The Antarctic Sun

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

October 20, 2002

Night cruise

Photo by Kristin Cobb/Special to The Antarctic Sun

The Nathaniel B. Palmer *cruises the darkened waters of Marguerite Bay on the Antarctic Peninsula in April, studying krill and their interaction with the ocean dynamics and ecosystem.* *Read more on page 7.*

Ice work has trickle-down effect

'Gateway' towns get boost to economy as participants travel to and from Antarctica

By Mark Sabbatini
Sun staff

Sometimes it's millions of dollars for plane tickets and hotel rooms for those traveling to the Ice, other times a few bucks for a beer or a massage for those leaving. But every year the economic impact of moving thousands of people to and from Antarctica adds up in the communities that host them.

Getting scientists, their equipment and support staff in the U.S. Antarctic Program to the Ice is costly, and many participants are likely to spend more than a few of their own dollars along the way for personal items and travel. Nobody seems to have official or exact figures, but estimates place annual spending in the tens of millions of dollars in the "port" areas of New Zealand and Chile.

"It took us a little time to understand the extent of the opportunity that the McMurdo Program offered us," wrote Rob McGregor,

See Ports on page 10

Science enroute

Hard labor comes before hard facts

By Melanie Conner
Sun staff

For some, traveling to Antarctica is a matter of packing bags of clothes, books and mementos of home while complying with a 75-pound weight allowance. For seal researcher Randall Davis and his comrades it means hauling 15 extra bags, weighing 70 pounds each, stuffed with laptops, underwater seal cameras, and other lab and video equipment across the globe.

Field research is only a portion of the work done by Davis and other National Science Foundation grantees researching in Antarctica. Their first challenge is the journey to their Antarctic labs via Chile or New Zealand, without theft, loss or damage to high-tech science equipment.

"We pack two of everything in different bags," said Davis. "If something goes astray you can still carry on. We've got ourselves covered."

"You make a lot of lists," said seal researcher Shane Kanatous. "And you give customs the lists with dollar amounts, everything."

Steve Alexander, supervisor for Crary Science Lab at McMurdo Station and a former grantee, agreed that lists can both help keep track of gear as well as convince puzzled airport officials to allow quick passage at

See Deploy on page 13

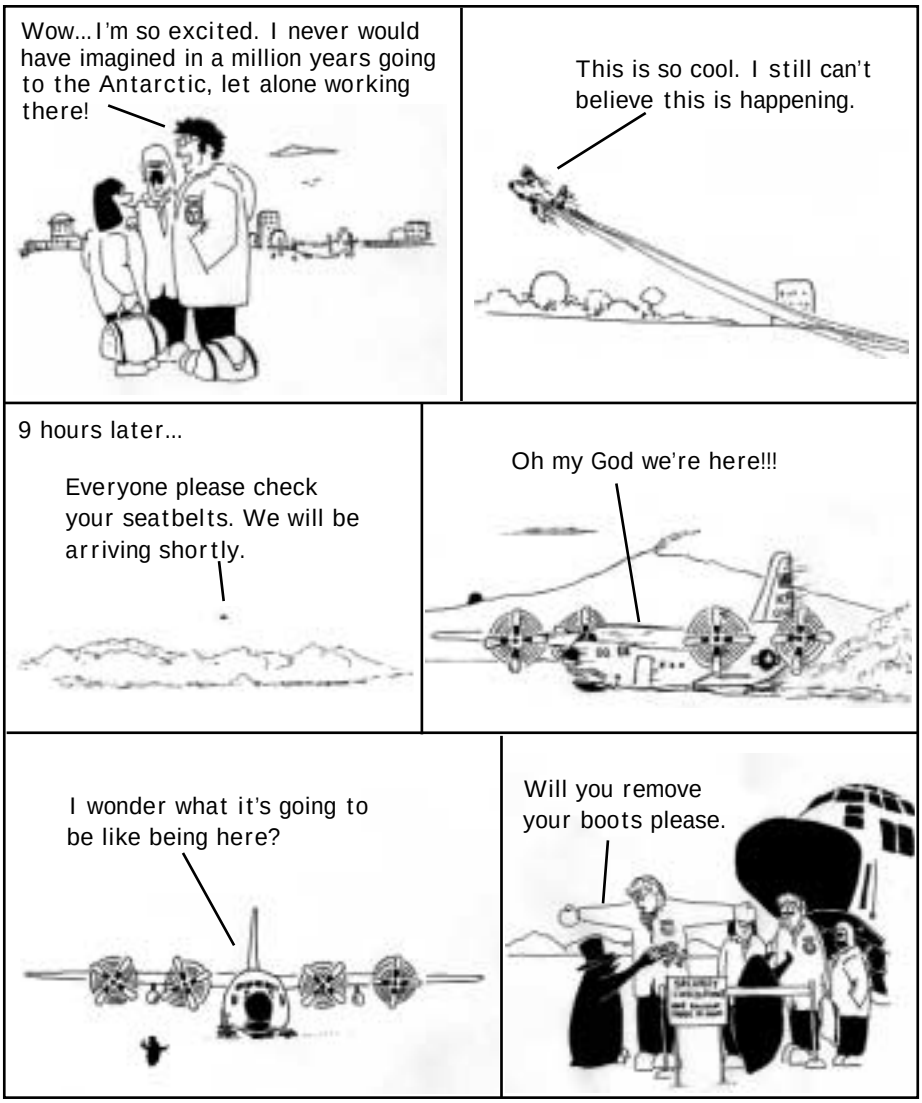
INSIDE

Quote of the Week

"I'm going to sleep 'til I'm done sleeping."

- Winter resident on what she'll do when she leaves the Ice

Ross Island Chronicles By Chico



Cold, hard facts

100-years-ago

Jan. 3 Capt. Robert Falcon Scott and his British Antarctic Expedition cross the Antarctic Circle aboard the *Discovery*.

Feb. Scott's Hut built at Hut Point.

Feb. Erich von Drygalski and the German expedition in the *Gauss* name Wilhelm II Land. They are stuck in the ice for a year.

Feb. The Swedish South Polar Expedition builds a hut on Snow Hill Island. Geologist Otto Nordenskjöld and five men spend two winters there.

Nov. 2 The Scottish National Antarctic Expedition sets sail from Troon on the *Scotia*. They will sail 33,000 miles (53,000 km) in the next 20 months.

Nov. 2 Robert Scott, Edward Wilson and Ernest Shackleton leave Winter Quarters Bay on the first serious attempt to reach the South Pole.

Dec. 31 Scott, Shackleton and Wilson turn back, having reached 82°17'S, 300 miles farther south than anyone before them.

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

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

Senior Editor: Kristan Hutchison
Editors: Melanie Conner
Mark Sabbatini
Copy Editor: Liz Connell
Publisher: Valerie Carroll, Communications manager,RPSC

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

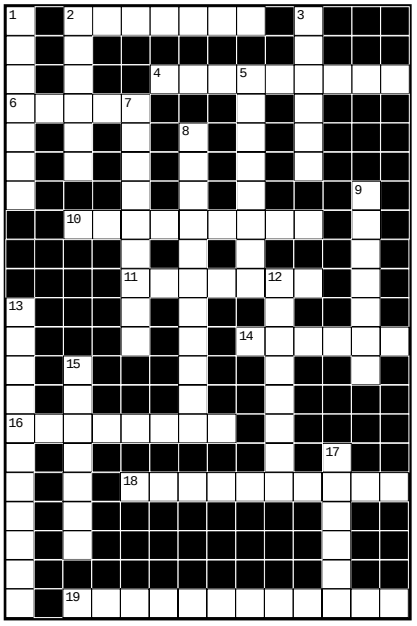
Web address: www.polar.org/antsun

Katabatic Krosswords: Getting to the Ice

ACROSS
2 The bundle of cash Raytheon workers get when they land in New Zealand
4 Never, ever pack things in these peanuts
6 Primary flight activity is this big bag
10 A flight that turns around in mid-air
11 The type of cold weather gear issued
14 The first group to arrive after winter
16 The first New Zealand city for the Ice-bound
18 The act of getting sent to the Ice
19 Departure city for McMurdo and South Pole workers

DOWN
1 What checked luggage is stored on
2 Summer workers get 75 of these to bring to the Ice
3 What is stressed to workers above all else
5 Get used to one; no solitary confinement here
7 Holiday considered unofficial start of Ice summer
8 Where Raytheon people learn about rules, benefits, etc.
9 People get two of these to bring gear to the Ice
12 What bringing in all the summer people is called
13 Departure city for Palmer and research ships
15 Where people stuff all their extra last-minute stuff
17 The city where Raytheon Polar Services is based

Solution on page 14



Squares too small? No pencil to erase your mistakes? Try our interactive online puzzle at www.polar.org/antsun

Dial-up doctors

By Kristan Hutchison
Sun staff

The South Pole has one doctor — and hundreds of medical specialists on-call.

The specialists are all back in the United States, so on-call truly means a phone call away, or sometimes a computer or video screen. Combining telecommunications with medical technology, they are able to examine patients, consult with the primary doctor and even assist with surgery.

When a meteorologist injured his knee mid-winter at Amundsen Scott South Pole Station, Dr. Tim Pollard was able to surgically repair it with the help of doctors at Massachusetts General Hospital in Boston. It was the first time the U.S. Antarctic Program had used telemedicine for surgery and was widely publicized.

A dozen other uses of telemedicine during the winter went unnoticed. The doctors at McMurdo Station used the telemedicine links over the winter to treat a tendon injury similar to the one at South Pole Station, and used the ultrasound link for an abdominal problem this summer. Besides the knee surgery, Pollard sent digitized x-rays back to the states to be read by specialists and held physical exams of orthopedic problems via videoconference.

"The consultants can see the patient and the patient can see them. This allows better physical exams and builds trust between the consultants and the patients," Pollard said.

Video conferencing was also used for psychological consultations from South Pole Station over the winter.

"You can see the body language the expression and some psychologists feel it's really better than being in the same room," said Dr. Ron Shemenski, acting medical director for the U.S. Antarctic Program. "It really adds a new dimension to the care we can provide from the station."

The telemedicine capability is fairly new. When Betty Carlisle started as a U.S. Antarctic Program physician in 1992 she had to call up friends if she wanted to consult with a specialist. In her second season she did a hand surgery at the South Pole with only a book to consult.

By the time another South Pole doctor, Jerri Nielsen, discovered she had breast cancer in May 2000 she was able to consult with U.S. doctors using cameras connected to computers and a digital microscope.

Now the South Pole and McMurdo have remote ultrasound capability and Polycom videoconferencing systems. They're scheduled to receive opthomological equipment allowing for eye exams long distance.

"It's just an evolution of the technology," Shemenski said. "We continually try to upgrade our medical capabilities."

National Science Foundation Representative Brian Stone and Dr. Betty Carlisle discuss the USAP telemedicine capabilities with people at the World Space Congress in Houston, Texas, Thursday morning, using the same videoconferencing equipment used for long-distance patient consultations.

Photo by Kristan Hutchison/ The Antarctic Sun

Palmer Station will be next. Until recently telemedicine at Palmer was limited to phone calls and digital photos of x-rays or skin lesions e-mailed to a radiologist or dermatologist, the winter doctor at Palmer, Alan Worth, wrote in an e-mail to the *Sun*.

"In one case this winter we had a four-way conference call/consultation with a patient aboard the *L.M. Gould*, Dr. Shemenski, a Texas based consultant, and me," Worth wrote.

Though limited, he found any contact with other doctors helps.

"I found e-mail was not only a link back to friends and family but also with the other Antarctic physicians and with several former Antarctic physicians," Worth wrote. "They formed a set of cyber colleagues that reduced my sense of isolation and whose experience I could draw on."

Palmer's telemedicine possibilities will expand soon. A new satellite receiver set up at Palmer last month allows the station continual high-capacity Internet connection. Video conferencing equipment is on its way, Shemenski said.

Having the telemedicine equipment is only part of the solution. Someone must be at the other end of the line to answer the phone. Usually it's a specialist at the University of Texas Medical Branch, which has a yearlong contract to provide telemedicine support to the Antarctic program.

"Just having equipment is one thing, but having the equipment linked to an institution that truly has 24-7 availability and has all the specialties is a quantum leap," Carlisle said.

The university medical branch has 1,600 faculty members, all on-call for the Antarctic program doctors and patients.

"That's the way we look at it. You have a huge academic health care center at your beck and call," said Scott Hermstein, director of community partnerships for the University of Texas.

The medical school is one of the biggest providers of telemedicine in the world, treating prisoners, cruise ship passengers, rural residents and corporate travelers long distance, Hermstein said. University of Texas doctors have done more than 70,000 live video consultations since 1994.

"Our physicians love it, they really do," Hermstein said. "They think that's the neatest thing to use modern technology to provide medical services to the South Pole."

The only place more remote would be space, and the space industry is very interested in how telemedicine works in the Antarctic. On Thursday the World Space Congress in Houston, Texas, featured the Antarctic telemedicine system. About 13,000 people attended the congress, which takes place once a decade. A few hundred of them got a chance to peek into the McMurdo clinic during a teleconference with Dr. Betty Carlisle and National Science Foundation Representative Brian Stone.

The presentation was partially a chance for the University of Texas Medical Branch to brag.

"We're kind of a good feather in their cap," Shemenski said. "There's nobody more remote than us and if they can provide teleconferencing to South Pole they can provide it anywhere."

Though the University of Texas is on-call, it's not the only option, Shemenski said. Recently a woman with a hurt knee at the South Pole had consultations with surgeons at Duke University. She chose Duke because it's near her home and she will go there for surgery after she leaves Antarctica.

"We can really hook up to about any medical center that we want to. We just have to make arrangements with them," Shemenski said. "It's unlimited."

Perspectives

The stuffing dreams are made of

Toy penguins, books spread love of Antarctic science among children

By Meredith Hooper

Last week Ponko the Penguin's amazing and courageous journey to the South Pole went public. Ponko is one of the earliest examples of film merchandising created. Stuffed velvet and plush, a mix of Adelie aggression and appealing bashfulness with a Princess Diana upward glance from downcast eyes, Ponko belonged to 'kinematographer' Herbert Ponting. Ponting arrived in McMurdo Sound with Capt. Robert Falcon Scott in January 1911. Ponko didn't actually travel to the Ice. He was created as a marketing ploy when Ponting returned to England, eager to sell tickets for his film of the expedition.

Photo by Jennifer Tabor/Courtesy of Meredith Hooper

Author Meredith Hooper during her visit in Palmer last January and February on an Artists and Writers grant.

A toy which did actually come south on the Scott expedition was a small teddy bear which belonged to the young Australian geologist, Frank Debenham. I saw a photograph of the bear while researching my first Antarctic book — an easy-to-access reference guide to the continent — 12 years ago. I wanted to write about him and got my chance when London's National Maritime Museum acquired Ponko. As part of their commitment to informing a wide public about Antarctica they asked me to write a children's book about Ponko — to give him a character, a personality, an Antarctic adventure. I asked the Debenham family in Cambridge for information about Frank's teddy. They didn't know it existed. But they said I could name him, and Ponko the Penguin got a friend called Joey Bear.

Ponko and Joey's adventures, published last week, are for 3-, 4- and 5-year-olds. But in 16 years' time those small readers will be old enough to vote, old enough for their attitudes to Antarctica to begin impacting on decisions. My desire to weave an awareness of Antarctica into people's consciousness, to give shape and substance to the wavy line at the bottom of maps, means writing in lots of different ways. There are all kinds of switches which persuade people to pick up a book about Antarctica and look at it. I've written a novel for children 10 and up about the ship's rats who planned their own expedition to Antarctica in 1901 on board the Discovery; a paperback for 9 to 13-year-olds about the strivings of Amundsen, Scott and Shackleton to achieve the Pole; a book about the Antarctic ecosystem with American artist Lucia deLeiris' acutely observed paintings; a picture book version of Shackleton and Endurance; a learning to read book on Weddell seals — based on the expertise of U.S. seal researcher Warren Zapol; an illustrated science book on plate tectonics inspired by a four-week cruise with geophysicists Fred Taylor and Doug Wiens on the research vessel *Laurence M. Gould*. I wrote about the logistics of getting humans into Antarctica, from my first trip south with ANARE, the Australian Antarctic research program, plus other articles in journals and newspapers.

My desire to find out about Antarctica began as a child when I watched the great waves rolling in on the wide empty southern Australian beaches and knew that, further south than I could imagine, was that nearest yet most distant continent. I didn't understand then that its frozen white bulk matched the long inward sweep of my familiar coast. But my father showed me where glaciers had ground north from out of the south, leaving deep scratches on sun-brown rocks. He told me how his revered geology lecturer, the Antarctic explorer Douglas Mawson, had shown him a rock he'd picked up on a local beach: Mawson said it reminded him of rocks he'd seen on Ross Island during Shackleton's 1907-09 expedition.

A year ago I was getting ready to return to Palmer, the second chance to live and work on the Peninsula, both times through the generosity of the National Science Foundation Artists & Writers Program. My project — to observe real Adelies, tracking as closely as opportunity allowed the work of ecologist Bill Fraser and his team. My new book, about the complex business of doing science in a remote location, will be for the general non-specialist adult market.

Now it's October. People keep saying to me, "going to Antarctica again, then?" Perhaps outsiders are beginning to think Antarctica is easy. But insiders — we know it's not. My new book on Antarctic science, focusing on Bill Fraser's work on the Peninsula, will — I hope — show a little about how you can't take Antarctica for granted — and why you shouldn't.

Meredith Hooper was an Artist and Writers grantee last season and a research Fellow of the Royal Institution Centre for the History of Science and Technology in London.

Please write
The Sun welcomes columns up to 800 words by scientists and community members for this page.

around the continent

SOUTH POLE

Winterers welcome summers first flight

By Judith Spanberger
Pole correspondent

The South Pole Station will welcome the first flight of summer in exactly a week from the time I am typing these words. A week. October 23. After 8½ months of existing through a South Pole winter one week is but a moment in time. And yet it seems like a lifetime away. In one week our world will change from one of incredible predictability and sameness to one of newness and great change. It's so hard to imagine that we will be bombarded with people and information unfamiliar to us that it still seems surreal. We'll almost have to see that plane on the ground to believe it. But whether we believe it or not the fact is that in a matter of weeks many of us will be in Christchurch reveling in all the sensations of the "real world," our time here done and our community gone forever. I'm sure it will seem like a dream to be pondered over many, many times in the months to come.

Photo by Jon Berry/Special to The Antarctic Sun

Rising moon over structure at Amundsen-Scott South Pole Station.

But in order for our winter to be over we have to prepare the station to open its arms to the summer season. One of the most important of the opening chores is the preparation of the skiway (we don't say "runway" around here). This is a task that takes a minimum of 150 man-hours of plowing, grading, smoothing, etc. If there happens to be a storm (what? In Antarctica?) it can undo every minute of work, so on top of the plowing and grading there's probably 150 man-hours of silent prayer. The heavy equipment operators have been working what seem to be 27-hour days and the skiway appears ready. The surface needs to cure and harden yet, but it looks good, the only thing missing in this picture is a plane. (Feel free to assist in praying for good weather to continue on through opening). How odd it is to see a skiway out there when for the last eight months it looked just like any other snowy wind-blown expanse of the polar plateau.

It's amazing how much the station has changed in the last few weeks. We've gone from a quiet place where the snow drifted around the structures giving the impression of a ghost town to a town with smoothed surfaces, doorways cleared of snow and buildings ready for summer activity.

The utility technicians have also been working long days opening up summer camp housing and offices. Buildings and Jamesways that for so long sat under a layer of powdered snow slumbering away are now plowed out and have smoke rising out of the stacks. Some work activity has already moved out to the summer camp offices and this weekend we winterers who've lived under the dome move into summer camp Jamesways, giving up our rooms for the summer crew. And so the baton begins its passing.

Photo by Jon Berry/Special to The Antarctic Sun

Sunlight at the gates of Amundsen-Scott South Pole station on October12.

For folks here at the South Pole, this last week is a time of closure. Many of us have been busy packing boxes to send back home, dropping off items in skua, coming to terms with the idea that we will not finish some projects we wanted or read the books we had hoped to read. Year-end reports are being written, shops are being cleaned and organized for the incoming crews, tools that were extensions of an arm are being put back on shelves in ready for another person's use. Travel plans are being made and addresses are being exchanged. The silent cloud of the impending good-byes sits directly above us.

PALMER

Getting to Palmer Station

By Tom Cohenour
Palmer correspondent

Anybody who's experienced it will tell you that deploying to Palmer Station is a real trip. Just getting there takes nine days if all goes well. The concerted effort needed to deploy a full season's support staff to a scientific research station in Antarctica takes an enormous amount of planning, cooperation and a fair amount of good weather. This is turnover; a time when winterers leave and summer support staff arrive at station for a typical six-month stay.

Most people had already been traveling for two days by the time the plane lifted off from Denver International Airport. Leaving home, flying into Denver, checking into a hotel, and going through orientation the following day was a bit tiring.

"The underground train at the (Denver) airport was really confusing to me," said one newcomer with a big yawn. "It felt like I was going the wrong way."

After orientation at Raytheon Polar Services Company's Denver headquarters, the flight to Houston was a welcome chance to relax. And the nine-hour nighttime flight from Houston to Santiago, Chile, was a chance to sleep.

Arriving in Santiago early in the morning, the travelers were met with big smiles, handshakes, and hugs from long time Antarctic program friend Jimmy Videla from Agencias Universales S.A. Videla is the smiling, efficient, English-speaking agent who pleasantly guides Antarctic participants through Chilean customs and onto

See Palmer on page 6

the week in weather

McMurdo Station
High: 10F/-12C Low:-17F/-27C
Wind: 53 mph/85 kph
Windchill: -53F/-47C

Palmer Station
High: 36 F/2 C Low:19F/-7C
Wind: 59 mph/94kph
Snowfall: 7 in./18 cm.

South Pole Station
High: -56F/-49C Low:-74F/-59C
Wind: 18 mph/28 kph
Windchill: -116F/-82C

Palmer From page 5

a flight for the next leg of the journey.

The next flight wasn't for another 12 hours, so the travel office booked hotel accommodations for the day in central Santiago, which gave the travelers a chance to rest, eat, go sightseeing and do some shopping. By evening the group was back in the air for two hours before touching down in Puerto Montt for a half-hour layover. Again, back in the air for another two hours before landing in Punta Arenas, Chile, and being met by Ximena Mancilla and her contingent from Agencias Universales S.A.

Photo by Jeff Kietzmann/Special to The Sun

Technicians fix a broken weather station on Racer Rock.

Two vans crammed with weary travelers, one flatbed truck heaped with baggage, and 30 minutes later, the group arrived at the dock to board the research vessel *Laurence M. Gould*. The trip was only one-third over.

After picking up their extreme cold weather gear the following day most people wanted to see the city and get something to eat. "Let's go to Lomit's!" someone was heard saying. "Yeah, I could go for a *churasco* (Chilean snack) and *cervesa* (beer)," was the response.

Two days after the group arrived in Punta Arenas they found themselves on the deck of the *Gould* watching the pier slip away as they headed out into the same straits Ferdinand Magellan sailed over 500 years ago. As is required, the *Gould* was piloted by a Chilean pilot in Chilean waters. Around midnight the pilot was picked up by the pilot boat and Captain Robert Verret resumed command.

The Drake Passage is infamous for its rough seas but in order to reach Palmer Station it must be crossed. Whoever said, "I hope it's Drake Lake and not Drake shake!" summarized what was on everyone's mind. Fortunately, 12-foot seas were as bad as it got for the travelers and seasickness was minimal.

Once safely across the Drake, talk turned to the subject of Racer Rock and the automated weather station, which hadn't been transmitting data for about a year. Stopping three-quarters of a mile from Racer Rock, the *Gould* crew lowered two zodiacs into the ocean, and four people went ashore to repair the weather station. Lab Supervisor Rob Edwards, describes it this way:

"In case you were wondering what we were doing for those 12 hours in the Gerlache Strait, basically, we went ashore to ascertain the condition of the automatic weather station, and try to fix what we could. When we finally found a reasonable landing area and got up to the station, we found that the wind sensor was toast, the antenna was toast, the connections were toast, the solar panel was toast, the batteries were toast, the junction box was toast and, oh yeah, the mounting brackets were…actually swiss cheese.

Through the efforts of all involved we were able get the station running again (with the exception of the wind data, which is still…charred croutons). Special thanks go to Jeff Kietzmann for technical assistance, Mike Murphy for antenna fabrication and especially Bruce Felix for doing it all, particularly when he thought this was going to be a simple shuttle transit."

After another nine hours of ocean voyaging, the summer crew finally arrived at Palmer Station. It takes a dozen line handlers to tie up the ship. Each one wears an orange float coat as a precaution in case a misstep causes a sudden plunge into icy waters. Teams of four to six tug on ropes securing the *Gould* to various mooring points attached to solid rock. After 45 minutes of docking, the ship's crane lowers the gangway connecting the ship to the pier for safe passage to dry land. Now turnover can really begin.

Photo by Jeff Kietzmann/Special to The Sun

Crossing Racer Rock to fix a broken weather station.The station had been broken for a year.

Continental Drift

What do you expect Antarctica will be like?

(Asked of people on their way to the Ice for the first time)

"I don't know what to expect. It will be a new environment, new conditions, new people. I find it exciting."

Gregory Cowan

Plumber's helper on his way to South Pole Station from Marshall, Minn.

"A very cold college town."

Susan Monroe

Sr. Analytic Chemist on her way to McMurdo Station from Denver, Colo.

"Well, I've been up to Alaska a lot, spent seven summers and several winters. I guess I'm just expecting a little harsher environment."

Jeff Roller

Marine tech on his way to Palmer Station from Truckee, Calif.

For the thrill of the krill

Photo by Kristin Cobb/Special to The Antarctic Sun

Adelaide Island viewed from the Baltic Room on the Nathaniel B. Palmer, *where instruments are cast into the water to measure temperature, depth and other traits.*

By Kristin Cobb
Special to T he Sun

In China they eat rice.
In Europe wheat.
And Antarctica's staple food is krill.

These shrimp-like creatures, the size of a pen cap, are the key link in the Southern Ocean food web. Nutrients in the water "feed" algae, phytoplankton and other primary producers, which in turn feed krill. The krill in turn feed fish, sea birds, penguins, seals, whales and other predators.

For a second winter, scientists aboard National Science Foundation research vessels tried to find out how and where krill survive during the fierce Antarctic winter. Beyond that, scientists hope to find out how krill are connected to the rest of the Antarctic animals and microorganisms, to the dynamics of the ocean, and how krill respond to changes in climate.

Two high-tech research vessels, the *Laurence M. Gould* and the *Nathaniel B. Palmer*, explored the Antarctic continental shelf in four separate cruises in 2001 and 2002 as part of the Southern Ocean Global Ecosystem Dynamics (SO GLOBEC) program.

As winds reached up to 69 miles per hour (110 kph) crossing the Drake Passage, scientists experienced firsthand how life in the ocean depends on the movements of the sea. The waves climbed to 20 to 25 feet (6 or 7 meters) for a time, enough to tip chairs and knock keyboards to the floor in the ship's computer lab.

Then, just as quickly as the seas had stirred, the lurching motion subsided. The treachery of the Drake was forgotten as research took on a frenzied, 24-hour-a-day pace.

The *Palmer* and the *Gould* worked as a team in Marguerite Bay on the western side of the Antarctic Peninsula. The *Palmer* surveyed 92 points along a grid, collecting data on the shape of the seafloor, the distribution of krill and plankton and the numbers of sea birds and whales as it cruised from point to point. The *Gould* focused on five stations, spending four to five days at each.

Mapping the ocean

Water in the ocean is not uniform. Like pouring hot water into a cold bathtub without stirring, the ocean has masses of water with distinct features and histories. Differences in density and salt content prevent these water masses from readily mixing and maintain environments that may be as disparate as a rainforest and a desert.

"You'd be amazed how much structure there is," said Julian Ashford of Old Dominion University, who worked with a group on the *Palmer*'s measuring the basic physical features of the sea – temperature, depth and conductivity or how well it transmits electricity or heat. Ashford's group created maps that show high and low zones of salt, oxygen and temperature, much as elevation maps show mountains and valleys on land.

Just like the topography of land governs its ability to support life, so too does the layout of the ocean. The cruise mapped a new piece of the Southern Ocean floor. The seafloor is rich with volcanoes, deep troughs and dents where jagged icebergs once scraped across the bottom. These features affect the biology of a region.

For example, SO GLOBEC scientists have been slowly mapping a deep trough that cuts diagonally across the continental shelf of the Western Antarctic Peninsula. Warm water may enter the continental shelf through this trough, bringing in nutrients and increasing the fertility of the strip. Colder, denser water may also sink deep in the trough, making a habitat for certain types of fish.

"Water movements affect where the food chain starts, where the green stuff is, where the krill is that eats the green stuff, and so on," said Andres Sepulveda, a graduate student from Old Dominion University who worked with the same group as Ashford, measuring the oceans basic vital signs.

See GLOBEC on page 8

Photo by Kristin Cobb/The Antarctic Sun

Amy Kukulya of Woods Hole on far left, Alice Doyle of Raytheon at the middle back, Jenny White on the right and Pete Martin of Woods Hole in front work on an instrument nicknamed "The Fish."

GLOBEC

From page 7

A dramatic example is the Antarctic Circumpolar Current, the world's largest current, which circles the continent and governs much of the life in the Antarctic. The current forms a swift-moving corridor in which animals can travel for thousands of miles.

"They don't even know they are moving because their environment never changes," Ashford said.

The current may also bring warmer, nutrient-rich ocean water to the continental shelf of Antarctica, potentially affecting the biology there.

"These nutrients are essentially fertilizer that phytoplankton use to grow. They support the base of the food chain," said Rob Masserini, a graduate student in chemistry from the University of South Florida, who examined the nutrient contents of the water layers.

Masserini was particularly interested in ammonia, a form of nitrogen that phytoplankton use to make proteins. Last year's SO GLOBEC cruises revealed startlingly high levels of ammonia and unexplained seasonal shifts in its concentrations along the Western Antarctic Peninsula.

In addition to nutrients, the Atlantic water also brings heat, which can thin out sea ice. Krill require sea ice as a winter refuge, as do certain penguin species and mammals. Their numbers may decrease if the water coming from the Atlantic warms, thinning the sea ice even further.

"Last year at this time there wasn't any ice. This time, we have a lot of ice. The contrast will be interesting," said Peter Wiebe, chief scientist aboard the *Palmer*.

Learning how krill respond to year-to-year variations in climate may help scientists predict their responses to prospective long-term climate change.

"The Fish" finds Plankton and krill

During the cruise the zooplankton and krill research team dodged a close call with their key instrument, the Bio-Optical Multi-frequency Acoustical and Physical Environmental Recorder (BIOMAPER-II), which was affectionately called "The Fish."

The Fish was almost fried when an electrical fire broke out in its garage - a converted blue shipping container on the back deck. Luckily, the fire burnt itself out and The Fish was unharmed except for a layer of soot easily washed off by the ocean.

The Fish is towed behind the Palmer to find krill and other zooplankton in the water. Its body is a 15-by-3 -foot white box, reminiscent of a chest freezer, adorned with an airplane tail, a black nose, and mounted cameras that resemble coiled bug antennae. Wearing a round, yellow Woods Hole sticker where an eye might be, it looks almost creature-like. At 1,700 pounds, it weighs as much as a baby whale.

"It's kind of funny: they don't call it 'The BIOMAPER' they just call it 'BIOMAPER,' like it's a being, like it's this little entity," said Jenny White, a marine technician from Raytheon Polar Services Co., which provided support for the research cruises. Other scientists jokingly asked when they could watch it be fed.

The Woods Hole team has good reason for acting like proud and protective parents. The instrument is unique to Woods Hole, created in the mid-1990s by Wiebe and Tim Stanton. Wiebe and Stanton took a standard piece of oceanographic equipment — one that images microscopic sea animals with high-frequency sound waves — and added capabilities no other instrument has. Wiebe used the second-generation BIOMAPER-II for the SO GLOBEC cruises.

The Fish has three subsystems: the acoustics, the video plankton recorder and the conductivity, temperature, depth sensor. Together these instruments measure the distribution of zooplankton relative to the structure of the ocean.

The Fish sends sound waves up and down the water column from five up-looking and five down-looking acoustic transmitters. Particles and organisms in the water scatter the sound waves and bounce them back to receivers on The Fish. The pattern of scattering depends on the density, size, and type of particles and their distance from the instrument. The signals are relayed to a computer through fiber-optic cables in the towline that ties The Fish to the ship.

What researchers see on their computer screens are smatterings of color that, to the untrained eye, look like an Impressionist painting of the world beneath the ocean surface. Trained acousticians, however, can read the code hidden in the colored pixels. For example, patches of krill might give splotches of color from red to orange, and even to black, when the patch is extremely dense.

"It's a fish finder on your boat," explained Andrew Girard of Woods Hole. "But with the frequencies we're using, we're looking at microscopic stuff in the water." Girard, along with Pete Martin of Woods Hole, was one of two technicians that accompanied BIOMAPER-II on the cruise.

Interpreting the acoustical signals is tricky business. Researchers can't always be sure of what The Fish's acoustic sensors are seeing.

"The acoustics can tell you that there's a patch of something there," Girard said, but they can't tell what that something is.

That's where The Fish beats standard oceanographic tools that depend solely on acoustics. The Fish carries two high-resolution cameras that provide visual confirmation of the acoustical data. As The Fish moves through the water, these visual plankton recorders film all the microscopic animals passing through a small volume on the front of the instrument, giving scientists a visual sample of what's down there.

"If Peter [Wiebe] sees a big red splotch on his acoustics, and says that's a patch of krill, we fly BIOMAPER down through," Girard said. "If krill start popping up on the VPR (visual plankton recorder), we know that the patch was identified correctly."

Besides the cameras, another way to ground-truth The Fish's acoustical data is to directly sample the water with nets—which scientists such as Carin Ashjian of Woods Hole did periodically from the *Palmer*. Additionally, scientists are developing mathematical models to help them better interpret the acoustical data.

See GLOBEC on page 9

GLOBEC From page 8

The zooplankton and krill group have been surprised by the results they are seeing so far.

"It's been very different," said Ashjian. "We haven't seen the krill like we saw last year." The fall cruise last year saw a lot of young krill in a specific layer of colder water called winter water, and they also saw lots of krill on the continental shelf, Ashjian said.

Moving up the food chain

Leaving Marguerite Bay midcruise, the *Palmer* steamed through a vast wasteland of new lumpy, slushy "shuga" ice that was dotted with broken ice floes and cakes — the snow-covered leftovers of last year's ice.

While the ice tested other scientists' gear and patience, bird surveyors Erik Chapman and Matthew Becker, of the University of Wisconsin, welcomed it. Adelié penguins, one of their focus animals, are chiefly found near ice. Ice brings food up to the surface, "nurses" baby prey that will grow into hardy penguin meals, and gives the penguins a surface to haul out on, Chapman said.

Chapman and Becker mapped the distribution of flying birds and penguins along the *Palmer*'s route. Because birds follow the food, they point scientists to particularly lush areas of the sea. This is especially useful in the winter, when sea life is sparse and hidden.

"Sea birds have an extremely well-developed ability to perceive the ocean in ways we can't," Chapman said. "If your goal is to understand the biology of a large area of ocean, you have to use clues like that."

The presence of certain species also flags events down the water column. Cape petrels and southern fulmars feed on tiny copepods right on the surface. Antarctic petrels plunge into the water and catch fish below the surface. Penguins dive much deeper, scrounging for krill or fish.

Similarly, Deb Glasgow of the International Whaling Commission mapped the distribution of whales and seals along the *Palmer*'s path. At the top of the Antarctic food web, whales and seals are important indicators of what's happening with animals lower down, including krill.

"Where I saw large groups of whales, they also saw krill on the BIOMAPER," Glasgow said. "The information tied up really well."

Meanwhile, on The Gould

Complementing the *Palmer*'s large-scale survey, *Gould* scientists focused on how krill and other animals survive the Antarctic winter.

For example, krill reduce their metabolism in the winter so they do not have to eat as much to stay alive, said Kendra Daly of the University of South Florida, who sailed aboard the *Gould*. They can also feed on large masses of bacteria and algae that accrue on the bottom of sea ice if it sits around long enough.

"It's kind of like spinach in your freezer," Daly said. Since food in the water column is extremely low in the winter, these "algal popsicles" are a key food source. In the absence of sea ice, or if sea ice forms late in the winter, this food source may diminish, affecting krill survival rates.

Daly measured krill growth rates, molting rates and feeding rates. The *Gould's* chief scientist, Joseph Torres, of the University of South Florida, measured krill metabolism.

Torres led a group of under-ice scuba divers who studied Antarctic fish up close. Among other adaptations, some Antarctic fish make antifreeze proteins that prevent their blood from freezing.

The *Gould's* Brett Pickering and Chris Denker of the Polar Oceans Research Group braved the austral fall in tents. They camped for 11 days on Avian Island to tag penguins and examine their stomach contents.

Photo by Kristin Cobb/The Antarctic Sun

Kristy Aller of Scripps Institution of Oceanography and Jenny White of Raytheon are lowered from the Nathaniel B. Palmer *to sample the sea ice. They will study the microscopic plants in it.*

"The penguin guys have a good idea what's going on in the system because their animals are sampling the same things my net's sampling," Torres said.

The first birds they caught were full of krill, nearly 10.5 ounces (300 grams), Pickering said. "It's like a plateful, it really is. More than I'd want to eat of krill."

Pickering and Denker camped in Scott tents and made use of a Chilean refuge, a dilapidated wooden hut to cook and get out of the wind. Twelve hours from the *Gould* and at risk of being trapped in ice, Pickering and Denker brought two back-up tents, a man-hauling sled, a zodiac inflatable boat, generators, and plenty of safety equipment. In all it was probably close to 1,000 pounds of gear, Pickering guessed.

"It wasn't a normal camping trip," he said.

There were more than 1,000 fur seals, as well as some elephant and Weddell seals, covering the tiny island when they first landed.

"The first few days the seals didn't know what to think of us. They were a little testy," Pickering said.

The unpredictability of the science and of the day-to-day living may be exactly what draws scientists, technicians and crew to the Antarctic.

"You leave port, and you've got a certain amount of material things, a certain amount of talent, and a certain amount of ingenuity and energy," said marine technician Steve Tarrent. "Any problems that develop, you're going to have to deal with them with what you've got right here…There's a sort of grace to that."

Kristin Cobb is a graduate of the science communication program at the University of California, Santa Cruz. In April she went on the third cruise of the Southern Ocean Global Ecosystem Dynamics (SO GLOBEC) program to the Southern Ocean.

Photo by Mark Sabbatini/The Antarctic Sun

"The thing about the product being Antarctica is you don't get it in any other country."

- Mike Hyde, office and finance manager for the Antarctic Centre

Visitors at The Antarctic Centre in Christchurch, New Zealand, try on clothing worn by scientists and workers who deploy to Antarctica. The center, located at the same facility which houses the Antarctic programs for the United States, New Zealand and Italy, is one of Christchurch's most popular tourist attractions.

Ports

From page 1

co-owner of the Total Body Concept wellness spa in Christchurch, New Zealand, in an e-mail. But he said during the past three years they have built up a steady stream of Antarctic customers, often during what would normally be slow periods for the business, and "it would be fair to say that we are delighted" with the program's impact.

The Antarctic program also provides a boost to Christchurch's image, McGregor added.

"Without doubt. I think Christchurch City does benefit greatly from this gateway image and the attention it draws to us," he wrote. "Having (those) U.S. citizens coming and going every year in itself helps the economy and helps spread the word through (the) USA (about) what a nice City we have."

Few think Christchurch or Punta Arenas — the Antarctic program's main port city in Chile — base their economy or primary tourism trade on their status as an Antarctic transport hub. But plenty of businesses and organizations, large and small, credit Antarctic connections for a large part of their clientele.

The program is a major customer of the port facilities in Punta Arenas, where research ships depart for Palmer Station and other parts of the continent. The privately-owned Antarctic Centre in Christchurch is considered one of the city's main tourist attractions and is a gathering hub for program participants before they head to McMurdo.

A stop at Bailie's Irish Bar in Christchurch or Lomit's in Punta Arenas is considered almost mandatory for large numbers of deploying participants. Those already on the Ice find fliers and posters on bulletin boards and other scattered areas inviting them to indulge, dine, relax or go adventuring when they leave.

The Antarctic program typically transports about 3,000 people annually through Christchurch, including 2,500 U.S. participants, plus 300 for the New Zealand program and 200 for the Italian program.

Transporting that many people, most of them halfway around the world, makes the the program a major customer of Qantas Airlines, said Lynn Dormand, manager of the deployment specialists group for Raytheon Polar Services Co., which provides Antarctic support services. She said they also use more than 50 hotels and other lodging facilities in Christchurch. The lodging, meals and related expenses are covered with a per diem payment of about $250 participants receive when they arrive.

Dormand said the total spent on transportation and lodging is "millions and millions every year."

A "long-winded and slightly shaky calculation" by Antarctic Link Canterbury estimates $18 million to $28 million in New Zealand currency (roughly $9 million to $14 million U.S.) is spent on lodging, food and discretionary spending by Antarctic program scientists and staff in southern New Zealand, wrote Sue Stubenvoll, a volunteer coordinator for the organization. The sum assumes participants spend a total of 33,000 room nights a year in the area. The estimate also assumes about one out of every three participants spends an average of 10 days for personal travel in New Zealand.

"Either figure means the program has a huge impact on the Christchurch and South Island tourism economy, never mind its agricultural supply," she wrote.

Several hundred people pass through Chile each year as part of the Antarctic program, and while "it's not like Christchurch," expenses there also run in the millions, Dormand said.

The tally for Raytheon-related services in Punta Arenas was nearly $3.7 million from November 2001 to August 2002, wrote Ricardo Doberti, the agent for Agencias Universales S.A., the hosting agent in Chile for the Antarctic program.

"This, of course, does not include the personal expenses paid by each participant," he noted.

Six Agencias Universales employees work year-round at the Antarctic program port facilities, which consist of two warehouses plus outdoor cargo space.

"It's a little difficult to measure the impact this program makes on the local economy, but from our point of view it's not little,"

See Ports on page 11

Photo by Mark Sabbatini/The Antarctic Sun

A bartender at Bailie's Irish Pub in Christchurch, New Zealand, who identified himself simply as "Jim" serves drinks to Sean Norris, right, a carpenter helper working his first year at McMurdo Station, and Darryl Shakespeare, a Wellington, New Zealand, resident visiting the city. The pub is a common hangout for Antarctic workers before and after they deploy to the Ice.

Ports

From page 10

he wrote.

Many businesses and organizations said the best part is meeting people who work on the Ice and hearing about their experiences. In some cases — such as the Antarctic Centre — that allows them to better inform "enthusiasts" about what life at the bottom of the world is like.

"The thing about the product being Antarctica is you don't get it in any other country," said Mike Hyde, office and finance manager for the center, which gets more than 200,000 visitors annually.

He said attendance is growing 10 percent a year and half of all Christchurch visitors who pay for a tourist attraction come to the facility. Since it is in the same complex as the Antarctic program facility in Christchurch, the center also reaps benefits such as having nearly every deploying person eat breakfast there before catching their flight to the Ice.

The impact the program has on other individual businesses varies widely, even among closely located businesses that would appear to offer services appealing to Antarctic travelers. A clerk at an electronics store in Christchurch said numerous people come in for parts, while a server at a $2.50 all-you-can-eat ethnic restaurant a half-block away said she's never knowingly met an Ice worker. Bus drivers and lodging staff frequently can identify Ice people at a glance, offering useful advice on getting around the city and arranging transportation to their flights.

Kelly Lind, a New Orleans resident working as a carpenter's helper during her second season at McMurdo, bought a wool thermal top at a Christchurch shop recommended by a co-worker and "a really cool necklace." She said she's likely to travel in New Zealand for about three weeks after she leaves the Ice.

An assortment of items, including sushi ingredients and Halloween face paints, were purchased by Helen Trujillo, a Frasier, Colo., resident working her second season as the resale coordinator at McMurdo. Many of the items were purchased at Kiwi Disposal, which she said it sort of a military surplus store.

"You can always find good finds there on odd items," she said.

The fliers and other advertisements posted at stations on the Ice are often brought by program participants impressed with a particular business. Among those in the main hall at McMurdo are circulars for sheepskin clothing, New Zealand crafts, gourmet cheese, wilderness gear rental, flightseeing and various places to stay.

Word of mouth also plays a large role. Ellen Ridge-Cooper, a San Francisco resident working as an x-ray and ultrasound technician during her first season at McMurdo, searched the board hoping to locate a company selling a replica of a large new decorative neon clock hanging in the galley. She flinched a bit after finding it on a Web site at a list price of $265.

"Maybe I'll ask Santa to bring it to me," she said.

Proof that the Antarctic connections are often about more than money can be found at Bailie's, located in a historic downtown Christchurch hotel where Robert Scott's party once dined and Ernest Shackleton spent the night. The walls are decorated with photos, large replicas of patches worn on the Ice, a map reportedly signed by most of the pilots who have flown to McMurdo and other memorabilia.

During the past 15 years its Antarctic presence has grown. In the early days of that transition, it was the business that often helped the workers instead of the other way.

"We had a lot of broke people around the bar," said Stan O'Keefe, who manages the bar with his wife Lynne. "We'd advance them a couple hundred until the end of the season."

Now the influx of Ice dwellers marks the beginning of tourist season. Stan O'Keefe said it's a small part of his business financially, but the impact goes well beyond that.

"It's a friendship that we don't measure in dollars and cents," he said.

Wave goodbye to Green Wave

And say hello to the *American Tern*, new ship on the Antarctic route

By Mark Sabbatini
Sun staff

A newer and bigger ship will bring most of the supplies to the Ice for the coming year, replacing the *Green Wave* vessel that has been an end-of-summer landmark for the past 18 years.

A 12-year-old German ship, renamed the *American Tern*, has about one-third more cargo space, a higher ice rating and is 10 years newer than the *Green Wave*, officials said. Everything from curly fries to heavy construction machinery is scheduled to be loaded into the *American Tern* at the end of December in Port Hueneme, Calif., for its anticipated inaugural arrival at McMurdo Station in mid-February.

Photo courtesy of American Automar

The American Tern *at dock in Antwerp, Belgium.*

The *Green Wave*'s contract with the U.S. Antarctic Program expired this year. Program officials asked for a larger ship when they submitted their technical requirements to the U.S. Military Sealift Command, which selected a vessel from bidders.

"Two years in a row we had too much cargo to put on the *Green Wave*, so obviously the program is growing to the tune that the *Green Wave* is no longer adequate for us," said Michael Embree, director of logistics for Raytheon Polar Services Co., which provides support services to the Antarctic program.

The excess cargo had to be flown to McMurdo, which is considerably more expensive, he said. Raytheon officials estimate it costs 11 cents per pound to transport items from Christchurch, New Zealand, to McMurdo on a resupply ship, compared to $2.50 a pound by air.

The 521-foot-long *American Tern* won't look much bigger, being only 14 feet longer and seven feet wider than the *Green Wave*. But the German ship can carry 977 8-by-8-by-20-foot shipping containers, called milvans, compared to 594 on the *Green Wave*. The most noticeable difference may be on the ship's deck, where 655 milvans can be stacked compared to 362 on the *Green Wave.*

Each milvan 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.

The *American Tern*'s capacity is more than the Antarctic program will need for the coming year, said Lee DeGalan, manager of Port Hueneme operations.

"This is probably going to be a lesser year for the ship, but it does give the National Science Foundation the ability to program construction and other projects in a much tighter time frame," he said.

The cargo capacity will be vital for large-scale projects such as the construction of the new South Pole station, scheduled for completion in 2007. About half of the 12 million pounds of cargo on the *Green Wave* this year was for the South Pole, whose population is about one-fourth the size of McMurdo's.

"I think this ship should be enough to satisfy the requirements of the Raytheon contract," which could last until 2010, Embree said.

Military Sealife Command officials select the vessel from bidders because the ship is also used outside of the Antarctic program. The winning bid came from American Automar, a Maryland-based subsidiary of the international NOL Group that provides sea-based support for the U.S. military.

The ship is in drydock in Jacksonville, Fla., being re-flagged as a U.S. ship and "being fitted with features required by her charter to the U.S. government," wrote Bill Charrier, an official with American Automar, in an e-mail. The ship was also given a new name for its new mission.

"American Automar has traditionally named its vessels after birds, in many cases a bird appropriate to the ship's mission," Charrier wrote. "A good example is the *American Cormorant*, one of the few very large semi-submersible heavy-lift ships in the world (it dives to pick up its cargo)."

"The Arctic tern migrates 22,000 miles or more per year between the Arctic and Antarctic regions. So will the *American Tern*, since two of its missions are to resupply McMurdo Station and the Air Force base at Thule, Greenland."

The *American Tern* has three on-board cranes, compared to four on the *Green Wave*, but those on the newer ship are larger and can lift more, Embree said. Also, the *American Tern* cranes can lift cargo of up to 90 tons, compared to 75 on the *Green Wave*.

The newer ship also is more suited for icy conditions, Charrier wrote.

"She is equivalent to Finnish ice class 1A, the highest ice rating for cargo vessels that are not actually icebreakers," he wrote. "The *Green Wave* is equivalent to ice class 1B, a lower ice rating."

"A number of features of the *Tern* are specially designed for service in the ice," Charrier added, "including strengthening of the hull, protection of the propeller and heating coils in the ballast tanks to prevent ice formation in extremely cold temperatures."

There will be two captains aboard the *American Tern* when it comes to McMurdo, although longtime *Green Wave* Captain Peter Stalkus will not be one of them, Embree said.

"They wanted to give both skippers the experience of going in so they could use these skippers interchangeably," he said.

There are some differences between the *American Tern* and *Green Wave* when it comes to their ability to load and unload cargo, but DeGalan said "our anticipation is it will take the same amount of time."

Much of the cargo arrives at Port Hueneme in September — more than a year before the incoming summer crowd will use it — but DeGalan said he can't say yet what unique items might be loaded for the voyage.

"We don't know what's going onto the ship until the day before," he said.

The shopping list for the ship's cargo is massive, since it represents about 85 percent of the total supplies brought to McMurdo. Food, concrete, napkins, fitness equipment, file cabinets, beer, t-shirts for the gift shop, tires and everything else a small town needs for a year are brought to Port Hueneme for loading.

Loading is scheduled to begin Dec. 27 and departure for McMurdo on Jan. 6. Traveling at a maximum speed of 16 knots — the same as the *Green Wave* — the *American Tern* is scheduled to arrive at McMurdo for offload Feb. 2 and depart Feb. 10. Offloading will go on 24 hours a day during its stay at McMurdo and involve nearly all station employees, as cargo is first hauled off and then items for return to the U.S. — such as science samples, garbage and old equipment — are loaded.

On the Ross Ice Shelf at McMurdo Sound, carpenters build a Jamesway as a science lab and living quarters for Weddell seal researchers. The researchers will spend the next eight weeks in what is known as Weddell World.

Photo by Melanie Conner/The Antarctic Sun

Deploy

From page 1

the check-in areas, gates and customs.

According to Alexander, steering luggage carts through busy airports was often a frustrating experience.

"Those carts at LAX are designed for a couple of bags, but we had trains of them fully loaded," said Alexander. "The things are constantly tipping over and you always get the one with the broken wheel."

After the McMurdo and South Pole grantees land in Christchurch, New Zealand, they are outfitted in white bunny boots, red down parkas, long underwear, goggles and other cold weather clothing, they board the military airplane and fly to their science staging area: McMurdo Station.

At McMurdo Station, grantees are required to attend field safety training courses, organize field transportation, food and equipment, coordinate the construction of field camps, arrange for lab space, locate and unpack cargo that was sent prior to arrival and finalize computer support needs.

"It's a bit hectic and they are thrown into it – they have to do hazardous waste training, sea ice training, lab orientation," said Alexander. "Sometimes they wonder if they will ever be allowed to do science."

According to Alexander, scientists often become frustrated their first weeks when they spend much of their time doing non-science work.

"As a grantee you just see the road blocks," said Alexander "But on this side you see how hard people work to get the science going."

Every janitor, dishwasher, cook, computer specialist and heavy equipment operator on the Ice supports science with his or her work. Science support personnel make up the majority of station populations, and provide support ranging from chemists and workspaces in the Crary Lab to food, shelter and transportation in the field.

"It's a true lab on the ice complete with electronics and technologies," said seal researcher Terrie Williams.

The science support personnel spent more than a week constructing a field camp located on the Ross Ice Shelf in the McMurdo Sound. The camp, known as "Weddell World" is made up of a "Jamesway," a semi-permanent, tunnel-like, vintage Korean War structure made of wooden frames and insulated, woolen blankets. The Jamesway will provide the infrastructure necessary to conduct research and house the scientists for about seven to eight weeks. The Jamesway has a wet lab area, with an ice hole under the plywood panel flooring allowing researchers to place dive cameras on seals and take tissue samples as the seals surface. The dry lab is a section of the Jamesway that houses computers and other electronics used to process data obtained from the wet lab. It also has living quarters that sleep up to 10, a kitchen area and showers.

Because the layout of the Jamesway is crucial to the daily collection of seal data, the scientists visited the site almost routinely during its construction to answer questions or resolve layout issues.

"I was so impressed," said Williams. "It was so cold – minus 40. No heat, no fuel and they are out there building our camp."

Carpenters, electricians and heavy equipment operators work hard as a team to build field camps so that science can begin on time.

"We build a town and maintain that town so they (scientists) can conduct science," said Randy McEndree, manager of Facilities Engineering Maintenance and Construction. "The labs are state-of-the-art, million dollar facilities."

"I am amazed at how hard people work to make it run smoothly," said Alexander.

Other science groups will travel far into the continent's interior via helicopters, twin otters, snow machines or other tracked vehicles. On Oct. 23, weather permitting, the first of about 50 NSF grantees will continue on to the most southern of all research

See Deploy on page 14

Deploy

From page 13

facilities: Amundsen-Scott South Pole Station.

Although South Pole Station grantees do not have to coordinate the construction of field camps or the logistics of field parties such as tents, camp stoves, sleeping bags and climbing gear, they must prepare for work at high-altitude in sub-zero temperatures. At 9,300 ft. scientists and science support personnel spend their first few days acclimatizing and quickly learn about the treatment and prevention of Acute Mountain Sickness and other altitude related sicknesses.

Far north of the South Pole and McMurdo stations, NSF grantees travel by ship from Punta Arenas, Chile, through the Drake Passage to Palmer Station and other coastal research camps on the Antarctic Peninsula.

Like motor home camping, the vessels act as supply rigs for the Island Hoppers — shore-based research projects near Palmer Station. Researchers disembark the vessels and travel to shore in small, inflatable motorized crafts called "zodiacs." It takes multiple trips in the zodiacs from vessel to coast to transport equipment, instruments and field camp supplies. The Island Hoppers scientists work hard the first few days to set up communications, living quarters and labs.

"My job is to sell scientists on the joys of working like a dog," said John Evans, special projects coordinator on the Antarctic Peninsula and Southern Ocean.

Once the research camp is established, Evans leaves the scientists behind for the next four to five months and sets off to another destination. "We say, 'Good bye, ya'll. See you in March.'"

In March, when the summer research season ends on the Antarctic Peninsula, the process is reversed as they pack up camps and travel north.

But on the continent, winter arrives earlier. In mid-December, when the Ross Ice Shelf begins to lose its integrity, Randall Davis and his colleagues will head for home. Construction crews will disassemble the Jamesway and all traces of Weddell World will be gone. The scientists will box their cameras and laptops, desert the spaces that once served as a busy science lab and return to the U.S. taking with them what they came for: scientific data.

Photos by Melanie Conner/The Antarctic Sun

Workers assemble and carry arched frames that will support the wool-lined canvas Jamesway walls, while a box of electrical equipment rests inside the skeletal structure. For over one week carpenters, electricians, computer technicians, heavy equipment operators and scientists worked on the construction of the seal research camp, Weddell World. Weddell World is located one hour from McMurdo by tracked vehicle.

When complete, the camp will be heated and powered by 16 solar panels and a wind generators. It will be one of the biggest alternative energy set-ups at any temporary field camps. The Jamesway will sleep about 10 people and will have bathrooms with showers, telephone and electronic communications, a "wet" lab — an area with ice holes for seals to surface and a dry lab to download and analyze data.

Answer to crossword from page 2

Another Antarctic Sun day

The real Antarctic sun pours through the window of our office at McMurdo Station, turning the walls into a sundial. If we don't close the shutters midday, it will illuminate the map of the continent on the far wall, and then our list of story ideas for the coming season. That far-off light is our namesake, and perhaps a mentor. We, too, try to cover the continent, and maybe sometimes enlighten.

It's not easy. The U.S. Antarctic Program is a unique community. Field camps, ships and stations are isolated not only from the rest of the world, but from each other. *The Sun* aims to be a connecting force, bringing together on the page people who may never meet in person. Like the stations we serve, *The Antarctic Sun* is a unique amalgam — part popular science, part community news, part letter home to the U.S.

We can't do it alone from our office. A community paper is nothing without the community that reads it. Consider *The Sun* your community paper. We welcome submissions of many kinds, including guest articles, columns, story ideas, photographs and letters. We won't be able to run everything we receive, so feel free to run ideas by us first. Even if you can't stop by our office in Building 155 at McMurdo Station, we are always available by e-mail (antsun@usap.gov) or phone (ext. 2407).

Photos, poems, fiction stories and essays can also be entered in our annual photography and writing contest. The deadline is Dec. 16. Look for details in this and future issues.

Many of our readers only find us online, at www.polar.org/antsun. Some remote field camps get their weekly news delivered by air, with a shipment of needed cargo. It may be several days or weeks late, but they tell us it's welcome anyway. Wherever you are, if you are not getting *The Sun* on a regular basis, let us know and we will try to find a way to deliver it.

Both suns are shining high over the continent now and we'll be here until the sun goes down.

Meet the *Sun* team

Kristan "Stan" Hutchison returns for her third year as an editor at *The Antarctic Sun*. In more than a decade as a journalist she has reported on everything from the Iditarod Sled Dog Race in Alaska to salmon farms in Chile. During the off-season she returned briefly to *The Juneau Empire*, in Alaska, where she worked most recently.

Melanie Conner returns to the Ice from an off-season trekking in Nepal and whitewater kayaking in her hometown of Hood River, Oregon. It's her second season with *The Antarctic Sun*. She brings over five years experience as a photojournalist in Oregon, Utah, Washington, D.C. and Hong Kong and holds a master's degree in journalism.

Mark Sabbatini is a former Colorado ski bum now living in Juneau, Alaska. He has worked as an editor, reporter and photographer at daily newspapers for 11 years and has spent the past few years trying to grow wise in the ways of Web programming. This is his second season in Antarctica.

Antarctic Photo & Writing Festival

Four photo categories:

(*One entry per category per person*)

Scenic
Wildlife
People
Other

Photos may be digital or traditional, preferably submitted at 300 dpi.

Four writing categories:

(*One entry per category per person*)

Poetry: Up to 30 lines
Haiku: Traditional 5-7-5 syllable poem
Micro-fiction: Short stories; up to 300 words
Non-fiction: Essays, letters home, e-mails, memos, journal entries, etc.; up to 300 words

Rules:

◆ **One entry** per category per person for both the photo and writing contests, so choose your best. ◆The contest is for photography and art with an Antarctic theme. This will be broadly interpreted. ◆You do not have to be on the Ice to enter.

◆**All entries due by 7 a.m. Dec. 16.**

◆Send entries to sabbatkr@mcmurdo.gov or the *Sun* office at McMurdo Station, Bldg. 155
◆Winners will be printed in the *Sun*, on the Web and posted on Highway 1.

Profile

In the mind of a chemist

By Mark Sabbatini
Sun Staff

Scientists come to Antarctica to collect and analyze data. Susan Monroe is here to ensure their results are accurate. The senior analytical chemist at McMurdo Station will spend her first season on the Ice providing analysis of samples, advice on gathering them and other similar help on a variety of projects. For Monroe, who works with disadvantaged youths on science projects during summers in Denver, coming to Antarctica means both reliving and giving up a lot of her own youthful connections.

"For me it's like running away from home," said Monroe, who lives in Westminster, Colo.

Photo by Melanie Conner/The Antarctic Sun

Susan Monroe will analyze nutrients from sea water and freshwater in the Crary Lab

Monroe said she had to get rid of five aquariums, including a salt-water tank, a tough thing to do since "I'm one of those people that have had aquariums since I was 12 years old." But the longtime chemist also expects to recap some of the feeling she had as a college student when she was counting turtles as part of a research project for a wildlife refuge.

"I'm getting back to that same sort of thing by going to Antarctica," she said.

Getting hired to work on the Ice is also a bit of a role reversal from a family perspective, since her husband Jim is mostly responsible for their moving 15 times in nearly 33 years of marriage. He works for the National Oceanic and Atmospheric Administration and "typically three weeks out of four he'll be gone," she said.

"Most everyone thinks it's tremendous," she said when asked how family and friends reacted to her going to Antarctica. "Jim thinks I've lost my mind."

Most of her co-workers were not surprised, as they know how much she enjoys travel. Monroe was chosen to participate in a "Women in Science" delegation to Cuba last year through the People to People Ambassador program with the goal of promoting interactions between the two scientific communities.

"We met with women serving as heads of various departments throughout Cuba and with scientists from a variety of disciplines," she said. "A 10-day trip can only give you an impression of a place, but Cuba left a powerful impression. Those dedicated scientists have overcome remarkable deprivation to perform valuable scientific research aimed at improving the lives of their countrymen."

Monroe's opportunity to work in Antarctica came in an odd way: The Denver-area company where she was working as senior supervisor of analytical services and quality control went out of business last year. An ad for Antarctic workers in a chemical and engineering magazine caught her attention as she was applying for various jobs.

"I think the way most people get into any job is luck," she said, adding "the opportunity for travel, and just being there, is the opportunity of a lifetime."

As one of three chemists, Monroe expects to spend most of her working time in McMurdo's Crary Lab providing analysis of samples submitted by scientists. But she also may be asked to assist field researchers, including one going to the Dry Valleys to observe sample collection and better understand the goal of the project.

Generally, though, she said she doesn't expect a lot of surprises.

"One thing I have learned is how incredibly prepared the scientists are at McMurdo for accomplishing the things they want to accomplish," she said.

Her work allows her to keep a close eye on a number of projects. She said they're all interesting, but among those that have stood out so far is a study of creatures at the bottom of the polar sea and how some have evolved to process proteins differently.

"I had anemones and soft corals in my tank, so I know how beautiful the tropical varieties are," she said. "But I had no idea they even existed in this type of environment."

A native of Greenville, N.C., Monroe developed an interest in marine science at an early age due to her proximity to the Atlantic Ocean. She dropped out of East Carolina University about two years after marrying her husband, who she met in a chemistry class.

"I had the highest grade in the class. He was flunking," she said. "I think that was part of the attraction."

She worked a wide variety of jobs during their frequent moves, including stints as an apprentice meat cutter, accounting clerk and assistant real estate officer. At one point she sold cemetery plots over the phone for National Memorial Park when her husband was drafted to serve in Vietnam soon after they both left college.

The couple has two sons, both in their 30s. Monroe returned to college when her sons were in high school, earning an undergraduate degree in mathematics from Mesa State College in Grand Junction, Colo., and a PhD from the University of Denver in BioInorganic Chemistry. She worked as a research scientist with a gas company developing methods to lower the detection limit for contaminants in gases, then joined the biologics branch of Sulzer Medica about four years ago until the company went out of business.

Monroe is also the founder of the Colorado chapter of Project SEED (Summer Educational Experience for the Economically Disadvantaged), a program with branches nationwide that offers scientific work experiences and mentoring to disadvantaged youths. She got involved with the project as a councilor for the American Chemical Society, which started the program in the 1960s. The Denver-based chapter secured funds for and mentored four youths last summer and two more this year.

Among Monroe's other interests are scuba diving and completing her first marathon in Kona, Hawaii, earlier this year while raising $5,400 for the American Stroke Association through their Train to End Stroke Program.

Monroe said the thing that worries her most about coming to the Ice is the responsibility that comes with being in charge of a very remote lab, but she doesn't think she'll have to face it alone.

"I'm told there's plenty of help available among the scientists and so far that has certainly been the case," she said.