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The Antarctic Sun

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Photo by Melanie Conner/The Antarctic Sun

Matthew Ribordy and Yulia Minaeva from the University of Stockholm joke together during a long day at the Mapo building in the Dark Sector near South Pole station while they review data from the AMANDA project.

Science all night long

Research continues through the dark winter

By Melanie Conner
Sun staff

Soon the moon will replace the sun over Antarctica, temperatures will plummet, stars will emerge and the long night will commence. Like bats, nocturnal scientists will awake to stoke the power in their highly-sensitive data receivers, telescopes and interferometers and go to work.

By the light of the moon, scientists at Amundsen-Scott South Pole Station study outer space and seek answers to fundamental questions about the origins of stars, galaxies and the universe.

Devoid of moisture, atmospheric haze, sunlight, artificial light and other electromagnetic radiation, the South Pole is a hotspot for winter astronomy projects. The clarity of the atmosphere at the Pole is rivaled only by space.

Scientists for the Degree Angular Scale Interferometer project, or DASI, use the telescope to examine the thin, dry and dark atmosphere and record slight temperature fluctuations in the afterglow of the Big Bang. The residue, dating back to over 10 billion years ago, allows astronomers to study the

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A ship for all reasons

By Kristan Hutchison
Sun staff

Everybody's been waiting for their ship to come in, the one that will bring a year's supply of frozen food and building materials and take out the trash and ancient ice from Vostok.

Today it did. The motor vessel *Green Wave* arrived at McMurdo Station this weekend with about 85 percent of the cargo coming through the station this year, said Derrold Burnett, the U.S. Antarctic Program's logistics manager.

The supply ship's voyage started 8,266 miles (13,303 km) away in the more temperate climate of Port Hueneme, Calif.

"We load it and then we get the pointed end headed toward south and

See Green Wave on page 14

Capturing the flavor of Ice

By Mark Sabbatini
Sun staff

Shackleton dished out cold penguin legs. Amundsen ate his dogs. Ben & Jerry's is hoping someone else has a better flavor to define the Ice.

The gourmet ice cream maker is sponsoring a flavor-naming contest for employees of the United States Antarctic Program, seeking a name and recipe that best defines the frozen continent. The winner receives a pint of Ben & Jerry's every week for a year and possible fame if the company decides to market the flavor.

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Season finale
Welcome to Winter!

Royal visit draws attention to historic huts
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Roamer finds home at the South Pole
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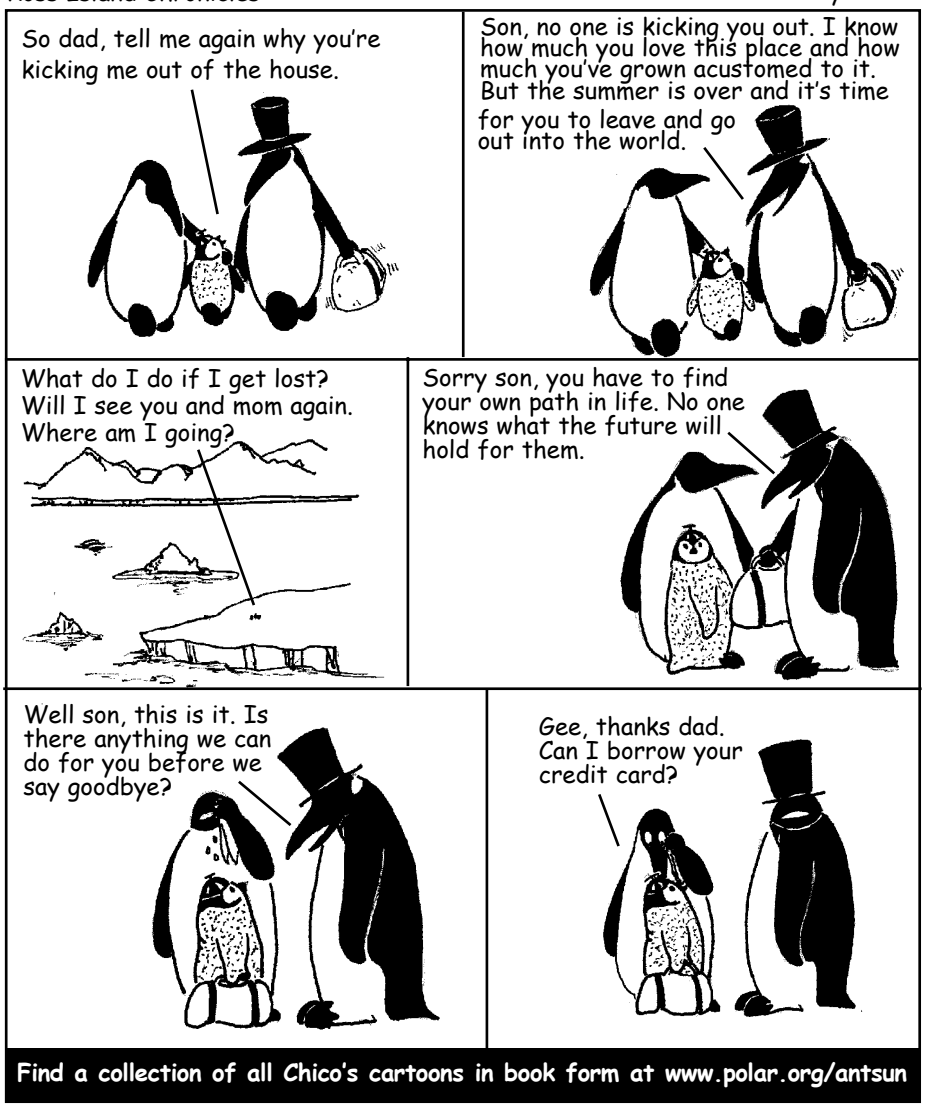
Quote of the Week

"We're just the petri dish they're waiting for."

- Someone warning of germs attacking workers worn out from offload.

Ross Island Chronicles By Chico



Find a collection of all Chico's cartoons in book form at www.polar.org/antsun

Cold, hard facts

News on the news

Number of words in this issue of *The Antarctic Sun*: 14,985

Total page count for entire season: 228 in 15 issues.

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Web address: www.polar.org/antsun

An Ice life

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Across
1) Don't leave home without it
5) Confusing code words
6) Occurring in Arctic and Antarctic regions
10) Frozen river
12) Continental camps
14) They are hemisphere dependent
17) Predatory sea birds
18) An ever-steaming cone
19) Flightless and fancy

Down
1) Once is enough (two words)
2) Trips for the lucky
3) A not-so-five-star accommodation
4) Walk or tramp in rough country
7) Icky Dry Valley organisms
8) Invisible, dangerous and abundant in Antarctica (two words)
9) Societal makeup on the Ice
11) Winter rarities
13) To leave Antarctica (two words)
15) Girl's name and neutrino detector
16) Don't board a helo without it (two words)

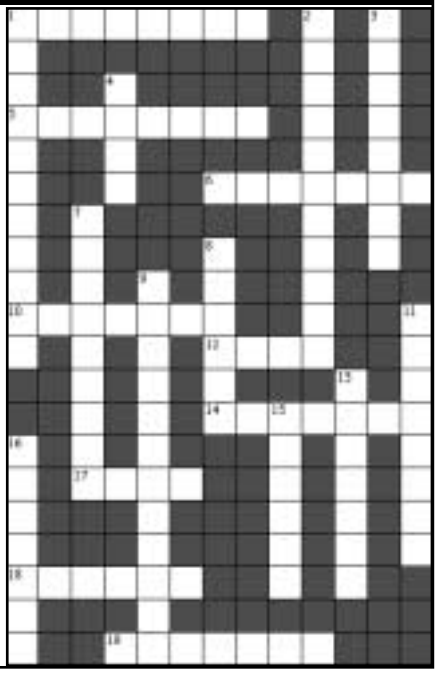

Photo by Melanie Conner/The Antarctic Sun

Cans of food in Scott's Discovery Hut show signs of rust and decay after 100 years.

Royal to visit 100-year-old hut

By Kristan Hutchison
Sun staff

Scott Base is preparing the royal treatment for Princess Anne.

Her highness will be visiting in early February to commemorate the 100-year anniversary of Robert Scott's arrival in McMurdo Sound, said Nigel Watson, executive director of New Zealand's Antarctic Heritage Trust.

"She's very interested in the heroic era and in Antarctic heritage," Watson said.

So much so that she is the patron of the United Kingdom Antarctic Heritage Trust.

The princess' visit is timed not only to recognize the anniversary of the Discovery Hut explorer Robert Scott's party built on Hut Point in 1902, but also to bring attention to the need to preserve the aging building and others like it in Antarctica.

"It's not generally appreciated, the significance of these buildings and their contents. It's the only continent on Earth where humans' first wooden buildings still stand," Watson said.

Though at a quick glance the huts look as if the explorers just stepped out, that's all a carefully staged illusion by the Heritage Trust, Watson said. Actually many of the 12,000 artifacts are decaying rapidly and the worst are in storage waiting to be restored. Rust is eating away the tins of biscuits and cocoa. Fungi spreads along the sleeping bags, shoes and clothes. The very wood fiber of the buildings is breaking down, Watson said.

"It's a myth essentially that they are perfectly preserved. The reality is that they are in poor condition. There's significant decay from biological and non-biologic processes," Watson said. "Unless major conservation work is undertaken across the entire collection they will be lost."

Princess Anne visits Scott Base and McMurdo Station this week.

Every visitor to the huts accelerates the decay simply by breathing, which increases the relative humidity and temperature, Watson said. As the number of visitors has grown, so have the problems. Occasionally artifacts are moved, or even stolen, Watson said.

At the same time, it's people who can save the buildings. After years of study and consulting with a number of experts, the Antarctic Heritage Trust has a plan for preserving the huts. Last year the New Zealand government gave the trust $350,000 to get the restoration projects started, but it will take much more. Watson won't reveal the cost until Princess Anne's visit in February, only that "it's a multi-million U.S. dollar project."

Her Royal Highness

According to a profile on the 51-year-old princess in *The Royal Report*, Princess Anne is one of the more earthy of the royals, "most at home in green Wellingtons behind the scenes at charity headquarters." She married a commoner, refused an earldom and ensured that her two children inherited no titles.

The princess divorced in 1992 and remar-

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Preserving Antarctica's historic huts

By Mark Sabbatini
Sun staff

They've aged remarkably well during the past century, but time is beginning to catch up rapidly with historic huts used by the likes of Scott and Shackleton.

The walls of the shelters built during Antarctica's heroic age are thinning due to wind and other natural elements. Increased moisture is causing mold and fungi to thrive inside and out. Fuel brought by the explorers appears to be spreading after leaking from metal storage containers. And visitors are doing their share - intentionally or not - through everything from breathing to theft.

"The Antarctic environment has protected the huts over nine to 10 decades," said Robert Blanchette, a professor in the Department of Plant Pathology at the University of Minnesota in St. Paul. "They're in good condition - better condition than if they were in other parts of the world."

"However, if we want to protect the huts for the long term...it's gotten to a point where short- and long-range plans need to be made for them."

Blanchette is the principal U.S. investigator for a collaborative project with Professor Roberta Farrell of New Zealand's Antarctic program to study the level of deterioration at historic huts in the McMurdo Sound region. In interviews conducted by phone and e-mail, he said methods to halt the deterioration are also being researched.

There are 34 historic sites in the Ross Sea region, four with surviving wooden huts, according to the Antarctic Heritage Trust, which has responsibility under the Antarctic Treaty for maintaining and managing the sites. They include Ernest Shackleton's hut at Cape Royds, Robert Falcon Scott's hut at Cape Evans, Scott's hut at Hut Point and Carsten Borchgrevink's hut at Cape Adare.

The trust plans to unveil a conservation strategy when Princess

See Huts on page 4

How to meet a princess

According to *The Royal Report*, one never refers to members of the Royal Family as "you," but always as "Your Royal Highness."

When introducing an individual to The Princess, the customary usage is: "May I present ---, Your Royal Highness."

After the initial introduction, The Royal Princess may be addressed as "Ma'am" (it rhymes with jam).

On meeting and taking leave of a member of the Royal Family, it is customary for a man to bow from the waist, and for a woman to curtsy briefly. It is not acceptable to offer a handshake; if a hand is offered, it should be taken briefly.

Princess

From page 3

ried a few months later. She now lives in a private apartment in London.

During her four-day Antarctic visit the princess will take the standard tour given to distinguished visitors, with special attention to the historic huts at Cape Royds and Cape Evans, said Scott Base Manager Kevin Rigarlsford. She'll also tour McMurdo Station, Crary Lab and Arrival Heights.

The princess will stay at Scott Base, along with her five-person entourage, five members of the press and three dignitaries from New Zealand's Antarctic program.

Rigarlsford said the visit is quite an occasion for the station and they are working out meal protocol and menus.

Though it's a Scott Base event, the royal visit is exciting for some of the Americans as well. Belinda Freet is one of those eager to see, and maybe meet, a princess.

"I'm an angolophile to begin with," Freet said. "Royalty is a romantic and ancient tradition."

The most public event will be a ceremony and unveiling of a new plaque at Hut Point at 10 a.m. Feb. 9. Father John Collins, the Catholic chaplain at McMurdo Station, is preparing a service to be held in The Chapel of the Snows at 11 a.m. A number of McMurdo musicians will perform.

"Everyone who we've discussed it with has-been quite keen to participate and their response has been one of privilege to participate," he said.

Watson hopes some of that excitement will transfer to the historic huts. For several years each Scott Base employee and visitor to Scott Base has donated $20 a year toward the huts, Watson said. He would like participants in the U.S. Antarctic Program to help out as well.

"It's ironic that really the highest number of visitors are from the U.S. Antarctic Program, but the largest direct financial support we get is from the tourist ships and Scott Base visitors."

The Antarctic Heritage Trust welcomes financial and other support. Contact Watson through the Web site, www.heritage-antarctica.org, or make a donation at Scott Base or one of the huts.

Huts

From page 3

Anne visits Scott's Discovery Hut at Cape Evans on Feb. 9 to celebrate the 100th anniversary of its construction. The trust, registered in New Zealand in 1987 is made up of members of the international Antarctic community.

The New Zealand government has given the trust $350,000 toward the multi-million dollar project, with the trust hoping to raise the rest through donations. Princess Anne's visit marks the beginning of the official campaign to raise funds.

"The implementation of the plan will be staged over nine years, to take into account the ongoing fund-raising campaign and the logistics of carrying out such a programme on the Ice," wrote Gerald Blank, a trust official, in an e-mail to the Sun.

Deep grooves carved by the wind into the wood hut sides.

Maintenance work has occurred at the huts since at least the 1950s, according to a statement at the trust's Web site. The trust has taken actions such as structural and weatherproofing work at some huts and conducting an inventory of artifacts in the huts, but says considerable work remains to be done.

"Despite these efforts, the Trust has not yet managed to halt the decline of the heritage it is striving to protect," the statement notes. "Significant increased effort will be needed to ensure this heritage continues to inspire, educate and inform future generations."

Studies by the trust and groups working with it conclude restoration work needs to begin soon, since restoration could eventually become impossible due to the conditions under which such work occurs on the Ice.

Blanchette's group, including researchers Benjamin Held and Joel Jurgens, in the second year of a three-year National Science Foundation grant, studied the huts at Cape Evans, Cape Royds and Hut Point. He said unique problems exist at each due to conditions they are exposed to, but common problems are wood deterioration and the growth of mold and decay fungi.

Wind, snow, ice and grit are blasting the wood of the huts, Blanchette said. He said salt deterioration is also taking a heavy toll with a chemical attack on the wood surfaces.

"The wood is gradually getting thinner and thinner, and also weaker," he said. "The surface of the wood is defibrated and degraded. The loosened wood fibers are detached and removed during wind storms, and a gradual loss of wood thickness and strength occurs."

Wind erosion is most noticeable at Cape Royds, salt erosion at Cape Evans, and dirt and grit at Hut Point, Blanchette said.

Researchers are hoping a colorless wood treatment, possibly silicon-based, can protect the huts. Wood panels treated with various compounds are being exposed on test racks at the three locations.

Blanchette said such protection might need to be applied every four or five years, which might be an unacceptable amount of effort. Also, he said, conservationists want to ensure the process is reversible.

"I don't know if anything is going to fit all of the criteria," he said, noting that researchers intend to continue testing a variety of materials to find those that are most acceptable.

Mold and decay fungi are eating away at the wood of the huts and their contents. Blanchette said the huts produce a microclimate with elevated relative humidity during a four- to six-week stretch of the austral summer.

"We have isolated unusual decay fungi in wood in contact with the ground," he said, noting the problem is particularly bad at Cape Royds. "These fungi are different from those that attack wooden structures in more temperate areas. These fungi are currently being identified and characterized. They apparently can become active in the short summers weeks, go dormant for the rest of the year and become reactivated the next year."

Inside the huts, excessive mold was found on everything from paper to various artifacts. Blanchette said a large amount of blackish-green mold was also discovered when they evaluated wood storage boxes separating the kitchen from the sleeping quarters at Cape Evans. And decay is taking its toll on items such as a reindeer sleeping bag on a bunk used by Scott.

"There are actually large chunks of

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around the continent

PALMER

Transition and travel

By Tom Cohenour
Palmer correspondent

Whoever first said "Change is the only thing that's constant" probably would have been a good candidate for a job in Antarctica. It takes that kind of attitude to deal with the myriad of changes that happen each season on the Ice.

A nine-year veteran of the United States Antarctic Program (USAP) was overheard saying, "The main characteristic of people who stay in the USAP is that they are flexible."

They can adapt to changes in ship schedules, flight plans, job priorities and saying goodbye to close friends. Maybe that's the hardest part; saying goodbye to people you've shared your life with and opened your heart to.

Travel talk is just beginning at Palmer Station. The summer season still has six weeks till the first folks leave on March 14. Transition to the winter staff will be complete on March 28 when the research vessel *Laurence M. Gould* (LMG) heads northbound for Punta Arenas, Chile (PA).

It's from PA that most departing Palmer residents begin their journeys.

Travel in South America is almost a given. Where to go in South America is the dilemma.

Travel plans vary from riding horses with rugged Gaucho cowboys in Patagonia and diving in crystal waters with giant sea turtles and hammer head sharks in the Galapagos to relaxing in soft, warm, white sands of Rio de Janiero, Brazil or hiking the Inca trail to the ancient mountain fortress of Machu Picchu, Peru.

Some may choose a tour ship up the mighty Amazon River, having seen similar tours stopping by Palmer Station.

Andrew McKlevey, president and CEO of Monster.com chartered the 423-foot (129-meter) Russian icebreaker I/B Kapitan Dranitsyn to bring 28 friends and family on a nine-day tour of Antarctica.

Arriving at Palmer Station with the Monster.com group was John B. Killingbeck.

Photo by Tom Cohenour/The Sun

John Killingbeck, one of the last people to use dogs in Antarctica

Killingbeck was part of the team that removed the last dogs from Antarctica in 1994 under the provisions of the Antarctic Treaty. "I was just a surveyor," said Killingbeck modestly. Between 1960 and 1963, Killingbeck worked with the Falkland Islands Dependency Survey conducting survey work on the Antarctic Peninsula for Great Britain.

"We had 300 dogs," said Killingbeck. "We'd go out in dogsled teams of two. Each team had one man and nine dogs. We'd stay out camping and surveying for three months at a time," he added. By the way he spoke, it was obvious the dogs were like family to the men whose lives depended on them.

Change is the only thing that's constant. The last 15 dogs on Antarctica left the continent by twin otter on Feb. 22, 1994. Killingbeck was with them as they were flown to the British base Rothera, the Falkland Islands, London and Boston.

In Boston, the dogs and handlers, including John, went by truck to Hudson Bay, Canada. From there they were transported by sledge to an Inuit village completing the circle from where the dog's ancestors had come some 100 years earlier.

Courtesy of the British at Rothera Station

Palmer Station as seen from a British helicopter.

SOUTH POLE

Summer projects done, make way for winter

By Judy Spanberger
South Pole correspondent

Temperatures are dropping and have remained in the minus 30s all week, and the sun's getting lower in the sky. The summer season is drawing to a close, and with two weeks left we're working hard to get done what needs to be wrapped up before winter sets in. The summer-only staff are discussing their travel plans while the winter crew is talking about all the activities we'll have tons of time for in the coming nine months.

FEMC is finishing up enclosing the new elevated station construction. The steel has been topped out, and most of the panels are up with only a few remaining. Construction will continue throughout the winter inside putting up walls, putting in utilities and installing equipment.

We had the chance on Jan. 22 to witness the very first South Pole marathon put on by Adventure Network International (ANI). A group of five runners representing Germany, Ireland and the States started their journey Jan. 8 when they arrived at Patriot Hills, one of ANI's base camps. Bad weather kept them there until Jan. 22, and by then the runners were more than ready. Three of the runners were dropped off at 89.5 south for the full marathon and two runners 13 miles closer to the Pole for the half-marathon. The three marathoners finished between 9 hours and 9 hours and 20 minutes. The

See Pole on page 6

the week in weather

McMurdo Station
High: 39F/4C Low:16F/-9C
Wind: 24 mph/38 kph
Windchill: -15F/-26C

Palmer Station
Not available

South Pole Station
High: -18F/-28C Low:-38F/-39C
Wind: 16mph/26kph

Pole From page 5

half marathoners took approximately 6 hours. It was great fun watching their small forms appear on the horizon, then get bigger and finally someone would cross under the banner set up by ANI. They were all in good spirits, and from looking at them you'd never know they just spent nine hours running on the polar plateau through snow four to six inches deep. While they all looked great they did say it was the hardest marathon they'd ever run. After the last runner was in and the banner still up a few of us took the opportunity for a unique photo. We went about 50 yards on the other side of the banner and came running in, arms raised in victory, while fellow Polies took pictures. We justified by saying we could have done the marathon, but we had to work.

The tunnel crew completed the tunnel this past week, and in fact are all on their way to warmer regions. No more will we hear the whir and grind of the tunnel machine throughout the days (and nights). We're wondering if they left us any secret underground passages to discover over the course of the winter.

This week the South Pole has been host to the principal investigator for the Global Seismographic Network (GSN) project on the continent: Dr. Rhett Butler. Rhett is the GSN Program Manager for the Incorporated Research Institutions for Seismology (IRIS). IRIS is a consortium of approximately 100 universities with research and educational programs in seismology. Since 1986, IRIS has established and developed the GSN which today has about 135 broadband, digital, high-dynamic-range seismographic stations around the world. The GSN sites at South Pole and one at Palmer Station are vital to seismic studies of Antarctica and the Southern Hemisphere.

Photo by Jerry Marty/Special to The Antarctic Sun

The new elevated station is now partially enclosed and work will continue through the winter.

This summer, drilling work by Ice Core Drilling Services (ICDS) commenced for the South Pole Remote Earth Science Observatory (SPRESO). The three 1000-foot-deep boreholes at this site, five miles from South Pole Station, will contain seismometers that will be part of the GSN. Rhett has had a chance to inspect this season's progress on the project, including the heated, insulated building that will house the electronics and data management systems. This building will be installed below the snow surface next season so that there will be no vibrations induced due to wind interacting with surface structures at the site. A five-mile long cable will deliver power to the site and a parallel cable will transmit data back to the main station. This remote fieldwork at South Pole has been facilitated by the excellent support received from the Berg Field Center and the Mechanical Equipment Center at McMurdo Station.

With only a short time remaining before station closing, most science projects are either complete or rapidly finishing up their summer work. Some experiments will continue through the winter, managed by nine winter grantees and three Raytheon Polar Services Company science technicians.

Overall we've had a good season here at Pole. Thanks to everyone for all the fun, giggles, friendships and lessons. Time now for winter, the quiet time in which we prepare for the next crazy summer season. South Pole station will welcome back the summer crews sometime in late October. We bid farewell to you, wish you safe and happy travels, and for those of you wintering, a safe and successful winter. Don't forget us!

Huts From page 4

hair that had fallen off of it and were on the floor," Blanchette said. "That's serious."

The rate of decay due to humidity appears to be increasing as exterior deterioration leaves the huts more exposed to the elements. In addition, tourists can bring moisture into the huts by wearing boots that have snow on them - or simply by breathing, which boosts humidity.

"Whether tourism is a big source or not is something we need to look at," Blanchette said.

Environmental monitors in the huts are providing hourly readings of the humidity in the huts on a year-round basis. Blanchette said the data will be matched up against storms and other events in the region, hopefully providing indicators of what allows moisture to get into the huts.

Tourists are also contributing to the deterioration of the huts in other ways.

"There's also obviously an increase in numbers of visitors and the human factor is a real concern for the long time survival of these buildings," said Nigel Watson, executive director of the Antarctic Heritage Trust. "A number of artifacts continue to be moved and in some cases removed from these huts."

A study recently issued by the New Zealand Antarctic Institute indicates most of the damage and potential damage appears to be unintentional.

"All visitors to the huts have the potential to cause damage, either intentionally or unintentionally, although tourist visits are generally tightly managed with close supervision inside the huts," the study notes. "However, visitors may not always be fully aware of the historic value of artefacts(sic) surrounding the huts or of the damage that may be unintentionally caused by handling or rearranging artefacts that are lying on the ground."

Also of concern are spills from fuel brought in by the early explorers. Blanchette said the fuel for vehicles - which never worked well - was left behind in storage containers when the expeditions departed the Ice.

"Especially on the hill above the Cape Evans hut you can see the remains of tanks there that have leaked out and contaminated the soil with these petroleum products," he said. "We know there's hydrocarbons that have leaked (but) we don't know how far it has moved."

Blanchette said his group will spend next season evaluating the effectiveness of protective measures such as the wood treatments and continuing to evaluate the sites. He said he's hoping to return in future years and that others are willing to make a long-term commitment to preserving the huts.

"If we can identify the current deterioration that's there and put in the correct measures, there's no reason those huts and their contents will not last forever," he said.

Photo by Marcus Horning/Special to The Antarctic Sun

Stars appear to streak the sky during this long-exposure photo of the winter camp near White Island, Antarctica, in 1981.

Winter camp memories

By Kristan Hutchison
Sun staff

While the rest of the science groups were packing up to go home, four seal researchers set up their camp at White Island in late January 1981.

The last plane took off without them and then winter settled darkly over the remote camp, six miles southeast of McMurdo Station. The plan was to study how Weddell seal diving behavior changes with the loss of light during the winter night, and the only way to discover that was to be there.

"To my knowledge it's the only time anyone's ever done a full-year winter-over study in the U.S. Antarctic Program," said Markus Horning, who stayed at White Island until December that year with Mike Castellini, Randall Davis and Maria Davis.

More than 20 years later they are hoping to repeat the winter-over study with better equipment.

"We want to work with them during the darkness, when there is no influx of light, to study how they navigate and how they find their prey," said Randall Davis, who is putting in a proposal to the National Science Foundation for a two-winter, three-summer project. "It's something we can't do any other place."

> "If they were to offer me a whole year going around the world in Club Med or a year there (at White Island, Antarctica), I would go there."
> Maria Davis

During the summer, the seals seem to find fish from below, probably by looking up for their silhouette against the brighter ice ceiling. The seals have large eyes sensitive to low-light conditions, almost like a nocturnal animal, Davis said.

But even their eyes wouldn't be enough in the winter, when the only light comes from stars and the ever-changing moon. The thick ice blocks that wan light, but somehow the seals find fish to eat.

"They're very well-fed," Davis said. "The biggest seal I've ever seen was at White Island."

Davis wonders if the seals use their whiskers to sense fish moving through the water or spot bioluminescence triggered by the swimming movements of the fish.

During the winter of 1981, the researchers spent three quarters of their time keeping the winter camp running, and the rest searching for seals. They had cut a hole through about 50 feet (15 m) of ice beneath one of the huts, hoping the seals would use it as a breathing hole.

The first thing they learned about winter seal behavior was that seals haul out only once every four to six weeks in the winter. They put mechanical time-depth recorders on the hind flippers of the few seals they could find, but only got five records back from the winter.

"We did not get as large a dataset as we would have liked," Horning said. Nor were they able to make conclusions on how the seals' diving related to available light.

"Still, we learned a tremendous amount about winter behavior of these animals," Horning said.

They also learned a lot about Antarctic winter in general. The four scientists spent the winter in two orange fish huts connected by a covered vestibule, with an outhouse on the side. A nearby Jamesway sheltered the generator and Sprytes.

The buildings were on a thin section of the shelf ice, on top of 50 feet (15 m) of ice and 7 feet (2 m) of snow. In March

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Camp From page 7

and April, the fall storms came through. The winds were tremendous, up to 117 knots (135 mph/217 kph). Horning learned to gauge wind speed by how difficult it was to move. He could walk in winds up to 70 knots (80 mph/130 kph), but when the wind blew to 80 or 90 knots (90-100 mph), he had to crawl. One time it took him half an hour to go 65 feet (20 m) to the Jamesway, lying flat on the ground with an ice axe and crampons. When the winds went over 100 knots (115 mph/185kph) he couldn't go out at all.

By April the hut roofs were flush with the snow, about 10 feet (3 m) deep.

"The weight of all that snow depressed the ice and we started sinking," Horning said.

When they noticed the hut runners were underwater, the researchers called for assistance. Two bulldozers were sent from McMurdo to dig out the huts and move them, but the dozers got stuck. A larger bulldozer was sent to pull them all out, and finally the huts were moved to thicker, safer ice.

Despite temperatures regularly minus 45F (-42C), and occasionally as low as minus 64F (-53C), the researchers enjoyed the star-spangled nights, roaring storms and periods of incredible stillness and beauty.

"It was so quiet out there," Davis said. "I remember standing in the hut one night looking out and thinking that was probably the closest I would ever come to an off-planet experience."

The lighting was often otherworldly, sometimes glowing blue or red. Through goggles it appeared green or yellow, Horning said. He had several small adventures, including frostbiting his feet on a particularly cold ride to McMurdo and freezing his eyelashes to the theolodite. On a drive to the north end of White Island, the spryte broke through a room-sized hole 100 feet (30 m) deep. The spryte made it across the crevasse and nobody was injured.

"I still consider that one of the best years of my life," Horning said. "It's extreme, but it's a challenge."

The researchers were in daily radio contact with McMurdo, which was a Navy base back then. Every two to four weeks two of them would make the three-and-a-half hour drive along the 6-mile flagged road to McMurdo for showers and supplies. The Navy-run station had just 95 people all winter, and Davis' wife Maria was one of only three women.

"The men were always very kind to me, very courteous," Maria Davis said. When she passed them between buildings they would always stop to salute her, no matter what the weather, time or other conditions.

Photo by Markus Horning/Special to The Antarctic Sun

Mike Castellini goes outside during a storm in 1981.

A self-described homebody raised by protective parents, Maria Davis discovered her own inner strength during the long winter.

"You just go out and do what you have to do. That in itself was helpful for me because I discovered I'm not such a wimp," she said. "It was very reassuring, and my self-esteem went up quite a bit because I knew that place can be inclement, very dangerous. But using common sense, I dealt with it very well."

More than 20 years later, she still considers the winter at White Island a highlight in her life and regrets not being able to return to Antarctica after the birth of her daughter.

"If they were to offer me a whole year going around the world in Club Med, or a year there (White Island, Antarctica), I would go there," Maria Davis said. "I've been to many, many other parts of the world for long periods of time and absolutely nothing compares."

Her husband has been back to McMurdo Sound many times during the summer, but he too wants to return for another winter. More than 20 years after the original winter seal study, Randall Davis wants to try it again with new equipment and he's considering a proposal to the National Science Foundation for winter research. This time he would use the video cameras he's been attaching on seals in the summer. With infrared Light Emitting Diodes (LEDs) to illuminate the water, the camera can record about 30 inches (75 cm) in front of the seal. It also does three-dimensional tracking. The video can record up to six hours over a week.

In many ways a winter science camp would be easier now than it was in 1981, Horning said. The only way they could communicate then was with a VHF radio. Now field camps can be set up with phones, e-mail and direct video links back to the U.S.

White Island is still the ideal place for a winter seal camp, since the 25 to 30 seals living there can't stray far from the cracks they use as breathing holes.

"Out there the seals are in a naturally captive situation," Davis said. "It's a unique outdoor laboratory, so to speak."

Davis has been back to White Island a couple times since 1981 and this summer he and Horning returned, finding survey markers they'd left on the hill still standing.

"They're a little more weathered, but they're still there," Davis said.

The same could be said of the researchers. In 1981 they were all young. Davis had just finished his doctorate. Horning was a 21-year-old undergraduate student. Now when they consider the possibility of a new winter study taking advantage of technological advances, they're thinking of sending a new generation of graduate students. Davis has a professorship and Horning runs a lab.

"Neither he nor I have the time to spend the winter," Davis said.

Ideally they'd set up a year-round camp at White Island, run by graduate students with the primary researchers coming just for the summer and a month in the winter.

That would require winter flights, something not currently done. Except in emergencies. A medivac flight last winter proved it could be done, Horning said.

"Ever since they opened the Pegasus runway they've had that possibility of bringing an aircraft in the winter time," Horning said.

Other scientists are also interested in a winter season. Three years ago 29 scientists met at the National Science Foundation's Arlington headquarters to discuss the possibility of extending the research season into the Antarctic fall and through the winter. Biologists working in the Dry Valleys or diving at New Harbor, scientists studying the ozone and sea ice all want to see what happens to their subjects in the winter.

"There's a lot of interest and now it's up to NSF to look at the costs and the benefits and the risks," Davis said. "It's not a simple issue. It's going to take a lot of thinking and planning."

Weathering the winter

Workers on the winter shift face cold, dark, isolation and unfathomable rewards

By Kristan Hutchison
Sun staff

Antarctica's a different world when the sun goes down, with unique challenges and rewards for the people who wave goodbye to the last plane out.

"You can almost imagine you're on a planet that's farther from the sun and the moon is your sun," said Jennifer Bird, who spent the austral winter of 2001 at the South Pole. "The ground becomes lighter than the sky."

The darkness, isolation and cold test people mentally and physically.

Doctors and psychologists have been studying the affects of Antarctica's long winter on the people who stay the night.

"There's no question that there are problems, but on the other hand there are great compensations," said Peter Suedfeld, a psychology professor at the University of British Columbia who has studied how people cope with Antarctic winters.

As soon as the summer-only staff leaves, the people staying get more space and privacy. Everyone has their own room in the winter and couples share two. The people wintering think of themselves as an elite group and often develop a sense of solidarity, Suedfeld said.

"For most people the winter is anything but stressful," agreed Dr. Larry Palinkas, a University of California San Diego psychologist who has done several studies on participants in the U.S. Antarctic Program. "In fact, for many of them it is an escape from the actual day-to-day routines they have to go through back in the U.S."

Bird looks back on the winter she shared with her husband at the South Pole as a time of simplicity, beauty and fruitful struggle. At times blowing snow obscured her vision in the dark so she couldn't even see her feet and the five-minute walk to her dorm became a journey. Other nights she could look into a planetarium-like sky and watch red and green auroras dance across it.

"They were very sensuous," Bird said. "Each show was a new show and each minute was a new minute."

But as the season drags on some people begin to feel confined by the weather, Suedfeld said. Some get tense and edgy, bored of seeing the same people day after day. Small disagreements arise and can become bigger problems.

"Things tend to become magnified. Behavior becomes magnified," said South Pole winter site manager Katrin Hafner. "The thing we're all going to have to learn is tolerance."

The hardest times are usually mid-winter, when "it sort of feels like it should be over already but it isn't," and again when the Winfly personnel arrive in the spring, Suedfeld said.

In the middle of winter people take part in wild traditions, like the "polar plunge" at Scott Base where they jump naked into the 28F (-2C) water or the "300 Club" at the South Pole where they run from the 200F sauna to the -100F outdoors wearing only bunny boots.

These traditions, along with a unique vocabulary, are part of the microcultures that develop at the various stations to bind people together and help them cope, Palinkas said.

"Things tend to become magnified. Behavior becomes magnified ... The thing we're all going to have to learn is tolerance."

Katrin Hafner

Winter syndrome

As winter progresses, people change. Some become tired and depressed. They withdraw and begin forgetting things. They'll set down their coffee cup and forget it. They'll lapse into the "Antarctic stare," described by some as a 100-foot stare in a 10-foot room.

"I've had it happen at lunch. I've had it happen at work, where anywhere from five seconds to 15 minutes you're just not there," said Mark Campbell, who's spent five winters at McMurdo Station. "Your mind is just a blank slate."

In the vernacular it's called being "toast," but doctors and psychologists discovered it has a medical basis. They refer to it as "winter-over syndrome" or "polar T3 syndrome."

"Usually it's temporary, especially on a large station where you have work to do," Suedfeld said. "On a small station sometimes it becomes endemic and everybody gets it. They stop washing and brushing their teeth and let their hygiene go."

Over time on the Ice some hormones increase and some drop, including the thyroid hormones T3 and T4. The thyroid gland helps regulate metabolism, which determines how the body uses energy and at what speed. The effect in people wintering is similar to hypothyroidism, when thyroid hormones in the blood drop too low. This causes the metabolism to slow down, followed by depression, fatigue, difficulty remembering, lack of motivation, weight gain and trouble sleeping.

"It becomes a wonderful excuse for about any faux pas," Campbell said. "Don't want to go to a meeting? Oh, T3."

About 8 percent to 15 percent of the people wintering at McMurdo Station experience winter-over syndrome, said Palinkas, who has studied the same thing in Northern Canada and Finland. He'll be back at McMurdo in October to do a follow-up study.

The hormone changes begin in the summer, so physiologists believe they are an adaptation to cold, Palinkas said. The exact causes of symptoms are difficult to distinguish because the thyroid also reacts to a number of conditions in the environment, changes in diet or exercise, illness, even the high altitude at the South Pole, Palinkas said.

Confinement and darkness can also lead to depression. Many people react with mild symptoms of Seasonal Affective Disorder, or SAD.

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Winter

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Even after passing a rigorous psychological evaluation to qualify for winter jobs, about 5 percent of the people at McMurdo Station during the winter seek psychological help, Palinkas said. He said their problems usually stem from events back home or difficulty getting along with co-workers. Some have sleep disturbance because of 24-hour darkness. For a month at the South Pole last winter Paul Daniels found himself caught in a cycle of sleeping fine for three nights, then not sleeping at all for the next three.

"Even if you think you've got this sleeping on the Ice thing licked there's certain times when it will become noticeable," Palinkas said. "Particularly around July, midwinter."

So far most of the winter hormone studies have been done on small populations wintering at McMurdo, Palinkas said. The study starting next fall will be the first to include the South Pole.

The South Pole is the most extreme of the three stations during the winter - the longest isolation, the most dark and the coldest. As a winter utility technician there, Daniels worked seven days a week without a break all season. He'd previously wintered at McMurdo and said he found the Pole three times as hard.

"When I was at McMurdo I felt like I was on vacation," Daniels said. "The Pole was just very intense."

This year a third of the winter workers at the Pole have stayed a winter there before, Hafner said. For the rest, including Hafner, "It's a big unknown; how are we going to react to being in the dark all the time?"

The best defense

Though thyroid hormone was successfully used to treat polar T3 syndrome in a small trial experiment, the drug is not carried or prescribed at the USAP stations.

The treatment is still too experimental, said McMurdo doctor Will Silva. The stations also aren't set up to monitor a chronic drug therapy, Silva said. Instead, if patients come into the clinic complaining of lethargy, depression, forgetfulness or other typical "winter over syndrome" symptoms, they are given a general exam, psychological review and advised of techniques to deal with the stresses in their lives.

There are plenty of ways to ward off the winter blues without medication.

Daniels brought a cappuccino machine to the Pole, so he could start each morning with a strong shot of caffeine. He also exercised every other day.

Palinkas recommends people develop a regular schedule for sleep, work and recreation, and then stick to it. Most people do best if they also find a level of social interaction they enjoy during the summer, and then keep that pattern through the winter as well.

At the same time, Suedfeld advised against revealing too many intimate details, which could become unwanted gossip in the insular community.

"It's a good idea to keep some reserve, not let it all hang out," Suedfeld said.

Learn a few simple relaxation techniques to help keep an even keel. The relaxation technique to avoid is using drugs or alcohol as a crutch, which happens more than it should in polar regions, Suedfeld said.

"If you start relying on that to make the dark or loneliness go away you're going to be in trouble," Suedfeld said.

The mind is a part of the body, so good nutrition and exercise feed into psychological health, Palinkas said. Though the dark makes people crave carbohydrates, they do better with a balanced diet.

"Some of the people who did best psychologically over the winter are those people who work out regularly at the gym and also those who pay pretty close attention to what they are eating," Palinkas said.

Keeping engaged mentally also helps, such as by reading or searching the Web. Computer or board games can be a good source of mental stimulus and entertainment, as long as you don't get too serious over them, Suedfeld said. It does happen. Many years ago there was an attempted murder at Vostok over a chess game, Suedfeld said.

Most people at the South Pole came prepared for the long night. Dr. Tim Pollard plans to write poetry and play the recorder to keep busy. Donald Highsmith, the galley sous chef, will work on learning to play guitar and speak German. Communications technician Jonathan Berry brought books to read and a number of slides he plans to transfer to video.

Last winter John Bird took flight ground school, tae kwon do and astronomy, all offered by fellow winterers at the Pole. His wife Jennifer played in a quartet and composed music.

"The isolation and the simplicity really enhances some people and stresses others," said Jennifer Bird.

They had each other, but for those who leave family behind, the hard part can be communicating back home. On the one hand, it's a vital source of support, but on the other it is sometimes easier not to know about problems that can't be solved.

"You may want to know if a family member is gravely ill," Palinkas said. "You probably don't want to know if the family dog is."

For many people the hardest transition is actually when they leave the Ice, Suedfeld said. It often takes several days to a week to get used to the colors, noise, people, cars and other sensory stimuli. When Suedfeld returns from trips to the remote, high arctic, he generally doesn't drive for a few days and makes a point of spending several hours alone each day to allow himself to adapt back gently.

"The reentry issue is a problem that usually people are not prepared for when the winter ends," Suedfeld said.

Even coming home can be difficult, because during the months apart their families have often developed new ways of doing things. In that way it's similar to military deployments, tanker crewmembers and other jobs that take people away from home for six months or more, Suedfeld said.

The silver lining

Wintering in Antarctica can also have very positive effects, giving people a sense of accomplishment and strengthened ability to deal with stressful situations, Palinkas said. They carry that self-confidence into other areas of their lives.

"We had time to think about what we were interested in and expanded our thoughts of what we can do in life," said Jennifer Bird. "I think when we leave here we'll be much more flexible and think of ourselves in broader terms."

They may also be healthier. Palinkas discovered that when he compared men who served in Antarctic for the Navy with those who had qualified for Antarctic service, but gone elsewhere. The men who'd served in Antarctica had reduced chances for being hospitalized for many years after, probably because they'd learned to cope with a variety of stresses, Palinkas said.

"The big thing is don't sweat it," Palinkas said. "You may experience a couple of nights or a week or two having problems sleeping. You might have a couple weeks in the middle of the winter being down in the dumps, but most people get over it and report having a really good time down on the Ice."

Listening to the Concert in the sky

By Mark Sabbatini
Sun staff

For D.J. Williams, it's another peaceful evening of listening to lightning strikes from around the world.

Static-like crackles sound at irregular intervals every few seconds at her small lab just outside the dome at Amundsen-Scott South Pole Station. A radio receiver system captures a variety of sounds caused by natural events in the atmosphere, the most common of which on this evening is lightning.

"What we're hearing is the energy of the lightning bolt being transferred to us," Williams said.

The frequency, time and intensity of the lightning strikes and other atmospheric activities are being captured and charted as part of a series of projects Williams is working on. The South Pole is an ideal listening post because the Earth's magnetic field lines connect there, essentially acting as a transmitter for naturally occurring very low frequency (VLF) events such as lightning.

Other noises include meteorites which "sounds like someone beating on a pipe" and the aurora australis "actually make a hissing noise," Williams said. There are also upper atmospheric defections that occur during the winter, known as a chorus.

"It sounds like a flock of songbirds in a tree," she said.

Projects at the Pole's Cusp Lab this year range from testing new recording equipment to continuing long-term research on solar and atmospheric activity. Data is used to help further understand short-term environmental effects such as the aurora australis and radiowave communications interference, plus long-term effects such as atmospheric composition and climate.

Knowing the pattern of activities such as solar storms can help prevent problems caused in the past, Williams said. She said Canada had a severe blackout in 1989, for example, triggered by a solar storm that caused electrical current to build up and blow out transformers in the country's power system.

Photo by Mark Sabbatini/The Antarctic Sun

D.J. Williams is keeping watch over the South Pole's Cusp Lab this winter.

"By studying this we'll be able to tell groups 'Hey, shut down because you've got a whole bunch of charge particles coming at you,'" she said.

Williams will remain at the Pole through the austral winter, working split shifts around midday and midnight, ensuring data is being collected for the various universities and other entities involved in the projects.

"(Each of) the projects really aren't big enough to entertain a person for a year, but they can entertain a person for one-eighth of a year," she said.

Among the projects:

- Stanford University is beginning a three-year effort to establish and operate a VLF beacon transmitter from the Pole to continuously measure solar effects in the mesosphere (the middle atmosphere 30-50 miles above Earth) and lower ionosphere (the upper layer of the atmosphere). Stanford is also testing the reliability of a new digital recording system that provides higher-quality data than reel-to-reel analogue tape.
- The University of Maryland is researching the thickness and opacity of the ionosphere using galactic radio-noise absorption techniques, known as riometry. Part of the research includes studying the transfer of energy from solar winds to the magnetosphere (the magnetic field lines 60 miles above Earth) and ionosphere.
- Lucent Technologies and Bell Laboratories are collaborating on a project to measure charged particles in the Earth's magnetosphere. They are also analyzing the causes and transmission of low-frequency hydromagnetic waves in the magnetosphere.

Much of the work is done in conjunction with other research on the continent and elsewhere. Stanford and the University of Maryland, for example, are both collecting additional upper atmospheric data from a network of six Automatic Geophysical Observatory (AGO) sites in Antarctica. The AGO sites operate year-round, taking photos of the sky, measuring fluctuations in Earth's magnetic fields and listening for changes in cosmic radio noise.

Williams arrived at the South Pole during Winfly and will depart at the beginning of the next austral summer, having spent a little more than a year at the bottom of the world. She said upcoming projects include developing a transmitter that will send the same audio frequencies as the lightening and other elements providing the concert in the sky. Instead of listening, however, this might be one to watch as it is charted on the lab's computer screens.

"We're taking a known thing and throwing it through an unknown atmosphere and seeing what comes out the other side," she said.

"It sounds like a flock of songbirds in a tree."

-D.J. Williams

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origins, evolution and future of the universe.

For two years in a row, DASI researchers stunned the science community when they announced the universe is "flat" and determined the universe is made of 65 percent "dark energy" or energy that doesn't interact with light and might cause the universe to expand.

Their findings were mostly based on the data collected during dark winters at the South Pole.

While the light or dark isn't a factor for the Antarctic Muon and Neutrino Detector Array, or AMANDA project, the researchers use the summer daylight hours to upgrade, calibrate and repair the detector.

"The summertime data is not used for physics, but rather for making sure the detector is healthy," said Katherine Rawlins, an AMANDA scientist. "Then we let it run undisturbed all winter."

The team is trying to map out the sky in neutrinos or light produced by high-energy subatomic particles traveling through Earth and matter that could help explain the source of supernova explosions and black holes. Like strands of basketball-sized beads, 640 underground neutrino sensors are lowered down 19 ice holes measuring two feet wide and one mile deep.

To map the sky, scientists say they need lots of data.

According to Rawlins, the biggest boost for the AMANDA team this winter will be the ability to see and analyze data as it comes in.

"(We can) pick out the neutrinos and have results before the winter's over," said Rawlins.

Despite the space-like advantages, conducting science at the bottom of the world has its disadvantages. Working in constant darkness, at high altitude, in temperatures of minus 70 degrees Fahrenheit (-56C) can freeze equipment, frostbite fingers and frustrate working scientists who can't turn lights on to see their work.

With red filters covering all sources of artificial white light, the Martin A. Pomerantz Observatory (MAPO) science building could resemble an outdoor darkroom. Located near the dome in the Dark Sector, a designated area absent of white light and other artificial contaminants, MAPO houses the highly specialized telescopes.

"The darkness is a drawback," said Mike Whitehead, winter science mechanical engineer. "We have to use red lenses over our headlamps or other lights to prevent stray white light."

Whitehead, who spent the summer repairing, preparing and winterizing telescopic mechanics, will maintain the mechanical components throughout the winter to keep the science going. Cold temperatures can prevent the mechanical components inside the telescopes from functioning properly. This summer, heaters were permanently installed inside the Viper telescope and electric heaters will be used to keep indoor telescope control rooms warm. Plans to enclose Viper with a wood and aluminum shelter are also underway.

Photo by Melanie Conner/The Antarctic Sun

The Center for Astrophysical Research in Antarctica is located in the Dark Sector, about a half mile from the dome. It houses the DASI telescope (far right) among others, that receive data to help scientists answer fundamental questions about the origins of the universe.

"I do preventative maintenance and make sure everything is in working order," said Whitehead. "I remove any obstacle that would prevent scientists from doing the job they came to do."

Mid-winter, Whitehead will dissemble one telescope (ACBAR) to attach another (SPARO), allowing scientist to shift research focus for the second part of the season. Switching the two takes about a half a day in the sunlit summer days, but Whitehead is optimistic the process will take only about two days during the winter, if he makes enough modifications.

"I modified the bolts so I'll be able to do it with mittens on," said Whitehead, who spent time at the Pole during the summer practicing his routine for the darkness. "It takes a lot of time, maybe you do one bolt, then warm your hands and undo another."

Besides the equipment, science crews must also maintain themselves over the long, dark winter. Those working at the MAPO building in the Dark Sector must walk over a half mile from the dome every morning in temperatures that can often reach minus 100 F (-73C). Then the crew returns to the dome for lunch and dinner, each time making the one-mile (1.6 km) loop in total darkness.

Life is a little warmer and brighter for McMurdo Station scientists, who download data from Antarctica at their home institutions during the northern summer.

"Most of the winter science in McMurdo consists of collecting atmospheric data. That is not to say there isn't a lot of biology to study and data to be collected over the winter, but it is difficult for scientists to stay over the long winter season," said Robbie Score, manager of Crary Lab sciences at McMurdo Station. "There is a push from the science community to come here during the winter, because they are missing a huge chunk of data during this time."

According to Score, most groups with experiments that run during the winter send a representative in the summer to McMurdo to make sure the science equipment and projects are in order and the science technician, Laura Tudor, who operates data-collecting equipment on the Ice, knows what to do.

"Basically, we have one person to do the work. There is a backup, but Laura is the primary person," said Score. "She has work to do seven days a week for one year. If she gets sick or something, it slows things down."

Trained in physics and electronics, the science technicians from all stations go through extensive training before they go to Antarctica in October, said Score. They visit many of the scientists' institutions for training on the use of specialized instruments or equipment or to learn general knowledge about a particular project.

Over the winter, Tudor will be in constant contact with the scientists by e-mail or phone about daily equipment adjustments or repair. If there is an equipment failure,

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Photo by Melanie Conner/The Antarctic Sun

At Amundsen-Scott South Pole Station, researchers Darryn Schneider and Katherine Rawlins display a neutrino sensor during a live teleconference with an annual Supercomputing conference in Denver.

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Tudor must figure it out.

"Equipment breakdowns are a problem for science," said Score. "Most of the equipment runs 365 days a year and it can have problems."

Tudor oversees 14 atmospheric space and physics projects. The data can be retrieved by scientists in the Northern Hemisphere, who then can ask Tudor to make equipment adjustments.

"The McMurdo science techs get asked a lot of science questions from the community," said Score. "They become the representative for science."

A station-wide favorite project is the green laser beam, or Lidar that vertically slices the black winter sky and measures the atmosphere above. It provides data to help understand depletion of the ozone layer.

"The previous science technician, Glenn Grant, said that the laser was a real morale booster for the community last winter," said Tudor.

"It really is fascinating to see," Score said. "The sky is black and you see a bright green beam."

But not all Antarctic winter research involves laser beams, astrophysics, neutrinos or galaxies. Some winter grantees venture to the outskirts of the Antarctic Circle to Palmer Station to study biology during the austral winter.

Located on the Antarctic Peninsula and inaccessible by aircraft, scientists travel to Palmer Station aboard the research vessels *Nathaniel B. Palmer* and *Lawrence M. Gould*.

The United States Global Ocean Ecosystems Dynamics Program, or Globec is part of an international cooperation of scientists who are studying the impact of climate change by looking at key species. The U.S. component of the international southern ocean Globec program focuses on wintering strategies and survival of Antarctic krill, shrimp-like crustaceans that provide a food staple for other Antarctic animals.

In the austral fall the team will begin the second year of study.

According to biologist Chris Fritsen, of the Desert Research Institute in Reno, Nev., a key question of research is how the timing of the formation of the ice cover influences the stocks of algae that grow or become trapped in ice.

"Last winter the region had an ice cover that formed rather late in the season (June) and did not have much in terms of algal or bacterial biomass in the ice," said Fritsen. "We hope to sample a wider range of ice habitats this year and also hope that the ice cover forms at a different time of the year in order to help answer this question."

Winter science

- The Center for Astrophysical Research in Antarctica, sponsored by the University of Chicago, operates three telescopes - ACBAR, DASI and Viper - at Amundsen-Scott South Pole Station. The telescopes receive data about the afterglow of the Big Bang, enabling researchers to study the origins and make up of the universe.
- Astrophysicists at South Pole station working with AST/RO and SPARO are studying the origins and evolution of stars and the planets in the galaxy. They are collecting telescopic observations to help them understand the lifecycles of stars beginning with the aggregation of dust and gas into dense clouds, from which new stars emerge.
- The National Oceanic and Atmospheric Administration (NOAA) is studying climate change and the ozone layer at South Pole Station. Scientists monitor ozone, carbon dioxide, water vapor and ozone-depleting compounds. The team collects flasks of air samples upwind of the station, in the Clean Air Sector as part of the long-term atmospheric study.
- At McMurdo Station a team of Astronomers from the University of Maryland are studying the process of energy transfer from the solar wind to Earth's magnetosphere and ionosphere at high latitudes. The data is collected year-round using galactic radio-noise absorption techniques and auroral photometers.
- At Palmer Station researchers from Stanford University are monitoring global weather at Palmer Station by tracking dynamic storms from around the globe. The team monitors amplitude changes of very-low-frequency radio receivers produced by lightning and thunderstorms. The data will be correlated with data collected at other stations around Antarctica.

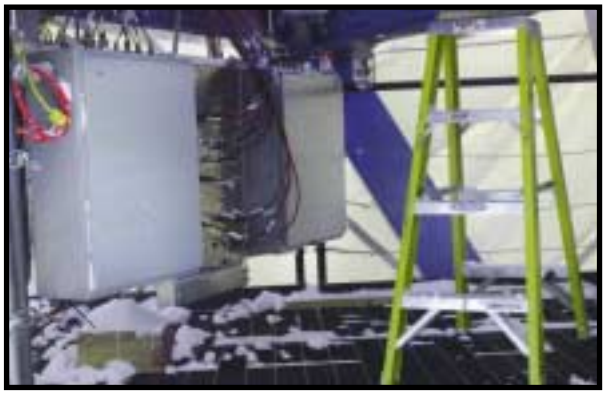

Photo by Melanie Conner/The Antarctic Sun

Inside the Viper telescope in the Dark Sector at the South Pole, mechanical engineers constantly maintain the hardware and electronics. Maintenance becomes challenging during dark winter nights.

Photo by Derrold Burnett/Special to The Antarctic Sun

In Port Hueneme, Calif., the Green Wave waits to be loaded for the journey south in January. Unless she's delayed, the supply vessel should be at McMurdo Station today.

Green Wave

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it goes out the gate," said Lee DeGalan, port manager at Port Hueneme.

Vessel loading started Dec. 26, but purchasing began much earlier. Even now cargo is arriving for next year's shipment. By September most of the cargo is due in the Port Hueneme loading yard. The food has to be there by Nov. 5. Each item is inventoried, weighed and usually repackaged in stronger containers. Frozen food is repackaged in wooden boxes so it can be stacked five pallets high in the McMurdo warehouse.

"Generally speaking, domestic packaging is not suitable for Antarctica," DeGalan said. "Most people don't package with the idea you might have it sit outside for a month."

Most of the cargo is loaded into 8-by-8-by-20 foot shipping containers, called milvans. Each weighs 5,000 pounds (2,268 kg) empty, up to 40,000 pounds (18,100 kg) full, and holds the equivalent of an airplane load, DeGalan said.

The early deadlines are needed because it can take a month to figure out how to safely balance the load in the ship, where containers are stacked four deep below deck and another four deep above. Too much weight high up could put the boat at risk of tipping in stormy weather.

"Those of us who travel on the sea know that the ocean is a fickle environment," Burnett said.

It's a three-dimensional puzzle fitting in all 391 milvans, along with 659 items too big to fit into the container, Burnett said.

In one load, the *Green Wave* carries everything that would normally come by truck, train, plane and boat over a year to a small city with a research facility. Books, tires, Ghirardelli chocolate, compressed helium, beer, a mandolin, an entire sewage plant in pieces and the all-important toilet paper … it's all onboard.

"If you can think of it we've probably bought one each and put it on the *Green Wave*," said Lee DeGalan, the Port Hueneme manager. "It's just staggering the diversity of the things you see...One minute you're looking at material for a beauty salon, then you're looking at 10 cement blocks for a footing and then you're looking at scientific equipment."

This year they had to load on 350 panels for the South Pole, 160 pieces of concrete slab as a foundation for the McMurdo wastewater treatment plant, seven trucks, two Caterpillar 966 loaders with accessories, a D8-R Caterpillar bulldozer and six sled-mounted fuel tanks.

The load has been increasing because of the South Pole construction project, from 10 million to 11 million pounds (4.5-5 mil. kg) on average from 1997 to 2000 to 14.8 million pounds (6.7 mil. kg) last year. This year the *Green Wave* brings 12.16 million pounds (5.5 mil kg) of cargo. When she leaves about 6 million pounds will be waiting in McMurdo to be flown to the South Pole, Burnett said.

The *Green Wave* is up to the load. She's a 10,000-ton cargo vessel, launched in 1980 by a German shipyard as the Woermann Mira. Four years later the ship was sold to the Central Gulf Lines, where she was renamed the *Green Wave* and chartered to the Military Sealift Command. She's traveled to Greenland with supplies for Thule Air Base and floated ammunition across the Atlantic Ocean, but the roundtrip to McMurdo and back is her regular route as primary supply ship for the U.S. Antarctic Program.

This year the *Green Wave* set sail Jan. 6. She stopped in Christchurch, New Zealand, to pick up cargo for New Zealand's Antarctic program and is expected in McMurdo today.

By the time the *Green Wave* reaches McMurdo she is often coated in ice.

"I've seen it when the vessel comes in and it looks like one huge ice cube," said Darrell Kimmes, supervisor of supply operations.

All hands for offload

The *Green Wave*'s arrival marks the climax of the logistics season at McMurdo. During vessel offload the station will be at its most crowded, with 72 members of the Naval Cargo Handling and Port Support and 20 New Zealand Defense Force Longshoremen on station to unload the *Green Wave*.

"They (the NAVCHAPS) are a very qualified, very trained group that has provided us great support over a number of years," DeGalan said. "If the program ever had to find another group to support us that would be difficult."

This week the McMurdo population is expected to reach the population cap of 1,100 residents established by the National Science Foundation. In preparation, the housing staff pulled new

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beds out of storage and added them to rooms in building 155, going from four to a room to five or six for the NAVCHAPS, said Housing Coordinator Debbie Lisman.

The signs of a full house are everywhere. There are lines for food in the dining hall and the phone lines to dial off-station are regularly busy. South Pole winter staff coming to McMurdo for a break before their seven-month isolation are four to a room, separating couples.

"At this point we have beds. We do not have rooms," Lisman said. "People jokingly even say to us 'Do you have tents you can rent?'"

They don't.

On top of the NAVCHAPS and longshoremen, 150 Raytheon employees will set aside their regular jobs to help unload the cargo, Burnett said. Half of the 242 people working vessel offload will be on night shift, as the unloading continues around the clock. That will make midrats, the midnight meal, a busier time than usual.

With people working 12-hour shifts and the entire station focused on offload, all recreation comes to a halt. The bars close and the store goes to very limited hours. Lectures and sports stop. Only the Coffeehouse will be open at all, Wednesday and Saturday mornings, serving coffee only.

"We don't have employees, because all the employees are generally involved in offload," said Bill Meyer, recreation supervisor.

Recreation has plenty to offload this week, with about 20 milvans of beer, wine and soda coming, including a year's supply of Bass Ale and Sierra Nevada Pale Ale. There's new gym equipment, a new stereo for Southern Exposure and new instruments including a keyboard and the mandolin people have been asking for, Meyer said. Southern and Gallagher's will also get high-pressure glass washers. For the literary, there's new library shelving and $5,000 in books, "a whole new library basically," Meyer said.

During vessel offload, bulldozers and other heavy equipment have the run of the station, carrying the milvans. In general longshore ship work is a dangerous profession, DeGalan said.

"You have people wearing bunny boots walking on containers maybe four high that may be icy in the wind trying to pull heavy chains," DeGalan said. "It's just inherently dangerous.

Over the years there have been a couple of serious accidents during the vessel offload, but in the last few years the most common injury has been fingers smashed as people tried to adjust the tines on a forklift. Kimmes said it's only because of the increased safety awareness on everyones part and the emphasis placed on safety that there aren't more injuries.

"It's a tremendous amount of activity in such a small area," Kimmes said. "You constantly have vehicles backing up all the time with material."

The goods

The cargo is delivered to all parts of the station. It's a winter's work just organizing everything that arrives. The store has 130 items coming in, from the regular toiletries and snacks to new shot glasses, insulated mugs, soy milk and long underwear. Only a few of the new items will appear on the shelves immediately after they arrive.

"A lot of things will be saved for next year," said Kelly Knight, one of the store clerks. "If we brought everything out right now it just wouldn't be as exciting. We bring something new out every week or two weeks."

Eventually everything will be put out with a price.

"We never send anything back, even if we get the wrong stuff or it's not to our specs," Knight said. "If it's here, we sell it."

The refrigerated warehouse made room for 36 containers of food coming, said Amy Pashov, the supply senior for food service. The most pounds come from meats. Another 17 milvans of non-refrigerated food is on board too.

Photo by Derrold Burnett/Special to The Antarctic Sun

A caterpillar bulldozer is lifted by crane onto the Green Wave last month. The Green Wave carries everything a small city would need, from bulldozers and cement blocks to library books and chocolate.

The kitchen is waiting anxiously for a new supply of paper plates, chocolate and butterscotch chips, decaf black tea and waffle mix, Pashov said.

"Thanksgiving morning they woke me up to come and try to find waffle mix," Pashov said. "We've been out of waffle mix and pancake mix since then, so what everybody eats is homemade."

Other items Pashov would rather not see come off the vessel. There's still a "wall of curly fries" in the warehouse, enough to last three years, Pashov said. Ten 40-pound buckets of tahini are left and enough croissants to feed a French battalion.

"We've got 10 crates of croissants untouched and probably more on the way," Pashov said.

As quickly as the *Green Wave*'s emptied, she will be refilled. Some of the northbound load looks to the untrained eye like nothing more than carefully labeled and packaged rocks, dirt, snow and ice.

"We have a seal carcass that came in, penguin carcasses, air samples, water samples," said Summer Snow, an administrative

See Green Wave on page 16

GreenWave From page 15

assistant for science cargo. "Glacier ice from the Dry Valleys as well as lots of rock and soil samples."

At their home universities in the U.S. scientists are waiting for the samples to arrive in April to continue the research they started on the Ice. Some of the items will ship back in the refrigerator containers the food traveled in, including the carcasses of a seal and several penguins found dead by researchers. The most precious cargo are ice cores from Vostok and the International Trans-Antarctic Scientific Expedition. The Vostok ice cores will switch ships in New Zealand and head to Marseilles, France. They must be kept below (-17C) the entire time to keep the 450,000-year-old ice from melting into a puddle.

The rest of the milvans will be loaded with items USAP is throwing away, selling or donating with the National Science Foundation's approval. Almost half the 278 waste containers are loaded with wood scrap and construction debris, according to Waste Operations Manager Mark Furnish. Another 19 milvans are full of food waste. Used cooking oil and lard alone fill an entire milvan, as do old television and computer monitors. The trash will be taken to a landfill while full containers of aluminum cans, cardboard, metal, paper and plastic are recycled.

The contents of 29 milvans will be auctioned in mid-March in Oxnard, Calif., along with 33 items too big for the milvans. Reuse/Resale Coordinator Helen Trujillo has already had about 10 inquiries from people in McMurdo interested in buying some of the military trucks, sprytes, track loaders and a bulldozer named "Fuzzy."

"Those seem to be the most popular items to date," Trujillo said.

Many of the items have clearly put in their years of service in Antarctica. The oldest vehicle is a U.S. Army trailer from 1959. Information on the sale will be at www.matherauctions.com.

Photo by Derrold Burnett/Special to The Antarctic Sun

Lumber and crates are packed into the Green Wave like jigsaw pieces.

"Once these items get posted to the Web site and people start viewing the Web site I think there will be some interest there," said Trujillo, who initiated the culling of heavy equipment after walking into the heavy shop at the beginning of the season and asking about all the old equipment.

Many of the items leaving on the *Green Wave* originally arrived on the same boat, which provides a vital link to the world.

"Without the *Green Wave* the program is stopped," DeGalan said. "This is what allows people to operate year-round."

Ice cream From page 1

The contest was arranged by Debbie Lisman, housing coordinator at McMurdo Station, who knew one of the company's co-founders when they were just starting up more than 20 years ago. She said the ideal blend for the winning flavor should be "universally appealing, but specific to those who are in the know."

USAP employees must submit entries by Feb. 6, with Ben & Jerry's marketing officials scheduled to pick a winner Feb. 11, wrote Lee Holden, a company spokesman, in an e-mail. A certificate of recognition will accompany the year's supply of ice cream, but the winning idea won't necessarily end up on supermarket shelves.

"We cannot guarantee that the flavor idea will ever actually make into the marketplace as a Ben & Jerry's flavor," Holden wrote.

Ben & Jerry's has sponsored only one major flavor contest, asking consumers in the United Kingdom to come up with the ultimate British flavor in 1996, he added. The winner was Cool Britannia, containing vanilla ice cream, strawberries and fudge-covered shortbread. Runners-up included Grape Expectations, Rolling Scones, Minty Python and Stiff Upper Lip.

The company also welcomes flavor suggestions from anyone at its Web site at www.benjerry.com.

Ben Cohen and Jerry Greenfield co-founded the company in 1978 in a renovated gas station in Burlington, Vt. Lisman said she met Jerry's wife Elizabeth during a hospital internship in 1980.

"She said 'Hey, why don't you come down and see my boyfriend's ice cream shop' when it was at the gas station," Lisman said.

A friendship developed and she convinced the couple to go trekking with her in Nepal about 13 years ago. They made a good-natured bet that whoever climbed the highest could name a flavor - and Lisman won.

Lisman, who is working her second year in Antarctica, followed up on the old bet this year, asking the couple if they'd be interested in a naming contest. The company was purchased in August of 2000 by Unilever, a British-Dutch food company, but the co-founders are still active in the company.

Lisman said she might enter a flavor herself, but is more interested in seeing the ideas and suggestions employees submit to her.

To enter, employees must submit by e-mail their full name, e-mail address, phone number, mailing address, the agency or station where they work, and the name and a description of their flavor to Lisman at deborahlisman@mcmurdo.gov. USAP workers at all Antarctic stations and those working in the mainland U.S. are eligible.

Answer to crossword on page 2

Thank you:

The Antarctic Sun could not come out each week without the help of many people who keep our equipment working, answer questions and assist in a hundred other ways, both big and little. Any list will miss many important names, but the thanks is heartfelt.

Robbie Liben, Tom Cohenour, Judy Spanberger, Richard Perales, Lynn Hamann, Kelly Brunt, Julie at Weather, Alex Brown, Katy Jensen, Ben Murray, Tracy Sheeley, Henry Malmgren, Ted Dettmar, Dwight Fisher, Al Sutherland, Central Supply, everyone at the Computer Help Desk, Lynn Sprowles and the rest of the Rec crew, Alana Jones, Jeanine Watkins, Rhonda Rodriguez, Rebecca Glover, Glenn Gordon, Eric Sturm, Lisa Wright, Jay Fox, all of the performers at Icestock, Jim Scott, Tom Vinson, Robbie Score, Debbie Lisman, Elaine Hood, Jerry Marty, Karen Joyce, April Brown, Joe Harrigan, Rita Bartolomei and the guys at Terra Nova, Karl Erb, Erick Chiang, Guy Guthridge, Peter West, Mark Buckley, and the galley staff for the 24-hour-a-day food and caffene fix.

Continental Drift

What are your "summer" plans?

"Squeezing fish for the Forest Service in Sitka, Alaska."
Scott Freeman
Field coordinator and biological sciences technician at McMurdo Station from Sitka, Alaska

"I will be returning to work at the Virginia Institute of Marine Science, which will include analyzing samples obtained at Palmer Station."
Michele Cochran
Research associate at Palmer Station from Yorktown, Va.

"My travel agent booked me for an exotic adventure to the South Pole."
Loreen Lock
NOAA technician at the South Pole from Boulder, Colo.

Profile

Settling down at the Dome

Jake calls the Pole home

By Kristan Hutchison
Sun staff

Jake Speed is becoming a real-life hero at the South Pole, the man who keeps returning.

Speed, who's real name is Joseph Gibbons, hates to leave the South Pole, at all. He spent 22 of the last 26 months there, and recently returned for his third winter in a row.

"Jake would just move to the Pole and stay there," said Paul Daniels, who wintered over with him in 2001. "They have to force him to leave."

Gibbons gained his nickname, Jake Speed, after a comic-book character while he was in college. He played football at Berkeley for a few years and another Joe on the team decided there couldn't be two of them, so Gibbons became "Jake." That naturally evolved into Jake Speed, because of his hyperactive tendencies.

"The cartoon character was always going 100 mph," Gibbons said.

People who hear that story now are usually most surprised that Gibbons ever played football. His lank 6-foot frame wears patched Carrharts and scuffed bunny boots. Red hair curls over his pale face and tangles down his back.

"They look at me and say 'You're a dirty hippy. There's no way you played football,'" Gibbons said. So he pulls out his passport to prove it, flipping it open to a photo of a man with the same laughing eyes, but otherwise completely different - clean shaven, hair neatly trimmed, a California tan. Flipping through a few more pages in his passport gives a hint at what happened.

"In college I got really tired of the old, balding white man telling me what the world was all about when I knew he'd been sitting in his office all those years," Gibbons said. "I had to check things out for myself."

In 1992 Gibbons dropped out of Berkeley and spent eight months traveling through China, Tibet and Mongolia. Traveling mostly on foot, he had plenty of opportunity to discover the country up close. People welcomed him into their villages and homes

"I never had a problem getting a bowl of rice, a cup of tea, something like that," Gibbons said.

He went back to college with a purpose this time, designing his own major in ethno-ecology, a study of how culture develops and relates to the natural surroundings.

Gibbons took another semester off to walk the length of Mexico, then left college in 1994 to work on boats in the Aleutians. He fished, crabbed and crewed on a ship trading with the Russians on the Kamchatka Peninsula and traveling up and down Alaska's Inside Passage. At one point he helped sail a 50-foot boat from Juneau to Mexico.

With the money earned in Alaska, Gibbons traveled to Europe, Asia and Africa. While in Africa in 1997 and 1998 he worked for a few months with the Norwegian People's Aid, running grain and medical supplies into Sudan.

"We got bombed, constantly shelled, came across a massacre of some 1,500 people," Gibbons said. "You block most of that out and just focus on what you're doing."

In 1998 Gibbons got his college diploma, and shortly after he began applying for jobs in Antarctica.

When Gibbons first went to the South Pole he was looking for adventure. He'd been to 28 countries, a confirmed wanderer, exploring them all, but never willing to settle down. He wanted to go to every continent, and Antarctica was just another on the list. He signed on for a summer contract, but when he arrived at South Pole he knew he had to stay for the winter.

"It's like falling in love, like when you find that one person. You can't explain it," Gibbons said, describing the first time he saw the South Pole. "I found home. Now I never want to leave, and they make me every year."

Gibbons considers South Pole his permanent address. There's not even a storage unit in the U.S. Everything he owns is at the Pole or the Christchurch facility. In the last nine years, he's only been with his parents and siblings once for Christmas.

But being at the Pole is like being with family, Gibbons said. Polies can tell in a glance when someone needs to talk, or when they want to just sit alone and drink coffee quietly.

"They are a real family. There all you have to do is go into the galley and there's always someone there who will say 'Sit down Jake, what's going on,'" Gibbons said.

Gibbons is a well-liked member of the family, known by many.

"Jake's kind of one of those folks who always seems to have an upbeat attitude," said Betty Carlisle, who spent last winter at the Pole with him. "He stays busy, very helpful; he's a very bright guy, though he probably wouldn't like you to know that."

Gibbons speaks of the Pole's silver-blue skies and winter scenery like a beat poet whispering to a lover at night.

"You tell time by Scorpio and the moon …Sitting out, the auroras are dancing around, catch a comet or two, pop out of the cab and check out the sastrugi…These formations that are just created by wind and ice and constantly in a state of flow…It's so dynamic."

It reminds him of the ocean, only these waves are frozen, this water he can walk on.

Perhaps the attachment is genetic. Gibbons' father flew for the Navy in Antarctica from 1963 to 1965. Gibbons was born five years after his father's final Antarctic flight, and remembers seeing his father's three South Pole medals as a boy. Now Gibbons has collected two winter service medals himself and is embarking on his third winter.

He'd like to do five to 10 winters in a row at the Pole. The Raytheon Polar Service's guidelines for South Pole limits a person to 13 months at a stretch and passing a psychological evaluation.

"When I talk to the shrink and stuff they're always trying to tell me 'Oh my God, you need to tie in and stuff,'" he said.

The Pole has changed him, Gibbons said, but "only for the better." Now that he's well-adapted to being there, he doesn't think he should need to leave.

The few months he spent off the Ice were strange, Gibbons said. He biked around Christchurch, going to smell the grass. He wasn't accustomed to carrying money and paying for things. The off-Ice world burnt him out or "toasted" him more than an entire winter at the Pole.

"If you want to see toast, check me out in a city after two weeks," Gibbons said. "I can do winter here, but that's one thing I cannot do."

> "I found home. Now I never want to leave, and they make me every year."
>
> Joseph "Jake Speed" Gibbons