South Pole.

Left, a firn drill sticks partially out of one of the 13 holes drilled as part of the IceCube's construction this summer. The team implemented a new firn drill late in the season, which helped the group surpass its goal for the season.

The lab construction is now complete, and teams are working through the process of making all the needed connections to get the strands powered up again.

The team added 13 new sensor strands to the neutrino detector this season, setting a record pace for the project and surpassing the summer's goal by one strand.

"It always looked like we were going to do 11 holes and then it looked like we might make it to 12 and then at the last minute everything accelerated, and we got to 13," said Mark Krasberg, an IceCube scientist from the University of Wisconsin.

The group surpassed the number of holes drilled last summer with about one month of operations left to go. But it hit its peak speed in the final days of drilling, thanks to a new drill designed for the uppermost region of the ice.

The ice sheet at the South Pole is made of compacted layers of snow from the last several hundred thousand years. The farther the layers are below the surface, the more weight they have pressing down on them, and the denser they become. This means that the upper layers of snow are still transiting to solid ice, resulting in a porous region called the firn.

"Drilling the first 80 meters of snow is a totally different problem than melting through the solid ice," Halzen said of the process that uses a hot water drill once it passes the firn. "You have to drill the hole without losing a lot of water, and that takes a dedicated drill."

The team currently uses a firn drill for this top layer, which uses less water by

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IceCube scientists strive to increase start-up efficiency

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circulating hot water through metal coils that do most of the melting.

The previous firn drill shares much of its setup with the main hot water drill, which means that the main drill just sits to the side when the firn drill is at work. The new firn drill comes complete with its own setup, allowing the drills to work simultaneously at different sites.

"The purpose of that drill is to save about 15 hours of drilling on every hole," Krasberg said. "That is about how long the firn drill takes before the main drill can make the two and a half kilometer deep hole."

The team brought down enough supplies to deploy an extra strand this season if it got ahead of schedule. With a one-week delay at the beginning of the summer, it was not clear whether the team would have time to install the extra strand, but Halzen said that the new drill provided them with that opportunity.

He added that one of the keys to meeting seasonal deadlines is to start drilling on time, which has yet to happen due in large part to the massive setup effort that the drilling operations require.

"Setting up this drill camp in the beginning of the season is very hard work," Halzen said. "You always run into surprises. Getting all that frozen stuff back to life is not just physically hard work; it's [complicated]."

The IceCube team is currently exploring options to speed up that process. It is contemplating winterizing the drill and leaving it at the drill site instead of dragging it several hundred meters closer to the South Pole station, where it is kept on a berm to prevent drifting snow from burying it over the long winter.

"Snow would pile up on it, which we'd have to clear, but we have to clear snow anyway to make water for the drill in the beginning of the season," Halzen said. "So, it's not that big of a problem for us because we have to move a lot of snow at that time of the year anyway to get the drill system going."

NSF-funded research in this story: Francis Halzen, University of Wisconsin – Madison, icecube.wisc.edu.

Robert Schwarz / Special to *The Antarctic Sun*

The South Pole station rests on the Polar Plateau, an area of polar desert. The frigid year-round temperatures prevent liquid water from naturally occurring. The station relies on an under-ice well system to provide the needed water.

Rod well brings water to desert

By Steven Profaizer
Sun staff

"Water, water everywhere / Nor any a drop to drink."

South Pole residents can relate to the famous lament of this mariner, surrounded by undrinkable water.

The station sits on top of a two-mile-thick ice sheet, which stretches to the horizon in every direction, gently rolling like a calm sea. And while snow and ice blanket the region, no drinking water exists in the polar desert.

Unlike the ancient mariner in Samuel Taylor Coleridge's poem, however, residents have the benefit of engineers who have created the Rodriguez well to harvest enough liquid water from the ice to meet their needs. But the emphasis around station on water conservation and the allotment of two two-minute showers a week serve as reminders that the water that flows from the station's taps isn't easy to come by.

"We create a Rod well, which is a cavity deep in the ice where we melt ice to create our own drinking water," said Brad Coutu, South Pole facilities, engineering, maintenance and construction manager.

This cavity is formed about 250 feet beneath the surface by maintaining a pool of heated water throughout the well's lifespan. The bulb-shaped pocket gradually expands as the walls continually melt away, creating a constantly renewing source of water that Coutu said can produce up to 1 million gallons.

A submersible pump and series of hoses cycle the water up the ice shaft and through heat exchangers, while siphoning a portion of the flow for the station's use before sending the rest back down to the well. Coutu estimated that the system gives one gallon of water to the station for every two gallons it reheats and returns to the well.

"The lifespan of a well is about seven years depending on the amount of people down here and the water usage," Coutu said. "Once the well gets to be over 500 feet deep, it takes too much energy to pull the water up and recirculate it."

The current well was created during the 2001-02 season at a depth of 180 feet and currently rests 435 feet beneath the surface, where it is now melting ice made of snow that fell around 500 A.D, according to John Rand, who provides engineering assistance focused on South Pole issues. He said current projections look like it could function for two more years.

As it takes about a year for a new Rod well to develop, Coutu is already leading the effort to prepare the infrastructure for the next Rod well.

"Before we use it, we have to wait until it has enough water for us to take some out of it and still have enough to recirculate for its continuous growth," Coutu said.

Rod wells have been used at the South Pole station since 1995. The first water well was installed by Cold Regions Research and Engineering Laboratory engineers. The Rod well system was developed by Army engineer Raul Rodriguez at Camp Century in Greenland during the early 1960s.

Surface snow melting, which required a constant snow-gathering effort, served as the Rod wells' predecessor at the South Pole.

"I'd say Rod wells are 80 percent more efficient, especially when it comes to labor. A snow melter is very labor intensive," Coutu said. "Once the Rod well is made, the hard work is done for the next several years. Besides maintenance and preventative maintenance operations, it's essentially like your water supply at home – you don't even know it's there. You turn the faucet on and out comes water."

Rhino Snot may keep McMurdo dust down

Continued from page 1

and using a soy-based product to lengthen the lives of roadways while reducing the loss of materials.

A couple of these have worked their way to the testing phase; the rest are dreams for which he is still working out details.

"I have to put all of this on a spreadsheet and say, 'All right, let's take this scenario,'" he said after walking through his idea of a consolidated airfield. "'Let's drive it through and find out what it takes. What do we gain? What is it going to cost us more? Now let's try it this way.'"

One project that is slated to be tested in a couple of years is the viability of generating electricity with wind-powered turbines. (See Dec. 17, 2006, edition at antarcticsun.usap.gov.) Blaisdell is currently scouting out prospective spots for the towers.

However, a more imminent project is the testing of a biodegradable surface binder called Envirotac II, popularly known as Rhino Snot.

A 500-gallon sample of the product has arrived at McMurdo, and some of it may be placed on the helicopter pad and roads in the next few weeks. But Blaisdell said the bulk of the testing will happen next summer, "when it's warmest and you can mix it in and set it up."

He said there are several reasons for wanting to control the dust that is stirred up from roads by traffic and quickly dispersed by the wind.

"It gets in vehicles' filters, radiators and cabs," Blaisdell said. "It's particularly corrosive here because this is a volcanic dust, which is very high in silica, which is a hard material, so things wear." The abrasive nature of the dust shortens the life spans of filters, lubricants and any moving parts in a vehicle, necessitating increased maintenance time and use of materials.

Health issues are a consideration, too, he said, from breathing dust and getting it into one's eyes.

"When there is dust in town," said lead physician Harry Owens, "it can be bothersome from a health standpoint, mainly as an eye irritant – especially for people with contact lenses – and secondarily as a sinus and nasal passage irritant."

The volcanic dust creates a problem not only with where it goes but also where it was blown from. Fines – the crushed rock material used around the station on road surfaces and to improve traction on ice – must be replenished and Blaisdell said there is not a good source for it.

"One of the ways that we can help that problem is to reduce our use of fines and the way to do that is to preserve what we have," he said.

What Envirotac II does is give cohesive ability to a substance, such as sand, that lacks it. The product played an important role in the early movements of the U.S. military into Afghanistan shortly after Sept. 11, according to the Web site of the manufacturer. As troops set up Forward Operations Base Rhino on a dry lake bed airfield, the nearly constant flow of aircraft created havoc with the surface. It was there that Envirotac picked up the nickname Rhino Snot.

"They use it, in this particular case, as a road binder and to settle the dust, to keep the dust down," said Fleet Operations Manager Gerald Crist. "They've been using it heavily over in Iraq to build airfields in the sand and it almost makes like a pavement. It just kind of binds it together, but it's not like it's something toxic or anything that we're used to."

Blaisdell said it is a by-product of soy and is very benign.

"It's non-reactive with the kinds of soils we have here," he said, "with waste or with fuel or with oils that might get dribbled on it. It's considered very neutral in that regard."

Photos by Steve Martaindale / *The Antarctic Sun*

Once the bulk of the snow and ice are gone during the austral summer, McMurdo Station residents and equipment must deal with dust. In the photo above, water is spread on the roads to help keep the dust on the road. A biodegradable binder will be tested on the helicopter pad, at left, and key intersections and stretches of roadway to see if it keeps the dust under control.

Thanks for flying ...

Not many of the entries on Blaisdell's wish list are as cut-and-dried as getting a sample, applying it and evaluating performance.

Take his idea of developing one airfield to use throughout the summer season. The ice runway part of it, due to what has been learned the past several years, is "a hundred percent doable," he said. "There's absolutely nothing that could stop us from doing that. We know how to build these."

The major issue that has to be sorted out, he said, is transportation.

"How do we get cargo and people back and forth between a single airport and town?" Blaisdell said. "How do we keep the roads capable of supporting that amount [of traffic]?" Now, travel is spread out

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Reducing airfields would offer challenges, rewards

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between the three different runways.

A year-round airfield would most likely be placed at or near the current Pegasus White Ice Runway, he said, but added that Williams Field would also be a very strong candidate. Currently, only the smaller, ski-equipped LC-130s land at Williams while the larger, wheeled aircraft, such as the C-17, land at Pegasus. He said he believes the technology is now available to land the larger airplanes at Williams.

Another major factor is fuel supply. Currently, a fuel hose runs to Williams Field and it is trucked from there to Pegasus, which lies farther out.

"But I'm convinced that those also are very manageable problems," Blaisdell said. "There are things on the market or things that with a very slight bit of modification can answer that. That's very doable. I need to develop a business case and develop a transition plan that would say, 'And here's how we would go about doing this.'"

The payoff in maintaining one airfield – probably with two parallel ice runways, one for wheels and one for skis – is a savings in time, equipment and personnel.

"What that would save us is in terms of the amount of fire fighting capability we have to have, because right now we're operating two airfields and they're far enough apart that they have to have two separate fire fighting capabilities – personnel and equipment.

"Navigational aids," Blaisdell continued. "We've got pretty much a duplicate at both of our runway sites. One of them has to move all the time, which is not good for 'nav aids.' ... It would mean not having to move the mobile buildings all the time, which, again, is pretty hard on them and takes up some time."

Tech. Sgt. Richard deLucia / Special to *The Antarctic Sun*

McMurdo Station's three seasonal runways may eventually become a memory, according to George Blaisdell, operations manager in the Office of Polar Programs of the National Science Foundation. He says the technology is available to create a single airfield that meets the station's needs but that many questions must be answered first. In this photo, an LC-130 airplane in the background is parked at the Annual Sea Ice Runway. In the foreground are engines of a C-17A.

Wheels down

In the 50 years that airplanes have been landing at Amundsen-Scott South Pole Station, they have done so on skis. That means that the U.S. Antarctic Program (USAP) can only fly there using LC-130s, which are considerably smaller than the wheeled C-17 used between McMurdo Station and Christchurch, New Zealand.

However, Blaisdell said that a feasibility study two years ago indicates that snow can be made strong enough to support any wheeled aircraft at the South Pole.

"The reason for doing that is that, right now, maybe a little more than three-quarters of all LC-130 flights on the continent are to South Pole, in essence for what is operational support."

A large portion of the deliveries is fuel for the upcoming winter season, but two large science construction projects – IceCube and South Pole Telescope – and before them the construction of the new elevated station, have demanded a large slice of air time.

"Each new project going in there tends to be bigger and requires more things and, of course, it holds the promise of even bigger and greater discoveries, so it's not that any of us begrudge that," Blaisdell said. "But there are other parts of the science community besides those that work at South Pole that need these resources to go study their potential Nobel areas."

Jessie Crain, lead planning support manager for Raytheon Polar Services Co., agreed.

"Freeing up LC-130 missions from Pole may allow USAP to support more deep field science," she said, "both large, multi-group, deep field camps and small individual projects. For many of the field projects, we use a model of providing air support with smaller aircraft from hub camps. These camps require a large infrastructure and quite a bit of fuel to support the operations. The LC-130 is the ideal airframe for moving all of that into the field."

For smaller projects, Crain said, as few as three or four LC-130 missions could put in a light field team in West Antarctica or the Transantarctic Mountains.

"The NSF tries to balance the large and the small science," she said, "and additional LC-130 missions provide more flexibility to support a diverse range of projects."

That could be achieved with a wheeled runway at the Pole because it would allow C-17s to make some of the deliveries there, freeing the LC-130s. Each C-17 can carry as much cargo as three LC-130s, Blaisdell said. He envisions the C-17 making its normal run between Christchurch and McMurdo but with two crews. Instead of starting back north almost immediately, the airplane could make three round-trips to the Pole and then return to Christchurch. That would replace nine LC-130 trips to the South Pole.

More power

Power is always a pressing concern in Antarctica, where the loss of electricity would prove a considerable hardship. But in addition to simply providing power, there is a desire to do so in a more environmentally friendly manner.

Part of Blaisdell's reasoning for scouting out sites for wind turbines at McMurdo Station is to temper the reports of the wind power experts who have examined the area.

"The folks who are used to doing wind turbine installations in the rest of the world look at our terrain here and essentially decide that there's almost nowhere here that's constructible, from their viewpoint, because they're used to sites that are much more accessible or flat," he said. "We aren't flat here."

He said he wanted to get a look at the areas that were reported as having a good wind regime and try to determine, "from what we know about construction down here," if erecting towers there may be possible.

Something else that must be considered is placing the turbines where they do not

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Officials generating new possibilities for power

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interfere with any scientific research or communications.

"And for that matter," he said, "even if it takes a huge amount of additional effort to construct them ... that's a fair trade-off because, since I view these as a long-term thing, eventually we will get the return on our investment. It may take a little longer, but it will be because we chose to do that instead of disrupting something else."

Another energy issue on Blaisdell's wish list is solar power at the South Pole.

While the sun shines only half of the year at Pole, that's also the time that requires more electricity.

"I'm re-looking at whether or not that's a good thing to do, whether it's worth the construction effort on our part, to have people there putting this up," he said. "I think it is, and I think that maybe that's fairly ideal for something like the summer camp," a collection of housing and offices used only that part of the year.

He said, though, that solar can only contribute small portions of the power that is needed.

Another possible contributor of power at the South Pole is a thermal siphon. Such a system is driven by differences in temperatures. Blaisdell said that 10 meters underneath the ice is about 40 degrees colder than ground level in the summer and about 40 degrees warmer in the winter.

That difference in temperatures can drive a turbine to produce power during the temperature extremes. It would not function during the periods that the above-ground temperatures are about the same as underground.

"These accumulate small amounts of energy," Blaisdell said, "but, especially if they're essentially free, consistently producing, they may be the kinds of things we want to start investigating."

Icy profile

Something he is already investigating and which, he said, "... ultimately, I believe we need to have," is an electromagnetic sea ice profiler.

"Right now, when we measure ice thickness, we do it the good, old-fashioned way, with a drill," he said. Sea ice measurements are important for determining whether it is thick enough and strong enough to support people or vehicles. While the drill gives an accurate measurement of the ice, it is only for that one point.

"Say you're somebody who [plans routes on the sea ice], and you're looking at a road out to the Penguin Ranch – that's eight miles or so," Blaisdell said. "How often are you going to take a sample and what does that sample really mean?"

Photos by Steve Martaindale / *The Antarctic Sun*

Wind-generated power may soon see more widespread use in the U.S. Antarctic Program. The T-Site near McMurdo Station, at left, is a leading candidate for placement of wind turbines within the next few years. On a smaller scale, wind turbines and solar panels are used elsewhere, such as Black Island, pictured above.

Even 500 drill samples, he pointed out, would represent less than 1 percent of the terrain.

"Now, is it representative?" he continued. "For the most part, it is. But when you're, say, approaching a crack, like the Barnes Crack that we know is always there, how many samples do you take on either side before you feel like you could draw a picture of what that is like?"

A similar challenge faces those who select the sea ice runway site that is required to support a fully loaded C-17 as it is landing. Ice depth samples are taken and Blaisdell said they err strongly on the side of caution.

A profiler is a portable device that can be towed behind a person or a snowmobile and it gives a continuous profile of the ice thickness. If it is snow-covered, the instrument shows the depth of snow and then the thickness of ice. With such thorough information, an educated decision can be made about the best location for a runway or a driving route.

Blaisdell said he had hoped to have someone come down this summer to demonstrate the product, but it did not happen, so the idea is still on the table. However, he's already thinking down the road.

"In fact," he said, "I even see the day when, instead of sending somebody out on the snowmobile to do this [runway] survey, every third day or so, we have a little robotic vehicle that's been programmed to traverse the runway in a grid pattern collecting ice thickness data."

In queue

There are still more ideas awaiting a chance for closer inspection.

One is the possibility of using propane as a fuel for kitchen and dining functions at Palmer Station.

"With regular ship traffic back and forth to the station, it may be considerably cheaper and cleaner to use propane as a fuel for some functions," Blaisdell said.

Another is a plasma converter "that turns all, and I mean all, waste into a fuel grade gas and a very tiny amount of cinders," he said.

The gas that is produced can be used as fuel.

"The interesting thing about it is that the energy present in the gas that is produced is significantly more than the electricity needed to run the converter," he said. "While this sounds like the story of the perpetual motion machine, the hidden 'trick' is that all trash has an inherent energy content, often considerable."

Profile Never far afield from the Ice

By Peter Rejcek
Sun staff

At first glance, Kevin Field does not look like someone who should be reminiscing about "the old days" in Antarctica.

But the shaggy-haired lead mechanic at McMurdo Station has spent 18 summer and three winter seasons in the Antarctic since 1980, when he came down to the Ice for the first time. He had just finished his apprenticeship as a qualified Caterpillar mechanic with a New Zealand company.

"I came down here as a 20-year-old kid, and now I'm a 46-year-old kid," said Field, an expatriate New Zealander with a home in Great Falls, Mont.

The station looked different in those days, when most of the operation was still in the hands of the U.S. Navy. Many of the buildings consisted of Jamesways (tent buildings) and Quonset huts. Scott Base still kept huskies in the 1980s. (The 1991 Protocol on Environmental Protection to the Antarctic Treaty banned dogs from the continent by April 1, 1994, because of health concerns for the native wildlife, particularly seals.)

"The dogs would come up to you [in the club] and jump on your lap," Field said. "The huskies were good for morale."

For an entire decade, Field split his time between McMurdo and Christchurch. He took a yearlong break around 1991 to work projects in a very different climate – Papua New Guinea. The jungle and lawless island didn't much agree with him, so it was back to Antarctica and a new job.

For the next three years, Field put his gregarious good nature to use as the station's first "recreation dude" when the Navy decided to put more of an emphasis on extracurricular activities with the formation of a local Morale, Welfare and Recreation department. He introduced bingo and karaoke into the local culture, events still popular today. During his tenure, the Acey-Deucy Club dumped the libations and joined the health craze, becoming today's aerobics gym. The Officer's Club received a double shot of Starbucks-like ambiance when Field help convert it to a coffee bar.

"I created this thing," Field said, gesturing to the wood paneled walls of the Coffee House as he chatted about the past.

The stocky mechanic sported a leaner physique in those days and was even a certified aerobics instructor. One of his students, Karen Joyce, still works at McMurdo Station and runs her own fitness class, Gutz-n-Butz.

"He never stopped moving," Joyce said of the energetic Field.

Peter Rejcek / *The Antarctic Sun*

Kevin Field works as a lead mechanic for the McMurdo Station heavy shop. He first came to the Ice in 1980 at age 20. A native of Christchurch, New Zealand, Field grew up around the U.S. Antarctic Program and said he always knew he'd come here some day.

Field does not look back on those early years with rose-colored glasses, however, noting a number of lifestyle improvements. McMurdo Station, though still dusty and muddy during the austral summer when the snowdrift melts, is much cleaner these days. The community is also healthier, as recent campaigns to stamp out epidemics of flu have proven effective.

"When I was here 10 years ago, the crud was a major player," he said. "Everyone got the crud.

"There's not an old-timer here who wouldn't say the place is a lot nicer than it used to be."

Like many "old-timers," Field expressed some ambivalence about the prevalence of the Internet and e-mail. The advances are welcome, he said, but the social atmosphere seems to suffer.

"You couldn't just pick up a phone in your room and call the world. Things were a lot more remote," he said, recalling a Christmas Day mountain bike ride to New Zealand's Scott Base to call home about a family emergency. Regular phone calls had to be booked two weeks in advance. You only had one chance to get through, he said, so you kept your fingers crossed that the line wasn't busy and hope someone was home to take the call.

"That was it. Your next call was in two weeks."

Despite the remoteness, Internet capabilities made an early appearance at McMurdo Station with the help of NASA, according to Field, before the Web spun out of control in the late 1990s.

"I saw the Internet being born down here," he said. "That was fun, being on the cutting edge of technology."

In 1997, Field quit the Antarctic and moved to Montana, where he ran a workshop for a construction company and owned a restaurant. But the Ice was never far from his thoughts: he would look wistfully at the calendar during deployment times.

"I missed it from day one," he said. Not surprising, really, since he grew up in the shadow of the U.S. Antarctic Program, living only a couple of miles from the Navy air base in Christchurch. He would ride his bike to the nearby airfield and hang out with the American squadron mechanics as their "token Kiwi kid."

"I always knew one day I would go [to Antarctica]," he said. "That was always a goal of mine since I was about 10 years old. To at least come down here and see where the planes went."

The indefatigable Field returned to his home away from home last season after about a seven-year absence. He's back in the heavy shop and seems to have plans to stick around for a while longer.

"I love the program, and I really love the equipment," he said. "I've seen a lot of this equipment come down here brand new, and I've been a big part of babysitting and maintaining that gear for 20 years.

"I'm a big Caterpillar man, and I love the fact that we have a fleet of aging Cat equipment that's still in good condition."

It's not an easy job. The cold, volcanic dust and aging machines aren't the only challenges. Logistics sometimes require 15 months before needed parts arrive. A mechanic in the Antarctic has to be an innovator.

"We have to MacGyver things. That's a challenge. That's fun," he said, referring to the resourceful television hero who would use common household items to save the day in every episode. "Anyone can change parts … but cobbling something out of nothing is a challenge.

"It makes you far more versatile. You're not just a parts changer; you're a troubleshooter, you're a welder, you're an electrician, you're a machinist – you're everything."

Profile Going where aid is needed

By Steven Profaizer
Sun staff

Steven Profaizer / *The Antarctic Sun*

From visiting Eskimo villages by dog sled to treating lion bites on the Serengeti, Dr. Harry Owens has made a medical career out of tending to patients in the most out-of-the-way areas. As the lead physician this summer season at McMurdo Station, he has added another remote practice to his resumé.

"I was 38 years old when I realized that I had probably retired at 35."

Dr. Harry Owens had just completed three years cruising up and down the Amazon River in the rainforests of Brazil on a hospital boat, bringing medical education and care to isolated villages.

He was still involved with the Brazilian program when he reflected on his time in the Amazon and realized he was doing exactly what he wanted.

"My definition of retirement is doing what you want, where you want, when you want, how much you want and with whom you want," Owens said. "That's what I realized I was doing, and I realized, 'You know, I think I'm retired.'"

Owens, now 67, said he is 32 years into retirement, although one wouldn't guess that from a resumé filled with remote medical experience, including his latest stop as lead physician at McMurdo Station.

Owens discovered his interest in remote areas at a young age. He spent much of his early life in Hawaii, where his father worked as an Academy Award-winning musician, but he did most of his growing up in Los Angeles. His family was visiting his grandparents in California in December 1941 when the Japanese bombed Pearl Harbor, preventing them from returning to the islands. They decided to re-establish their lives in Los Angeles, but Owens spent a lot of time in the years that followed on his aunt and uncle's sheep ranch in northern Arizona.

"Having had the experience of living in a city like Los Angeles and living out in the middle of northern Arizona and seeing the contrast," he said, "I much preferred the great outdoors. That's where I gravitated, and I knew that when it was my time to make an adult choice, that I'd be picking the rural life."

Owens graduated medical school in 1966. It was around that time that a large amount of U.S. troops headed to Vietnam.

"We were all being drafted one way or another for Vietnam," he said. "I joined the U.S. Public Health Service and requested remote assignment with Eskimos in Alaska because I was really interested in general practice. I started working north of the Arctic Circle. In those days, we'd go out by dog sled and bush airplane to the outlying Eskimo villages. And I loved every minute of that."

Owens' work in Alaska started him down the path of remote medicine. His next career-defining job came in 1973, when he accepted the opportunity to work on a large charity hospital ship that sailed around the world, doing one-year stints in locations that needed the onboard medical staff's services.

"I spent a year in northeast Brazil," said Owens. "That opened up the whole vista for international health, which is what I subsequently spent a lot of my time doing."

This newfound interest led him next to the epiphany-inspiring work in the Amazon and later to a remote hospital on the Serengeti plains of Tanzania. He returned to Tanzania for a second time in 2006 to continue his work with the Maasai people, right before coming down to the Ice.

"McMurdo is way uptown compared to what I'm used to working with. At the remote hospital I worked at with the Maasai, we didn't even have an EKG machine. We were lucky if we had electricity for a few hours a day," Owens said. "At that location, we had a lot of tuberculosis, a lot of other infectious diseases, a lot of kids with malnutrition, some lion bites, some snake bites, a few cape buffalo gorings, a few of those type things that are expected."

Owens has made a lifestyle out of his work, custom designing each year to find the balance he desires. He said he has chosen to stay single and avoid ties to too much "stuff" that would limit that ability.

Owens has seen much of the world while bringing his services to inaccessible areas, but travel itself has never been much of a motivator for him and has normally just come connected to his work.

"In many ways, I get to places that nobody gets to, and in many ways I don't get to places that most people get to," he said. "So, I haven't 'done' Europe, and I haven't 'done' the Orient, but I get [to] places that most folks don't get to see."

Instead of spending his off time traveling, he returns to his little cabin among the foothills along Oregon's McKenzie River.

"It's nice to go back and just do my hermit time right on the river," he said. "I'm not there very much though, normally only about 60 days out of the year. This past year, it's only been about 40 days."

So, are there any plans of a more traditional retirement in the future for Owens?

"If by retire you mean quit, not do much, sit in the rocking chair in front of the cabin and write the memoirs, then as long as my physical health is holding out, I'll probably continue to do a variety of overseas stuff, as well as up in Alaska and maybe back down here."

Pole

From page 6

throughout the winter, according to South Pole meteorologist Kris Perry (a.k.a., cool dude with the Mohawk).

Winterover scientists Tim Markle and John Gallagher will be responsible for constantly monitoring surface and upper air data from the Pole. Measurement techniques include daily launches of a weather balloon that collects data up to 120,000 feet into the atmosphere, observations of sky cover and visibility taken in the dark with the help of a flashlight, and hourly recordings of temperature, wind and air pressure. This data will be added to the year-round statistics that make up a comprehensive picture of weather at 90 south.

Winterover scientists from meteorology, the South Pole Telescope and IceCube will also be joined by science technicians ready to look at scientific phenomena best studied in the dark months of winter.

Aurora tech Neal Scheibe will soon arrive to work with tech Jason Stauch to monitor winter auroras. *Aurora australis*, or the southern lights, are caused by interactions between the solar winds and the Earth's atmosphere. The beautiful lights are the optical effect of this interaction.

The chance to see the auroras in person is just one of the many draws to wintering at the South Pole. This winter season has brought together a diverse group of hardy souls to weather the next eight months in isolation, as they carry on with the hard work and efforts begun by this year's summer crew. When asked why they chose to winter, answers varied from references to the auroras and the 300 Club to the need for a few months of peace and quiet and personal introspection.

The things that they will miss during these long months are personal to each individual: fresh chips and salsa, Guero's Tex-Mex in Austin, bananas and loved ones. However, as sad as the goodbyes may be, those of us who leave the Ice over the next few weeks wish a fond farewell and good luck to our friends left behind.

We leave you all with one promise: when we return in October, we will bring bananas!

Steven Profaizer / *The Antarctic Sun*

The research vessel Nathaniel B. Palmer *makes a port call at McMurdo Station on Jan. 29.*

VESSELS

NBP

Compiled from reports by Jim Dolan
Marine projects coordinator

After contending with rough weather much of the previous week, the *Nathaniel B. Palmer* began last week with near ideal sea and weather conditions as it completed its study of geological features of the seabed around the Adare Trough in the Ross Sea.

Researchers received very good quality data while personnel worked tirelessly with minimized downtime. The study was completed by the morning of Jan. 27 with the collection of approximately 330 hours of data over a distance of 2,750 kilometers.

The *NBP* headed south toward McMurdo Station, arriving there on Jan. 29 for a short port call.

LMG

Compiled from reports by Andrew Nunn
Marine projects coordinator

The *Laurence M. Gould* continued work on the Palmer Long Term Ecological Research (LTER) cruise. It received reports on Jan. 23 from the field team at Avian Island the previous week that it made good progress with its bird survey. However, weather had been continuously wet and windy.

On Jan. 25, the *LMG* broke off operations and traveled seven hours to pick up the Avian Island field team. Arriving shortly before midnight, personnel and cargo were picked up by Zodiac boat on flat seas.

There was time the following day to complete more research before departing the area for British Antarctic Survey's base Rothera, where the *LMG* arrived early Jan. 27 for combined science operations. Once there, 19 people were put ashore and 18 taken on board via the personnel basket.

The joint scientific team conducted two conductivity, temperature and density casts, including one in a location that was obstructed by ice the previous year. After mooring at Rothera, the crew and its hosts participated in a football game on the runway and a party with live music.

On Jan. 28, it was back to work for the LTER, including collecting data in an area that is usually covered by seasonal ice.

Thanks for the memories and the help!

Another summer season has ended all too quickly for us here at *The Antarctic Sun*. One of the best parts of the job is working with all of the volunteers who help make us look good. We would like to extend our deepest gratitude to these folks now.

First and foremost, to our dedicated copy editors who spent many a Friday night scanning these pages for typos: Ben Bachelder, Jesse Hastings, Rob Jones, Traci Macnamara, Cori Manka, Melanie Miller, Erin Popelka, Bethany Profaizer, Travis Senor and Emily Stone.

Our gratitude also goes out to Matt Davidson for his excellent cartoons; the multi-talented Bill Jirsa for his writing contributions; our correspondents at South Pole and Palmer stations, Susannah "Webster" Coates, Cathy Morrell, Katie Hess, Charles Redell and Kerry Kells; copier tech extraordinaire Glenn Gordon; Christina Hammock for her writing and photography contributions from Palmer Station; the folks at the McMurdo Help Desk and Supply Central; and our friends who keep an eye on the weather at South Pole and McMurdo.

Finally, to the Ice community: thank you for a great year.

– Peter, Steven, Steve

Peter Rejcek / *The Antarctic Sun*

A 3-hour tour

Steven Profaizer / *The Antarctic Sun*

Steven Profaizer / *The Antarctic Sun*

The crew of the U.S. Coast Guard icebreaker Polar Sea *extended an invitation to 450 residents of McMurdo Station to join it for a three-hour cruise in McMurdo Sound on Jan. 28.*

Top, participants stand around the bow of the Polar Sea *as it moves through the icy waters of the shipping channel that connects McMurdo to open water.*

Above, a minke whale surfaces alongside the ship. Seals, penguins and orcas are also often seen in and around the channel.

Left, the crew of the Polar Sea *demonstrates the ship's ice breaking ability on the sea ice.*