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The Antarctic Sun

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

A cool 90 degrees

Clad in only shorts, sunglasses and hiking boots, Nathan Tift sunbathes outside the South Pole's geodesic dome. The temperature was about -34F, said Tift, a meteorologist. He sunbathes about twice a week after taking a sauna set up in the dome. "It's one of the most relaxing things I've ever done," he said. The sunning sessions last 15 to 30 minutes, ending once his fingers start to feel numb. "I wouldn't want to fall asleep out here, but I could," Tift said. Photo by Beth Minneci.

QUOTE OF THE WEEK

"Spouses, friends, parents - who cares? I miss my dog."

- Helicopter pilot on loneliness in Antarctica

INSIDE

Lessons in logistics at Antarctica University

In scientia speramus

Story and photos by Kristan Hutchison Sabbatini
Sun staff

For students, the Antarctic biology course being taught at McMurdo Station is as much a vital lesson in logistics as science.

Learning the possibilities and limitations of science in Antarctica prepares graduate and post-graduate students to eventually return with projects of their own.

"The big eye-opening experience has been field work, just logistically how difficult it is to do simple things," said Amy Moran, a post-doctoral student from the University of California. "Just going out to do a plankton tow requires ski-doos and cold weather gear."

Like most students in the course, Moran would like to do research of her own someday in Antarctica. The course has given her a better idea of what sorts of research can be done, and what cannot.

See Course on page 10

Helicopter crash victim's friends to move memorial

By Beth Minneci
Sun staff

A wooden cross near the edge of McMurdo Sound has stood for eight years to honor a helicopter mechanic and search-and-rescue team member named Ben Micou who died in a helicopter crash. But a group of people who knew Micou say a new set of gray water pipes that run within two feet of the monument are too close.

"We just want to move the cross to a more appropriate place," said Mike Hush, air transportation services supervisor.

Hush worked with Micou in the U.S. Navy's VXE-6 Antarctic Development Squadron. Within weeks of Micou's death, friends built a monument and erected it near the hangar where he worked.

National Science Foundation representative David Bresnahan sanctioned the move earlier this season. The group is still considering a site, but plans to carry the cross to a nearby location early next month.

"I'd like to keep it near the helicopter hangar, someplace close enough to where it's accessible," Hush said.

Micou is also being memorialized at the Naval Air Station in Fallon, Nevada, where he was stationed before Antarctica. The First Class Petty Officer's Association in Fallon recently decided to name its new meeting building after Micou, said Sam Cox of the Fallon station. Cox never met Micou, yet he spearheaded the effort to name the building.

"I knew that he had been stationed here," Cox said. "I brought it up and the association voted unanimously to name the building after him."

The disaster was the last in which a person working with the U.S. Antarctic Program died in a helicopter crash.

On Oct 13, 1992 Micou and four others were riding to McMurdo Station from Cape Byrd in bad weather when the helicopter slammed into a glacier.

"He was a very kind, gentle man who was excited about the place he was working."

- Steve Dunbar search-and-rescue leader

Friends of 1992 helicopter crash victim Ben Micou say new water pipes near the helicopter hangar are too close to the cross that bears Micou's name.

The aircraft slid and rolled about 100 feet, then dropped and spun until it hit rocks below, said field science support manager Steve Dunbar, who lead the search-and-rescue team that responded to the accident.

One of the early impacts threw Micou from the helicopter. Two New Zealand support service workers, Garth Varcoe and Terry Newport, were also tossed out of the helicopter and died.

Dunbar described the conditions that day as whiteout with 20 to 30 feet visibility. The rescue team had a hard time finding the aircraft.

"Once in a while the clouds opened up and we got a glimpse of the wreckage," Dunbar said.

The pilot, Ed Crews, and the copilot survived, but immediately after the crash the copilot was injured to the point that he was unable to move. Crews crawled to reach an emergency radio in the back of the plane. Search-and-rescue was not within radio range, however, until the team's helicopter was close to the crash site.

Neither the stranded pilot nor the rescue party could see the other helicopter through the storm, not even when the rescue helicopter was directly overhead. Once Crews heard helicopter blades thumping, he called a radio message to Dunbar and the rest of the crew, Hush said.

"The pilot actually talked them into the location," Hush said. "He said, 'You have to be awfully close, I can hear you.'"

Some of the former U.S. Navy crew that worked with Micou still miss him. Micou was known for his cheerful disposition and generous heart.

"He was a very kind, gentle man who was excited about the place he was working," Dunbar said. "He had this infectious enthusiasm about it. He was just one of those good guys."

Hush said that Micou, who was 35 when he died, was a person who made the best of situations.

"He never had foul words for anybody," Hush said. "There were some people he didn't like but he was able to put them behind. He was probably – no, he was the greatest guy I ever knew."

Micou was survived by his wife, Janice, and an adopted son.■

Two ships McMurdo-bound

Due to a large amount of construction materials that needs to come south before the end of the season, the National Science Foundation has contracted a second cargo ship to bring supplies from Lyttelton, New Zealand to McMurdo Station.

The Finnish vessel *Archangelgracht* will be arriving at Winter Quarters Bay on or about Feb. 15, after the *Greenwave* leaves. That ship is due Feb. 7.

Together the two ships will bring approximately 14 million pounds of cargo to the southernmost port in the world.

"There's a lot more (cargo) than last year because of South Pole work and reconstruction projects here (at McMurdo)," said McMurdo's ship operations officer, April Brown.

Team rides for cancer cure

Eight people from McMurdo Station will be competing in an endurance race from Mt. Cook to Christchurch, New Zealand to raise money for a breast cancer foundation. The three-day race, which involves biking, running and kayaking, will take place from March 2 to 4.

"We picked this charity for a couple of reasons," said Trent Myers, who will be kayaking. "A couple people, who are members of our team, have had loved ones that have had breast cancer (and) we are learning about how many women this disease affects every year."

Fifty percent of all donations will go to the Susan G Komen Foundation. The other half will go toward the team's expenses, including entry fees, rental equipment,

Donations can be made in the store. For more information contact Julie Aurand in recreation or by e-mail at aurandju@mcmurdo.gov.

–Josh Landis

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Web address: www.polar.org/antsun

South Pole construction is changing the face of the station. On Wednesday, the final insulated panel was installed on the first elevated pod. Construction crews will spend the winter finishing it. Pole's new power plant also came on-line recently, increasing the station's peak generating capacity to one megawatt. Photo by John Rand.

the week in weather

around Antarctica

McMurdo Station
High: 36F/2C
Low: 6F/-14C
Windchill: NA
Wind: NA

Palmer Station (Saturday)
High: 49F/10C
Low: 29F/-2C
Avg. temp: 37F/3C
Wind: 28 mph/44 kph

South Pole Station
High: -11F/-24C
Low: -25F/-32C
Avg. temp: -19F/-28C
Wind: 20 mph/32 kph

around the world

Saturday's numbers

Bethlehem, West Bank
High: 56F/13C
Low: 40F/4C

Zanzibar, Tanzania
High: 88F/31C
Low: 79F/26C

Liverpool, U.K.
High: 43F/6C
Low: 34F/1C

North Pole, AK
High: 14F/-10C
Low: 4F/-15C

Kalamazoo, Mich.
High: 29F/-2C
Low: 22F/-6C

Eldorado, Texas
High: 45F/7C
Low: 37F/3C

WHERE THE WIND blows

By Kristan Hutchison Sabbatini
Sun staff

Life at the very bottom of the ocean depends on the fierce winds blowing from some of the highest elevations of Antarctica. Strong katabatic winds play a vital role in the creation of what is called Antarctic bottom water, cold dense water that slowly sinks to the depths of the ocean, bringing oxygen with it.

If you could dive to the seafloor anywhere in the world, from the Caribbean to the north Atlantic, you'd find water from the coast of Antarctica, said Gerd Wendler, a Fairbanks professor who studies the connection between the cold wind and the cold water.

"Seventy five percent of all the bottom water, wherever you are, comes from Antarctica," Wendler said in his thick, German accent. "It's a very small area of Antarctica and it's directly connected with these katabatic winds and the sea ice."

Wendler works with scientists from France and Australia to predict katabatic winds, particularly when the winds speed past 90 mph. This year he traveled to McMurdo Station on the *Polar Sea* icebreaker. As they cruised he measured the transfer of energy between the ocean and the air. The data will indicate how much katabatic winds cool the water.

But the process starts high above, around 10,000 feet higher, on the Antarctic Plateau. As air moves over the continent the layer nearest to the ice is chilled, creating a 10 to 20 degree difference in temperature between air traveling on top of it. The colder air descends to a lower elevation, the same way cold air drops to the floor in a warm room. Winds pulled downhill by gravity like this are called katabatic winds.

Since Antarctica is a smooth slope with no trees or mountains, the wind gains tremendous speed as it slides over more than 500 miles to the shore. Along the Adelie and George V coasts west of the Ross Sea the katabatic winds roar by at a mean speed of 60 mph.

The highest wind speeds ever recorded at sea level anywhere in the world were at Cape Denison in Adelie Land. Ninety years ago Sir Douglas Mawson landed there and dubbed the area "Home of the Blizzard" because the winds blew men off their feet. Peak gusts have been clocked moving faster than 100 mph.

Studying katabatic winds is difficult, not only because they are so strong, because the wind carries ice crystals from the high plateau to the sea. Wendler found that more than 10,000 ice particles per second pass through a square inch when the katabatic winds are very strong. Working at a camp on the ice, Wendler once had to string rope to guide him between the huts 100 ft. (30 meters) apart.

"It's highly dangerous because you can lose your way," Wendler said. "You always held on with one hand to the rope that you never want to lose."

Most of the time Wendler and his co-researchers track the katabatic winds through a series of remote weather stations, ranging from Dome C at 10,000 feet elevation on the East Antarctic Ice Sheet to sea-level. They are particularly interested with what occurs when the roaring wind meets the frozen sea.

"These winds are so strong that they can drive the sea ice away from the coast any time of year," Wendler said.

The wind pushes away the sea ice and cools the exposed ice until new ice forms. As new sea ice forms it leaves behind most of the salt, making the water below the ice the saltiest, densest in the ocean. The temperature is 31 F (-0.5C). Like cold air, dense water drops slowly down, sliding in 10 to 100 years the 2.5 miles (4 km) to the ocean bottom.

Called Antarctic Bottom Water, this cold water carries nutrients and oxygen with it, which supports sea life thousands of miles away, said Donal Manahan, who studies species living in the deep ocean.

"It pulls down nutrients down into the deep ocean and when those nutrients come to the surface again they stimulate plant growth," Manahan said.

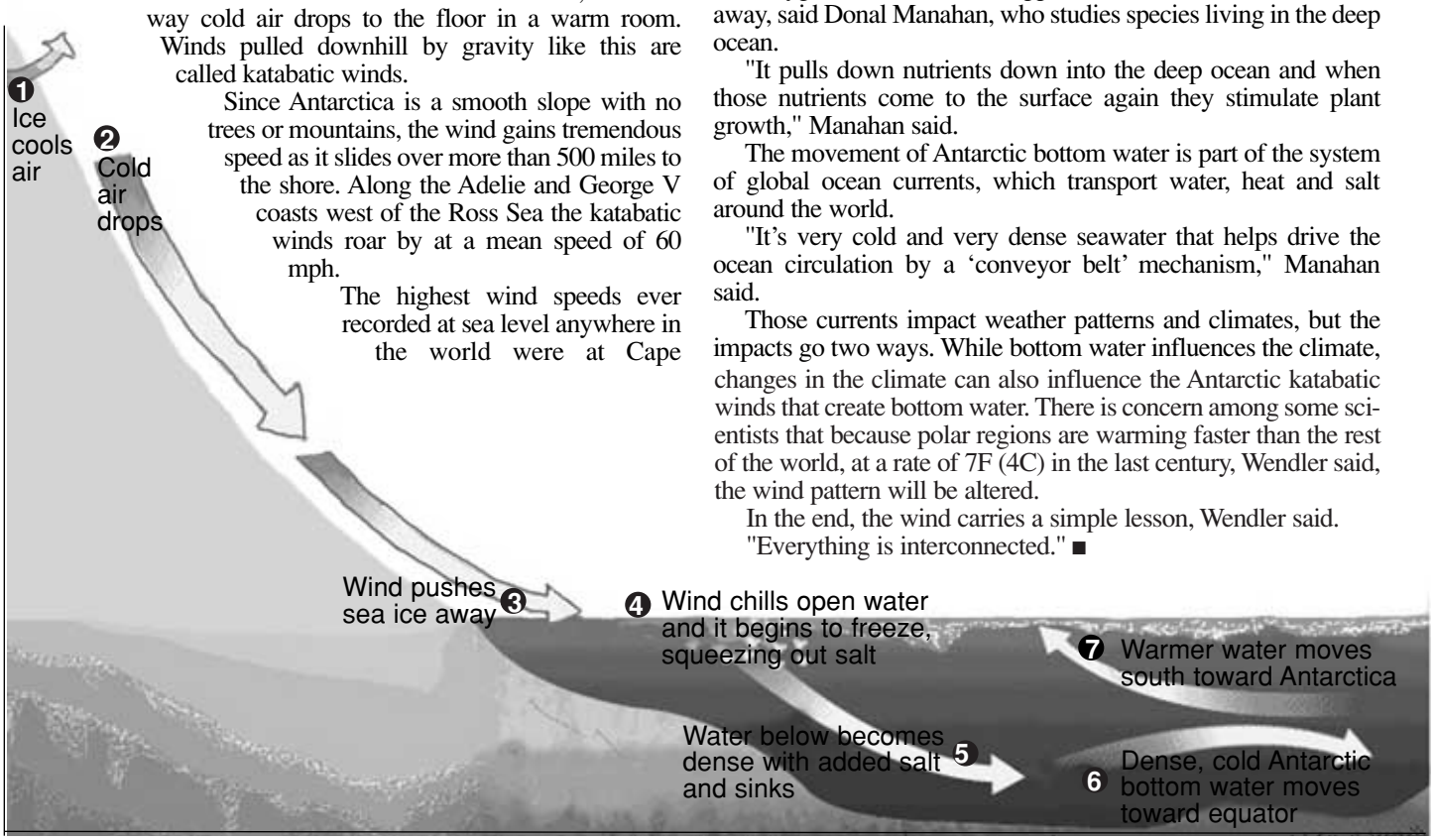
The movement of Antarctic bottom water is part of the system of global ocean currents, which transport water, heat and salt around the world.

"It's very cold and very dense seawater that helps drive the ocean circulation by a 'conveyor belt' mechanism," Manahan said.

Those currents impact weather patterns and climates, but the impacts go two ways. While bottom water influences the climate, changes in the climate can also influence the Antarctic katabatic winds that create bottom water. There is concern among some scientists that because polar regions are warming faster than the rest of the world, at a rate of 7F (4C) in the last century, Wendler said, the wind pattern will be altered.

In the end, the wind carries a simple lesson, Wendler said.

"Everything is interconnected." ■



happy campers

DARWIN GLACIER CAMP

Left: Helicopters shuttled scientists from the camp to mountains and glaciers like the blue ice glacier above. Photos courtesy of Kathy Young.

By Beth Minneci
Sun staff

Nestled between white, jagged peaks and smooth blue ice sheets hundreds of feet wide in the Transantarctic Mountain range is an ethereal spot.

This summer three research groups made this place their home. The Darwin deep-field camp, named for its proximity to the Darwin mountains and glacier, was the base for extensive searches for extraterrestrial and earth rocks, and petrified wood.

In the center of it all were camp manager Kathy Young and resident mountaineer and medic Jamie Pierce, two Raytheon Polar Services Co. employees who cooked the meals, melted the water, followed the flights, moved the cargo, recorded the weather and saw to it that the scientists' needs were met.

Kathy Young

"We were busy," Young said.

The camp at Darwin was the first there in decades. The idea was to base scientists in a central spot. Building small camps saves on fixed-wing flights between the camp and McMurdo Station, which are expensive and time-consuming.

"The camp was small enough for scientists to get the attention they needed," and they could still get flight communications from camp, said field sciences support manager Steve Dunbar. "Despite bad weather, it was a very productive season."

At most, 12 people stayed at the camp. They slept in tents while a 400 square foot Jamesway-style tent served as the central spot for cooking and eating.

Each person was allowed one shower a week in a Scott tent where a water bag was hung. Solar power fueled the radios and a battery that kept the camp lit. Once the camp was set up, Pierce and Young took turns communicating with pilots on the radio.

The scientists commuted several days a week by helicopter or snowmobile to nearby glaciers and mountains where they scanned snow and ice for rocks and wood. Their goal: to find and take home specimens that would reveal something new about the history of Earth, the moons and other planets.

Besides the beautiful scenery, highlights this season for Young included finding a meteorite while hunting for space rocks on Christmas Day, and finding petrified wood in a layer of sandstone on Mt. Henderson.

Young is an experienced camp manager, but she started out on the continent in 1987 as a shuttle driver, taking a job here for the free ticket to New Zealand. As a field camp assistant she became smitten with the lifestyle and now is a veteran Antarctican who has worked 10 seasons on the Ice, including four managing science camps and three more with the National Science Foundation in Greenland.

"I just really like it," said Young.

The deep field work appeals to Young because it offers the chance to be self-reliant and resourceful. "All your daily chores every day count. It's the whole lifestyle I enjoy. It's quite simple and it's very rewarding."

Pierce, an experienced mountain guide with medical training, was on hand in case of an injury and to assess crevasse danger. "It was a big concern," he said. No one was hurt.

Pierce worked for the program for four years before coming back specifically to work at Darwin and with Young. "I wouldn't have come down this year if I didn't have the chance to work in a small camp and I knew Kathy," he said. "It was successful. It's not a huge infrastructure to maintain, and lots of good science can happen."■

Highway One

What's a good way to save energy at McMurdo Station?

"Skylights in the summer."
Phil Boyer
firefighter

"By not cooking any tofu."
Geoff Theodore
Kiwi cargo

"Manual-powered conveyor belt on Highway 1 to power 155. It would be aerobic and energy-making."
Jeff Truelove
solid waste

Turning on the sun

Field camps powered by natural forces

By Kristan Hutchison Sabbatini
Sun staff

Lake Hoare has run for three years on a single tank of gas. The lights, coffeepot, computers and other plug-in equipment all hum along, powered almost entirely by the sun.

"One of the things everyone likes about Lake Hoare is it's so quiet. We rarely have to run the generator," said camp manager Rae Spain, who recently refueled the back-up generator for the first time this year. "Just imagine what it would be like in McMurdo if you could shut down that power plant for a day."

Though there are no plans to shut down the power plant, the U.S. Antarctic Program is trying to conserve energy and rely more on solar and wind power, especially in the field.

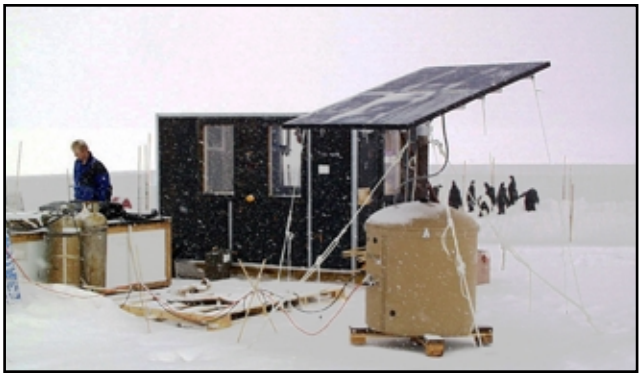
The conditions in Antarctica are perfect for renewable energy, particularly sun and wind power, said Tracy Dahl, alternative energy specialist for the U.S. Antarctic Program. The cold air is denser and therefore packs more punch for any given speed than warmer air, pushing wind turbines faster. Cold temperatures also make solar panels more efficient. Additionally, snow and ice reflect the 24-hour sunlight, boosting solar panel efficiency by another 25 percent or more.

"Basically, a solar panel operating in a summer field camp in Antarctica is operating at 200% greater efficiency than the manufacturers wildest dream," Dahl said.

The savings from using alternative energy are also greater at field camps because of the high cost of getting fuel there. Fuel is often handled about six times before it reaches a deep field camp, for an end cost of about $15 a gallon, Dahl said.

In one season the fuel savings alone more than paid for alternative energy systems Dahl installed at Downstream Bravo and Byrd Surface camps, he said. In the U.S. the payback time for a similar system would have been 10 years.

Beyond saving money, reducing fuel and generator use in field camps helps preserve the environment scientists are trying to study, said Tony Hansen, who is tracking air pollution from helicopters and camp generators in the Dry Valleys. When the generator runs overnight at Lake Hoare, his instrument 500 feet downwind records a spike in pollution.



This new model of solar generator powers a pump for the penguin pool. Photo by Kristan Hutchison Sabbatini.

The generator seldom runs at Lake Hoare anymore, though. Lake Hoare was the first field camp to be converted almost entirely to solar power in 1992. Now that the kinks have been worked out of the system, the generator runs less than 100 hours a season. Three solar arrays of eight panels each keep a bank of batteries energized. When the sky clouds over, the batteries can keep the camp lit for up to three days.

"They're getting all the power they need and then you're getting the quiet too," Spain said. "Everybody loves it out here. Everybody wants one."

Andy Young at the Mechanical Equipment Center is trying to make sure all the scientists who do want solar or wind power get it. He has about 250 gasoline and diesel generators to send into the field with science groups, but someday he'd like to see half of them sitting idle.

"I don't think we'll ever get rid of generators here completely, but I would like to see us greatly reduce the use of generators and convert to solar and wind," Young said.

For years scientists have been able to take 30-watt solar panels into the field to run laptop computers or other small equipment. This is the first season they've been able to take something more powerful.

A previous MEC manager bought 10 solar power systems with a $100,000 federal grant. Depending on the number of solar panels and batteries, the pods produce 600 to 4,000 watts. This year Young sent five of the solar power systems into the field. He has five more waiting to be used.

Even on a cloudy day, the solar power system at the penguin pool keeps the phone ringing and a pump circulating seawater through the penguins' lap pool.

"We haven't had problems with it ever since we put it up in October," said researcher Robert Van Dam. "We had it go through 84 mph winds without coming undone."

Young expects more scientists will begin requesting solar panels or wind generators as they hear about the advantages.

"It means not having to fly in barrels of fuel to a deep field camp, which saves aircraft hours," Young said.

A new wind generator Young sent with some of the field teams also got good reviews. In the past small wind generators often burned out when the wind became too strong. Seven types of wind turbines were tried and trashed over the last four years, said communications supervisor Bill Nesbit.

"The winds are so fierce that small or medium wind turbines just get torn to pieces," Nesbit said.

The new wind generators have cooling systems to keep them from melting. John Schutt took one with him to the Antarctic plateau for six weeks while he led a group of researchers searching for meteorites and loved it. The wind generator worked flawlessly, powering laptops and a digital camera he brought. Solar panels and wind generators are actually easier to transport and run in the field than a gasoline generator, said Schutt.

"I've been taking the generator just as a backup, but this last season I decided not to because I haven't used it in so long, why do it?" Schutt said. "Solar and wind are working great for us."

Dahl expects someday all field camps, and even McMurdo, will rely to some extent on the sun and wind. Then, maybe the power plant could be turned off for a day.■

Bottom of the food chain

Carrie Block pours batter onto a waffle iron at Sunday brunch.

"It's the most difficult job on station, and they probably work harder than anybody else."

- Jan Jasperson, food service supervisor

Story and photos by Jeff Inglis
Special to the Sun

Every meal. Every break. Every glass, plate, fork, knife, spoon, pot, pan, sandwich, juice container…. Every time a dining room attendant (DA) turns around at McMurdo, there's more to do.

But too often to diners on station they're just the blue-clad bodies moving a rack of glasses right in front of you or the faces at the dishroom window.

Most of the time, the DAs are smiling, and that's a tribute to their resilience.

"It's the most difficult job on station, and they probably work harder than anybody else," said Jan Jasperson, the winter-over food service supervisor, who said that if he could do anything for them, it would be getting DAs paid more than the $350 a week they earn.

The DAs play a role in every part of the galley operation, except one.

"We don't cook food," said lead DA Ginger Alferos.

The DAs clean and restock dishes, prep food and salads, make sandwiches and flight lunches, make sure the food lines are stocked, and clean the whole place when the meals are done.

"I do different jobs: deli, floating, pot room, dishroom, it all depends on your mood," said DA Amanda Dow.

The pot room is really where the legends of DA-dom are made. While sitting in on their "family meal," at a strange time like 9:30 a.m. for lunch, the stories come out. Many of them involve the cramped rectangular space called the pot room.

The din in there can be deafening. With big, metal pots and pans resounding while they are moved through stainless steel sinks, the shift starts out loud. Add the music, the singing along and the joke-telling and it's a big party, albeit crusty food in abundant attendance.

In the background is a periodic rumble of the disposal, a giant one, almost the size of a five-gallon bucket. And, as one story goes, a DA once dumped a big pot of mashed potatoes into it instead of scraping the pot into food waste first.

As if it were karmic retribution, the disposal exploded, spraying ground-up food everywhere and covering the operator's face with a big white cloud of potato glop.

It seems gross. It is gross. But then the DAs think it's funny, which gives insight into how they survive.

"The people make it fun," Dow said.

Some of their on-the-job entertainment comes from people who pass through the galley. The DAs keep tallies, like how many people lick their fingers before touching serving utensils. At times they'll take surveys, asking questions through the dishroom windows as people stack their plates.

It's a good way to keep their minds active while working a mindless job.

Their presence is appreciated.

"There's no way we could do what we do without them," Jasperson said. In the rest of the world, Jasperson said, the jobs akin to the DAs are held by high school students. But in their lives back home, these DAs are food-service workers, teachers, outdoor guides and other professionals, including a nurse and a geologist.

Jim Julian rinses dirty plates, bowls and glasses before running them through the dishwasher. The DAs manually refill the dishwasher about four times per meal.

It can be a good leg up for future jobs in the U.S. Antarctic Program, though. DAs can prove their ability to endure hardship and show their skills with the community.

"They're our front-line defense," Jasperson said, explaining that the DAs are the first to hear feedback from the community and take the most heat for problems in the galley.

They put up with it because they want to get to Antarctica and they stay because they're here. There is some appreciation from the community, the DAs say, but there's no such thing as too much. The folks in the galley, though, know the value of the grunt work.

"We love our DAs," Jasperson said. ■

our Antarctic week

28
Marathon and half marathon, meet at Derelict Junction at 10:30 a.m.

28
Science lecture, "Life at the Frozen Edge: How Antarctic animals avoid freezing" by Art DeVries, 8:15 p.m., galley

29
Slide show of the Khumbu Valley and Himalayas by Ty Milford, 8 p.m., galley

30
Travel Bingo with Kelly and Dee, 8 p.m., Gallagher's

30
Slide show, Polar Pioneers: Women's Contributions to Polar Science, by Julie Palais, 8 p.m., galley

1
Spoken Word Night, 8 p.m., Coffee House

2
Karaoke, 8:30 p.m., Gallagher's

3
Rave with Alexis, 9 p.m. to 1 a.m., Gallagher's

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Cold, hard facts

Dirt removal

Weight of dirt swept up on Highway One Dec. 20 to 26: **31 pounds 2 ounces**

Average pounds of sweepings per day: **4.4**

Number of days in the summer cleaning season: **145**

Number of buildings cleaned: **42**

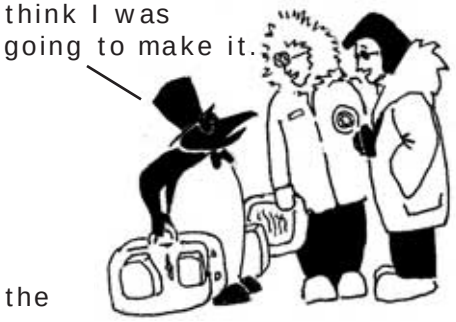
Estimated pounds of dirt swept up over the season: **20,139**

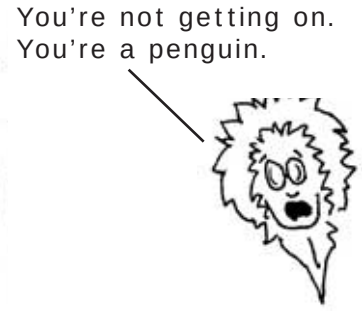
Summer seasons it would take to sweep away Observation Hill at that rate: **19.7 million**

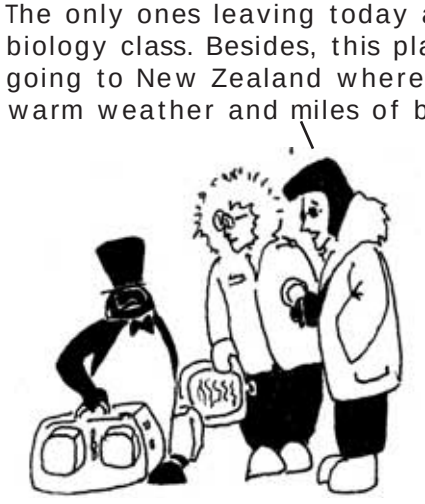
These calculations do not take into account dirt collected by mopping, washing walls or other janitorial duties beyond sweeping.

These facts are courtesy of Michelle Waknitz.

Ross Island Chronicles By ChicO







FINDING

The Endurance

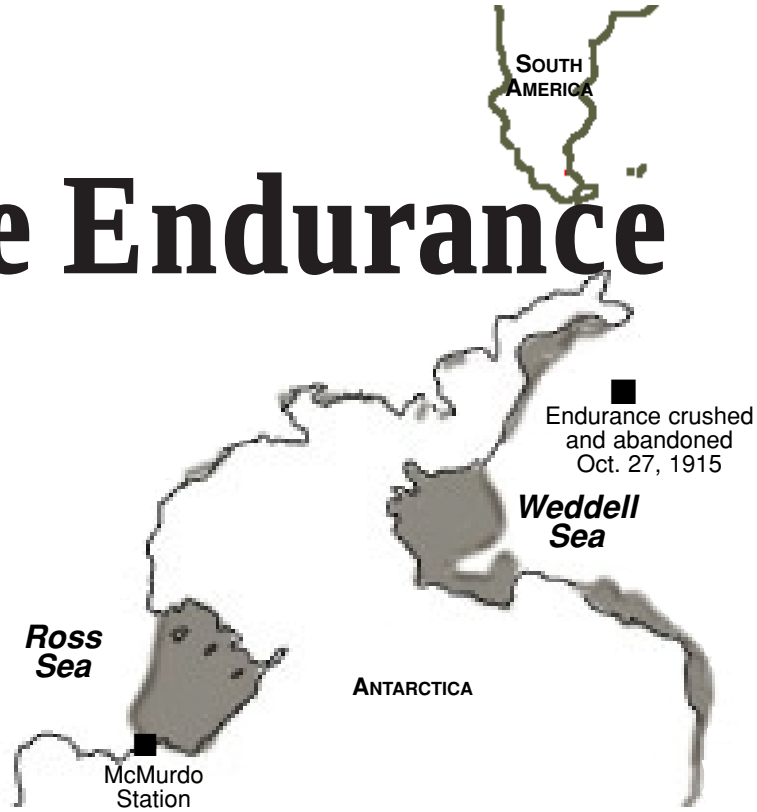



Photo courtesy of Royal Geographic Society

By Beth Minneci
Sun staff

The man who raised the *Titanic* is now making plans to find the epic shipwreck of the *Endurance*, but first he needs more money.

As recently as last June, famed deep-sea explorer Robert Ballard talked of making the trip south this March to the Weddell Sea, where the *Endurance* was crushed and abandoned about 200 miles from the nearest Antarctic coast. Because the area is typically covered in sea ice, Ballard must hire an icebreaker for several weeks to take him there. But a shortage of money and an incomplete proposal to the U.S. Coast Guard made the trip impossible so soon.

Each year the National Science Foundation pays about $24,000 a day for the use of a Coast Guard Polar-class icebreaker and its crew.

Ballard would probably need an icebreaker for several weeks, said spokesperson for Ballard, Cathy Offinger.

"The plans are up in the air," Offinger said, adding that Ballard is hoping to be underway in March 2002 or 2003.

"We're definitely working on it," she said.

U.S. Coast Guard Cmdr. Dick Kermond said people on the *Polar Sea* and the *Polar Star* icebreakers who know Ballard's work are enthusiastic about the idea.

"It's a really cool project and everyone is dying to do it," Kermond said. "There's a lot of excitement in anything Ballard does."

Ballard is best known for finding the *Titanic* in the Atlantic Ocean in 1985. Most recently, in September, Ballard and a crew found 7,000-year-old building ruins in the Black Sea while searching for evidence of the Biblical flood off the coast of Turkey. The National Geographic Society funded that trip. The Society will pay for part of the search for Ernest Shackleton's *Endurance*.

"It's an interesting story, it's a wonderful story, and one that has intrigued him for a long time," Offinger said.

In Antarctica, Ballard wants to capture, on film, the ship the sea ice crushed during one of the Most phenomenal survival stories ever. For 10 months the ship was trapped in the ice before it sank. Six months later, Shackleton took a lifeboat 800 miles to a whaling station and returned four months later to rescue the rest of the crew.

The ocean contains more history than all the museums in the world.

Robert Ballard, ocean explorer

For more than a year Ballard has talked on National Public Radio and to magazine and newspaper reporters of finding and photographing the wreck with remotely controlled cameras. Ballard has said that the ocean contains more history than all the museums in the world. His plan would include leaving the *Endurance* intact on the ocean floor rather than raising or dismantling it. The *Endurance* is believed to be below 2 1/2 miles of water and possibly several feet of surface ice.

Another detail Ballard must consider is timing, and how to best get to the wreck. The plan so far calls for using one of the Coast Guard's two Polar class icebreakers during its annual trip to Antarctica. Each year either the *Polar Star* or the *Polar Sea* cuts a channel through McMurdo Sound to make way for two supply ships at McMurdo Station. Typically, the ship reaches Hut Point in late December or early January and cuts ice until it leaves mid-February.

To reach the *Endurance*, the icebreaker would detour on its way home to Seattle. Instead of stopping in Australia the icebreaker would travel for about two weeks over 3,500 miles to Chile to pick up Ballard and his equipment. The icebreaker would have to cross a patch of rough sea on the Southern Ocean, which could cost time. Once Ballard is onboard, getting to the wreck would take about another week. Then Ballard would need at least three more weeks on the icebreaker once the *Endurance* is found.

So far Ballard has not presented firm plans to the Coast Guard, said McMurdo ship operations officer April Brown.

"The idea is being explored," Brown said. "We haven't gotten a hard and fast proposal yet."■

Sarah Goldthwait, above, a graduate student from the University of California in Santa Barbara, lowers a fine mesh net for gathering zooplankton into an ice hole while a curious seal watches. Below, Micaela Parker from the University of Washington learns the proper technique for scooping ice from the sea ice hole. Ice, seals and cold weather are some of the logistical difficulties biology students learn to deal with during a month-long course.

Course

From page 1

"It would be really hard to write a proposal or prepare a project without knowing what's down here, just in the sense of what animals you can get," Moran said.

Donal Manahan started the course in 1994 as a way to train students and enhance the educational role of the Crary Lab.

"It really struck a nerve in a positive way because it is pretty clear that there is huge interest in Antarctic science among young scientists who have never been able to get access," Manahan said. "This program is unique in that it opened access to an international group of young scientists."

This year, 22 students from the U.S., Canada, United Kingdom, Norway and Belgium were chosen from more than 200 applications, Manahan said. Many of the students already have doctorate degrees and a few are professors or working research scientists, so they bring a broad expertise of their own to the course. The findings from research during the course sometimes ends up in scientific journals, Manahan said.

Student Nadine Johnston has already published three papers on Antarctica and worked for the British Antarctic Survey in England for 18 months. But this is her first time to Antarctica.

"Applying for this course has been a chance for me to actually get here," said Johnston, an Australian with a bachelor's in marine Antarctic biology and a doctorate in marine biology.

As an Australian, Johnston normally wouldn't have access to the American research station and research positions at the Australian stations are very hard to get. That's a challenge all foreign students face.

"You have no real access to an American base unless you have an American partner," said Brent Murray, a course participant from Canada, "and you have to come down here to meet them."

Murray is a professor from the University of Northern British Columbia, where he has studied Arctic fish. Coming to Antarctica allows him to compare the adaptations of fish in extreme cold environments.

"It's easy to read (about) it, but when you actually come see it, it makes more sense," Murray said.

During the first two weeks of the course, the students divided into smaller groups to cycle through three sections introducing them to the diversity of Antarctic life, the seasonal changes to the environment, and constants, such as cold. Every lesson was more like a seminar, with professors sometimes debating theories. The course starts at 8 a.m. and students were regularly working in the lab until midnight.

"It's been fairly intensive," Johnston said.

Now the students are working on independent projects of their choice. On Monday Micaela Parker and Sarah Goldthwait dipped a mesh bag into the water to collect plankton for their experiments. They've both collected plankton before, but not from holes in the sea ice. As they worked, a curious seal popped its head up and watched, something that rarely occurs at the students' home universities in Washington and California.

"Some of the techniques are really similar. Plankton tows you use anywhere," Parker said. "You just have to deal with blizzards coming up and ruining your day."

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"It's easy to read (about Antarctic biology), but when you actually come see it, it makes more sense."

- Brent Murray, participant in the biology course

From previous page

The students took their samples back to the Crary Lab. Many were surprised by how well-equipped the lab is, making it comparable to the university labs they've come from. Darlene Lim had expected something more like the small lab she worked on in the Canadian Arctic as part of the Polar Continental Shelf Project.

"This is 50 times as big," she said.

Lim also dreams of coming back to work on a research project of her own.

"This would be an amazing place to work," she said.

It's a possible dream. In another lab room down the hall from the students, an alumni of the biology course was measuring the oxygen use of a pteropod, a pea-sized orange snail with translucent wings. Brad Seibel said he would never have made it to Antarctica if he hadn't taken the biology course two years before. During the course he and two other students, Josh Rosenthal and Robert Dudley, met and started planning a project to look at aspects of locomotion in pteropods. The National Science Foundation accepted their proposal, so this season all three course graduates returned as grantees.

Their experiences as students left them better equipped to answer NSF's questions such as how much helicopter time the project would need, whether they'd require holes cut in the sea ice, and other logistical issues, Seibel said.

"You'd have no idea if you needed that stuff if you'd never been down here before," Seibel said. "We were certainly more prepared than if we had never taken the class. It's hard to imagine coming down here as a PI (primary investigator) if we'd never been here."■

Above, biology course alumni Brad Seibel researches in the Crary Lab. Seibel is now a grantee.

Sarah Goldthwait kneels on the sea ice to pull zooplankton out of a water sample with a syringe.

Profile

Woman on the Move

By Kristan Hutchison Sabbatini
Sun staff

Karen Joyce, above, running in the Antarctic Marathon last year and right, sculpting ice at the MEC Alternative Art Gallery. Photo by Beth Minneci

Karen Joyce lives like she runs, with an almost compulsive need to go farther and do more.

She's hitchhiked from Denver to Bolivia alone, traveled from London to Nairobi in a garbage truck, and biked around Cuba.

"I'm just way too violently interested in everything," she said, explaining why she left a lab position at Massachusetts Institute of Technology. "I just can't settle on one little thing. I'm constantly scouring for new sources of information, which is why I can't stand small talk at meals."

Joyce's talk is big, and fast. In 15 minutes she rattles through her life. She was born in a dying tin-mill town in western Pennsylvania, then moved to Fort Lauderdale "at puberty, covered in pimples, where it took me a year to discover the age of Aquarius."

Joyce earned a bachelor degree in chemistry at Antioch College before her short stint at MIT. She was living in Oregon in 1980 when Mt. Saint Helens exploded.

Joyce and some friends painted "volcano refugees" on the side of a Volkswagon van and drove to San Francisco. There she performed with the anarchist dance collective Elbows Akimbo, continued her art, and started running marathons.

"Then I fell in love with a guy I hired at a law firm," Joyce said. After eight months she decided to escape the "cloying affair." Within a week she had a job as the first of two civilians in charge of hazardous waste in Antarctica.

"We inherited a sea of leaking barrels labeled 'Yuck Waste,'" Joyce said, "and no plan from anybody."

Joyce thought Antarctica would be a five-month adventure, but it's become a way of life. After 11 seasons on the Ice, Joyce is now the lead for computer science support. She has an office with a sea-ice view in the Crary Lab and a mountain named after her. Joyce Peak sits somewhere between Mt. Terra Nova and Mt. Terror.

"I would love to get to see it," Joyce said. "It's not far from here."

Joyce also has a reputation as the de facto workout guru for the station. People come to her with questions about how to train or what a certain knee pain means. Her core strengthening class has a devoted following despite, or Joyce would say because of, it's almost sadistic intensity.

"She's hard-core," said Kevin Stephens, who's attended the class regularly for 12 weeks. "But that's good. She uses a little bit of an intimidation factor."

The Antarctic marathon Joyce started with Nancy Ford four years ago is also picking up speed. Last year 10 ran the course. This year 32 signed up in advance.

Joyce has run so many marathons herself she's lost track. She once ran two marathons in South Africa because she had a better chance to win where few women compete, she said. Her best time was 3 hours 37 minutes. Now she expects to run the Antarctic Marathon in about four hours.

"I have a pretty cavalier attitude toward training anymore, which is to say I don't," Joyce said.

Her version of not training would wear most people out. Joyce still runs for an hour every day, usually up and down the hallway above the bowling alley.

"I hate treadmills, " Joyce said. "I just get on them and think 'What time is it?"

Through it all Joyce has been close friends with Evelyn Genkinger, whom she met in elementary school. Genkinger describes her friend as highly intelligent, competitive, creative, and having a tremendous ability to concentrate.

Last March Joyce turned her focus on writing, assigning herself 500 words a night. By July she finished a 272-page novel, "My Continent, My Concubine." She describes it as a verbal cartoon of McMurdo in 1990. It's the story of six general assistants who go from one filthy, futile job to another.

Joyce wrote herself into the novel, but only in a cameo role in the galley scenes.

"I'm the small, mousy, librarian-looking woman who is annoyed because she can't read a magazine," Joyce said.

Sitting alone to read at meals is one of Joyce's defining traits. Joyce doesn't mean to be anti-social, Genkinger said.

"It's just that when she's reading she's focused in on that and doesn't want you to sit with her," Genkinger said.

The book ends with the two main characters watching the last plane of the summer season fly away, a moment Joyce remembers well from wintering over in 1993.

"There's a panic moment that takes place when you watch that plane take off and you think 'Oh my god, I have no free will,'" Joyce said. "Talk about irreversible."

Joyce stayed sane that winter by reproducing Matisse paintings on six-foot-by-four-foot canvases. A realistic painter, she specializes in portraits of dogs and refrigerator magnets painted with biological organisms.

The fusion of art and science Joyce found at McMurdo feeds her need to learn in a way that actually doing science never would.

"I like to filter-feed through science," Joyce said. "If you have to get stuck in one spot and have your feet cemented to the ground, it might as well be in a place where there's a tremendous stream of information." ■