



December 7, 2003

Safer, gentler seal counts tested



Photo by Kris Kuenning/The Antarctic Sun

Darren Ireland takes an overhead photo of a seal pup while Bob Garrott holds a measuring bar in the photo.

By Kris Kuenning

Sun staff

Weighing a 700 kg seal used to mean drugging the beast and physically hoisting it with a block and tackle. A more recently developed technique involves luring mama seals onto weigh trailers using their own babies as bait. Soon, a seal's weight will be calculated from a simple photograph or two.

In addition to its annual population studies, the seal researchers at Big Razorback Island are completing a project to develop techniques to calculate body mass from digital photographs.

After 30 years studying seals in McMurdo Sound, researchers still are finding new questions to ask and new ways to find answers.

Since the late 1960s, researchers have tagged nearly 17,000 Weddell seals. The core of the research hasn't changed much, but new technology is expanding the scope and depth of the project.

Bob Garrott and Jay Rotella from Montana State University took over the long-term study from Don Siniff of the University of Minnesota last year.

"This is one of the premier population studies in the world for quality and longevity for a large predator at the top of the food web," Garrott said. "I don't think there is a comparable study in the world."

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Spring blooms in the Ross Sea

By Kristan Hutchison

Sun staff

In the ocean garden, the most important blooms are so small they can't be seen individually, and so prolific they change the color of the sea.

Floating plants, phytoplankton, are the fields on which the marine ecosystem grazes and the filter that pulls excess carbon dioxide from the atmosphere. But the same sunlight phytoplankton convert into food energy for marine animals may be damaging the plants themselves.

A number of researchers have been trying to better understand phytoplankton through a series of Antarctic cruises this season.

While the Antarctic continent is one of the more barren landmasses in the world, the Southern Ocean is one of the most prolific

marine bodies.

"In truth, the Antarctic is the place to work," said Walker Smith, of the Virginia Institute of Marine Sciences. "It has a major impact on the marine carbon cycle. It's the single most important region to study and understand in that respect."

In the summer, the Ross Sea is the marine equivalent of a jungle. The amount of phytoplankton in the Ross Sea water is 20 times that in the ocean off Bermuda in the summer. Bermuda catches up in the winter when everything's dark in Antarctica, but the southern summer bloom is one of the most intense in the world. The Ross Sea area is particularly fertile because patterns of wind and current create a polynya, a hole in the sea ice, open almost year round. The polynya grows

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Quote of the Week

"People, they can smile at you one minute and put a bullet to your head the next. Mountains don't do that."

- South Pole documentary producer on why he'd rather film in the wild than cover war zones

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Virtual pilots fly to Antarctica

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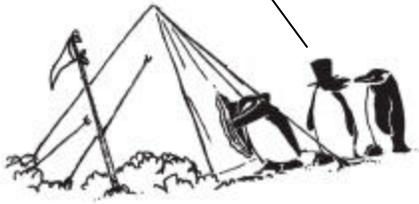
Dan Dixon's trip from dropout to ice expert

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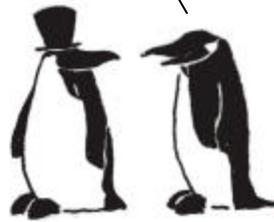
Ross Island Chronicles

By Chico

That guy from the National Geographic Society won't mind us borrowing his video camera. Besides, he's asleep.



Cool! Hey, let's do a documentary about us to sell to the tourists.



So, is it true the Emperor penguins are far more advanced than humans?



Yes, for example, we recycle what we eat straight to our offspring's mouths. It eliminates waste and the need for microwave ovens.



Is there anything that really bugs you about the scientists?



Yeah. That they don't bathe enough. You can only put up with their smell so long you know?



Cold, hard facts

Weather fun

Strongest and highest recorded gust of wind: 372 kph at the Mount Washington Observatory, N.H., April, 12, 1934.

Herbie: A hurricane-force blizzard that typically drops from the Antarctic polar plateau onto the ice shelf, producing winds over 100 kph.

Williwaw: A strong downslope wind in Alaska.

Tough mutton: Sheep can survive for up to two weeks buried in snow drifts.

The longest glacier: The Lambert Glacier in Antarctica's Prince Charles Mountains is up to 74 km wide and over 460 km long.

Antarctic winds: Winds in Port Martin in 1951 were an average of 74 kph throughout the year, averaged 120 kph during the month of March, and an incredible mean speed of 200 kph March 21-22.

Sources: *Antarctic Dictionary*, onlineweather.com

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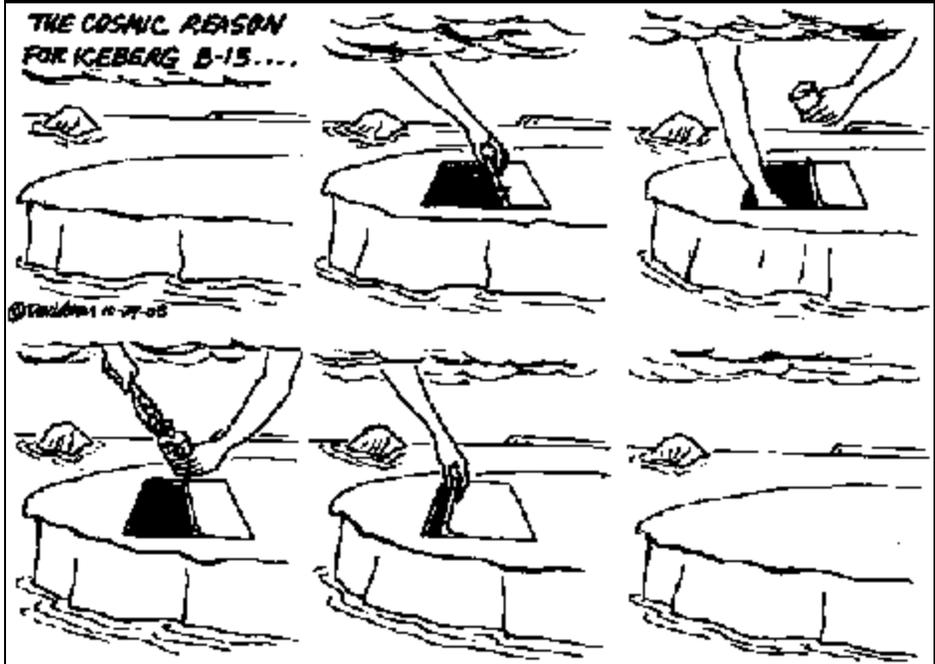
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Matt Davidson



Stormy weather hits McMurdo

By Kris Kuenning
Sun staff

A powerful, three-day storm brought snow, wind and a few slumber parties to McMurdo last week.

The largest unplanned sleep-over consisted of 40 people trapped at Williams Field by bad weather Monday night. Scattered among the buildings, most of the stranded people slept comfortably, though there were complaints from some of the 11 sheltered in the temporary weather port. Lauren Scott said his night was cold, wet, noisy and punctuated by the regular eruption of a "snow geyser" coming through cracks in the floor.

During periods where the wind was greater than 90 kph, people were prohibited from going between buildings, including to the outhouse.

Station services manager Bob Tellez described the stranding as "a good way to get rid of leftovers."

Work was slowed. Reed Chambers of the balloon launching crew said on Tuesday, "We worked a little yesterday. We got some stuff shoveled off so the new snow had somewhere to go."

The long duration balloon preparations were delayed by the storm but Chambers said it might help the launch in other ways.

"We're still waiting on the upper level wind. Sometimes a storm actually helps."

Deltas came to the rescue at Williams Field Tuesday afternoon soon after normal conditions returned.

At McMurdo, 12 stranded New Zealanders found shelter in spare dormitory beds Monday night. Six firefighters spent 72 hours at the ice runway.

MacOps was tracking 99 people in the field during the storm.

A Pisten Bully was sent to rescue two people stranded in a Delta 11 miles from the Black Island camp, where the winds reached up to 195 kph. The people were taken back to Black Island camp Tuesday night and the group headed back to McMurdo on Wednesday. The snowed-in Delta will be recovered later.

The search and rescue team was also called out to escort several vehicles back from Pegasus Runway road using the Global Positioning System.

"We can use GPS and other things," said Brian Johnson. "It's just safer. It gives you peace of mind that you're not going to run over a fuel line."

Tuesday's "Happy Camper"

snow training school was canceled.

Meanwhile, there were some not-so-happy campers in the field. Camp F6 at the mouth of Lake Fryxell in the Dry Valleys reported to MacOps that the storm whipped through their camp and wrecked two of their three tents.

A camp at Hjorth Hill at the mouth of the Taylor Valley was partially put in on Monday.

"They didn't get all of their gear," said MacOps coordinator Shelly DeNike. "But they seem to be doing fine. They haven't complained."

Out on the sea ice, the weight of the snow drifting around buildings and fish huts was pushing the ice below sea level. Snowplows were being sent out to remove the drifts and ease the pressure.

At the Penguin Ranch, researcher Paul Ponganis said drifts of 2.5 meters to 3 meters filled the corral and covered the dive hole. Near the buildings, drifts were up to 3 meters. Researchers worked to re-open the dive holes so the 13 emperor penguins could reach the water to feed.

Cape Royds penguin researcher David Ainley reported the sea ice edge receded 2 km during the storm and satellite photos confirmed it later.

At the lower Erebus Hut, Kiwi mountaineer and volcanologist Harry Aeyes reported a serious snowball fight.

Sleeping in tents, the six people were comfortable and well fed, but additional team members had been delayed along with some supplies.

"We're starting to run out of dishwashing



Photo by Rachel Murray / Special to The Antarctic Sun

A McMurdo resident comes in from the storm.

liquid. I used women's shampoo last night. It made my hands smell beautiful," Aeyes said.

During the week-long storm, the party still managed two trips to the crater rim. "We dug the skiddoos out three times," he said.

Digging was a major activity at McMurdo on Wednesday, after the storm passed.

More than 24 cm of snow accumulated at McMurdo, and was blown into deep drifts by winds at nearly 100 kph.

Fleet operations supervisor Gerald Crist said there were drifts up to three meters around buildings.

Staff at four locations and on two shifts were working overtime to clear snow from Williams Field, the runways and around town.

"We'll be feeling this for another four or five weeks," Crist said. "Some of it for the rest of the season."

At Pegasus runway on the Ross Ice Shelf, the southwesterly storm filled in an area they have been working to clear for the past three years.

Crist said there was already a 200 percent increase in the snow accumulation on the ice shelf this year. With another 0.5 meters brought in by the storm, the work to clear the runway for January has almost doubled again.



Photo by Lauren Scott / Special to The Antarctic Sun

Christy Carney was one of 40 people forced to spend the night at Williams Field during the storm.



Perspectives Perspectives

Learn to fly Antarctica, virtually

By Matt Thompson

Have you ever wondered what it would be like to fly your own C-17 from Christchurch to Antarctica, but you don't have millions to spend for your own plane?

Well, you can try flying to the Ice for a lot less, virtually of course. Microsoft and some other companies have produced several versions of a flight simulator program, with Antarctic scenery available.

Basic programs start at \$40 while the really extravagant ones cost thousands. The standard Microsoft Flight Simulator costs from \$40 for the 1998 version to \$100 for the new 2004 version.

Some flight instruction schools use these programs to teach basic flight and procedures. It allows the user to fly all over the world, including Antarctica, and in different types of aircraft and weather conditions.

Aircraft controls range from key commands to high-dollar aircraft controls that hook to your computer for realism. I will use Microsoft Flight Simulator as the basic model.

For virtual reality, the basic scenery package that comes with the Microsoft Flight Simulator program has good enough detail for the airports and major cities of the world. You can download more scenery for these airports as well.

Ross Island has a pretty good-looking Mount Erebus on it except they left off Mount Terror, Mount Terra Nova and McMurdo Station.

Early versions of Flight Simulator wouldn't let you fly past 66 degrees latitude north or south, but the three latest versions, starting with the 2000 version, will let you fly to the poles.

Some people have designed scenery files for stations in Antarctica, including McMurdo. Granted, some items included at the air fields are a little unrealistic, such as the hangars and light beacon on the sea ice at McMurdo or the concrete runway at South Pole.

Most stations are represented on downloadable scenery files. Some of the files are well done and some are pretty cheesy. Most can be downloaded for free, so you get what you pay for.



Screenshots courtesy of Bear Racing, Microsoft Flight Simulator 2004, Transpolar Virtual Airline

Want to learn more about flight simulation games? Here are a few Web sites to check out:

- <http://www.microsoft.com/games/flightsimulator/>
- <http://www.flightsim.com>
- <http://www.simflight.com/news5/>
- http://www.avsim.com/pages/0101/bear_12-31/bearracing.htm

Just about every aircraft, military or civilian that has ever been flown can be downloaded into Flight Simulator. All of the aircraft currently flown in Antarctica, including helicopters, and some historic ones can be downloaded. Most are painted to resemble a specific airline, squadron or agency.

If you don't like the paint or the scenery, you can buy or download programs to paint your own aircraft and build

your own scenery. Most include tutorials on how to make, use and integrate the files.

Several Web sites offer flight simulation tips, news, products and downloads. There are even virtual airlines that you can join and fly routes delivering imaginary passengers or cargo.

So if you have the time, a little bit of money and a decent computer, you too can fly Antarctica.

around the continent

SOUTH POLE

Stuffed at Thanksgiving

By Vincent P. Scott
Pole correspondent

Mood lighting. White linen tablecloths. Candles. Linen napkins. Roasted turkey. Fried turkey. Smoked turkey. Mashed potatoes. Stuffing. Gravy. Green bean salad. Squash. Freshie salad. Rolls. Red and white wine. Pecan pie. Pumpkin pie. Apple pie. A veritable cornucopia of delectability carefully prepared by Jon "Cookie" Emmanuel and his staff.

All this and more greeted Polies who participated in the gala 2003 Thanksgiving festivities at South Pole Station on Saturday evening, Nov. 29.

Polies chose one of three available seating times in which to gather for appetizers and to dine with friends and colleagues. Hors d'oeuvres included smoked salmon, fresh vegetables, and a traditional cheese and cracker assortment.

Brian Cobabe, a first year communications technician from Ft. Collins, Colo., provided entertainment at the pre-meal appetizer gathering by sharing his keyboard skills and musical talents.

Each dinner seating was filled to capacity with employees and grantees who were happy to be sharing a meal and taking some well-deserved respite from a normally busy schedule.

Financial donations from the many generous science grantees allowed for the purchasing of table wines, which helped create a celebratory mood throughout the meal.

Volunteers served the wine and soda, cleared tables and served slices of delicious pies baked by master baker Erica Fickeisen.

The other dining staff who shared their culinary talents in feeding over 200 hungry employees and in leading the clean up efforts included: Nathan Bahls, James Brown, Steve "Beaver" Cohen, Jonathan "J" Dunn, Donald Highsmith, Keros Johnson, Navah Levine, Sheri Mason, Rolf Peterson, and Robin Solfisburg. Much credit to the success of the evening



Photo by Bill McAfee / Special to the Antarctic Sun

Chris Goetz, second from left, Cori Hayth, Jessica Irmen, and others fill up their plates.

is due to this tremendous dining facility staff who spent much time and effort to make the Thanksgiving dinner a memorable, tasty, fulfilling and tummy-filling event!

PALMER

Writing class offers break

By Kerry Kells
Palmer correspondent

The past few weeks at Palmer Station were full of activity. Beyond the usual outdoor activities of hiking up the glacier or boating to the numerous islands in the area were activities offered on-station by members of our community. These included regular salsa dance lessons on Mondays, exercise classes on Tuesdays and Thursdays, yoga on Wednesday mornings and science lectures on Wednesday evenings. Parties and arts and crafts classes are offered on occasion. But this past week at Palmer, the community members got a special treat when our NSF sponsored writer, Lucy Bledsoe, offered a writing workshop.

Lucy Bledsoe, a recognizable name from the McMurdo summer of 1999-2000, is now at Palmer Station for a month to gather information on this side of the continent for a new novel. She gave a lecture on her writing and read excerpts from her book, "The Antarctic Scoop" written after

her season in McMurdo. Before deployment, Bledsoe researched Antarctic writing and discovered that most books were nonfiction -- for both children and adults, with very little Antarctic fiction in existence. She began with the idea of a science adventure story featuring Antarctica and aimed at children nine to 12 years old. She chose the topic of astrophysics for "The Antarctic Scoop," hoping to engage children in the topic of astrophysics and the South Pole. For her next book, a sequel, one of the supporting characters, Alexander, will join the main character Victoria, on a trip to Antarctica to study oceanography. This topic fits well with the ecological studies of the Southern Ocean surrounding Palmer Station.

Bledsoe's goal in developing a story line is that the "characters are agencies of their own destinies" and that they "make choices that cause and/or solve problems." Right now Bledsoe is in the "what if" stage of her writing, trying to think of a problem or crisis that would fit with the Palmer Station area. At the same time the story needs to incorporate well-developed characters who interact with each other and their environment. How do Victoria and Alexander get to Antarctica, what problems do they encounter, what problems do they solve? Additional supporting characters need to be developed into the

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the week in weather

McMurdo Station

High: 28 F / -2 C Low: 19 F / -7 C
Wind: 58 mph / 93 kph
Windchill: -18 F / -18 C

Palmer Station

High: 41 F / 5 C Low: 25 F / -4 C
Wind: 25 mph / 41 kph
Windchill: 12 F / -11 C

South Pole Station

High: -16 F / -27 C Low: -33 F / -36 C
Wind: 22 mph / 35 kph

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story and the plot has to be finished.

During the writing workshop, Bledsoe explained the five aspects of planning the creative short story: character, central conflict, linked scenes, language and dialogue. After a short discussion of each one, we were given 10 minutes to brainstorm our ideas onto paper, build a character from physical description to habits to defining relationships, develop linked scenes that surround the central conflict and manipulate the feelings and thoughts of the reader with language and dialogue.

Five days later we got together for an "open mic" to read our finished pieces. Some recited the poetry of others and those who found the time to put their brainstormed ideas to paper read their work. Barb Watson read an unfinished descriptive work "The Rose Garden" and Glenn Grant read about his trip to the South Pole and all the special intricacies of that experience. Jeff Kietzmann developed a story based on games of competitive table

tennis he played as a child and at the South Pole during one summer and winter. For many of us, stories sit unfinished, ideas scattered about without structure. But Bledsoe's tremendous knowledge and her Creative Writing 101 class are an inspiration to put our thoughts and experiences to paper.

SCOTT BASE

Visitors keep base busy

By Kris Kuenning
Sun staff

Scott Base has seen a flurry of media and distinguished visitors in the last couple weeks.

Antarctica New Zealand's annual planning meetings brought the organization's board of directors to Scott Base last week.

Another visitor group met to look at the New Zealand government's plan for Antarctic conservation and the sustainable management of marine resources in the Southern Ocean.

Scott Base also hosted Seddon Bennington, chief executive of The Museum of New Zealand Te Papa Tongarewa in Wellington. Te Papa will host a major exhibition on the Antarctic historic era, called "South" from May to October 2004. The exhibition will include Shackleton's boat, the James Caird.

Geoff Dangerfield, chief executive of

the Ministry of Economic Development was on station observing activity because of his role in the strategic directions for New Zealand science through the Foundation for Research, Science and Technology.

Lesley McTurk, the newly appointed Christchurch City Council chief executive officer, also spent time at Scott Base. As a gateway to the New Zealand, Italian and U.S. Antarctic Programs, Christchurch has a unique relationship with the work that goes on here.

Media crews have also been roving the base. A New Zealand 60 Minutes program is being produced on station this week and



Photo by Kerry Kells / Special to the Sun
Writer Lucy Bledsoe arrives at Palmer Station to research a new book. She recently gave a writing seminar for base staff.

National Radio's legendary broadcaster Kim Hill did her three-hour Saturday morning program live from the base two weeks ago, when she interviewed research and Scott Base support staff.

Hill said the purpose of her trip was to discover "what life is like down here."

"Antarctica is a state of mind," she said. "And everyone has a story to tell. There's no dead wood."

Hill described visiting Scott Base as the nearest thing to being at a space station. "But at the same time it's very New Zealand."

New Zealand artist Grahame Sydney will be at Scott base until Dec. 14. The respected painter was invited to the base as part of Antarctica New Zealand's revamped Artists in Residence program.

Sydney is capturing the continent with photography and notes. He will transpose those to canvas from the warmth of his Dunedin studio.

Famous for capturing the landscapes and rural scenes of his native Otago, Sydney said he enjoys the Antarctic landscape.

"I love desolation and isolation and empty places. It is bliss for me – visual bliss because of the subtlety."

In his first week, Sydney said he already had many pictures of work in his mind.

"It's always been very critical that whatever work I create, it not be by any-

one else's clichés," he said. "I have to find my own clichés, find things that I can use and bring to other people's attention. That is the challenge but I knew from the first day that would be no trouble."

What form the images brewing in Sydney's head will take is another matter.

"The medium...oil paint feels too fat. In my mind, oil is already inappropriate because of its lushness."

Instead, Sydney is leaning towards egg tempura, a medium he used more in the first half of his 30-year career.

SHIPS

Laurence M. Gould

Compiled from reports by Skip Owen

Wind and ice rerouted the *Laurence M. Gould's* most recent cruise. The research ship started out from Punta Arenas on Nov. 23.

When the ship first got into the Drake it experienced moderately rough seas, but then managed to skirt the low pressure system on the way to King George Island. The winds abated and Richard Veit's seabird group conducted surveys of the bird life between occasional snow showers.

The *Gould* proceeded to Frei Station and dropped off two people, one to be medevaced and another as an escort. They flew back to South America on a Chilean C-130 on Nov. 27.

After that, the *Gould* proceeded to Copa field camp, but was unable to dock there because of high winds. The ship did drop off one small package for the field camp at Arctowski Station before departing.

The ship transited overnight toward Vega Island in Erebus and Terror Gulf. Heavy multi year ice, bergs and large tabular floes had plugged the southeast end of the Antarctic Sound.

It was clear that with the high winds out of the south and east it would have been days at least before there was any appreciable change in ice conditions, allowing passage towards Vega and Seymour Islands.

The *Gould* detoured to Palmer Station, encountering calm, mostly sunny weather on the way through the Bransfield and Gerlache Straits and stopped to calibrate scientific instruments.

The *Gould* arrived at Palmer Nov. 30 and left again Dec. 2, after having unloaded cargo and exchanged passengers.

As of the last report, the ship headed back to Erebus and Terror Gulf, which appeared mostly open in a satellite photo Dec. 1 with some pack ice in the same area that prevented the ship transiting before.

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dramatically in November and December, allowing phytoplankton to flourish.

“The Ross Sea, in particular the southern Ross Sea, is probably the most productive area in the entire Antarctic,” Smith said.

While thousands of species of phytoplankton grow around the world, the Ross Sea is dominated by five to 10 types.

“There’s one in particular that is very unusual and seems to be very important in the food web,” Smith said. “*Phaeocystis* is a gelatinous sort of goopy organism that normally forms colonies the size of your fingernail.”

Among phytoplankton, the *Phaeocystis* colonies are large. Most other phytoplankton colonies are invisible to the naked eye, except as a wash of color in the water. The first reports of phytoplankton anywhere in the world came from early Portuguese navigators who saw the water turn red. Christopher Columbus sighted what he thought were massive patches of sawdust on the water. From the air, phytoplankton-rich coastal waters are brownish, whereas the less productive open ocean is blue.

When the *Phaeocystis* blooms in the Ross Sea, the water turns brown and concentrations of chlorophyll in the water increase to 10 to 15 micrograms per liter, from a normal chlorophyll level of 0.05 micrograms per liter.

Phaeocystis also contain large amounts of a class of compound that absorbs ultraviolet light. Known as mycosporine-like amino acids, these compounds are believed to shield *Phaeocystis* from harmful ultraviolet light, allowing them to survive and outcompete other phytoplankton in the water, said Joaquim Goes from the Bigelow Marine Laboratory Department of Ocean Sciences.

Goes, along with expedition chief scientist Pat Neale from the Smithsonian Environmental Research Center and other researchers, cruised into the Ross Sea in November. Their intent was to understand the effects of the sun’s radiation on marine life as part of a larger international effort. Scientists are particularly interested in learning about the harmful effects of ultraviolet radiation on life because the thinning ozone layer in the stratosphere is exposing parts of the world, including Antarctica, to up to 50 percent more solar ultraviolet. In humans, excessive exposure to ultraviolet radiation causes skin cancer, blindness and aging.

“The need for more research in the effects of the solar UV radiation has become all the more urgent over the last few years following the recent discovery of mini ozone holes over several inhabited regions of the northern hemisphere, including several Scandinavian countries as well as Canada,” Goes said.

Because they depend on the sun for photosynthesis and growth, phytoplankton have to remain in the upper, lighted layers of the sea, where they are also exposed to ultraviolet light. Wade Jeffrey, from the University of West Florida, found that DNA-damaging radiation reaches down to 20 meters. Working in the lab, Goes discovered ultraviolet light affected the amount of photosynthesis by phytoplankton cells, and also changed how carbon was allocated within the cell.



Photos by Walker Smith / Special to The Antarctic Sun

Above, crew deploy a mooring to sample phytoplankton. Below, a bloom of the phytoplankton *Phaeocystis*, common to the Ross Sea.

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Phytoplankton exposed to UV radiation were incapable of synthesizing polyunsaturated fatty acids. The polyunsaturated fatty acids are highly essential for the growth and reproduction of higher animals in the food chain. Zooplankton, krill, fish, penguins, and whales all depend on phytoplankton for the fatty acids. He's expecting to see similar effects in the wild.

Phytoplankton are also the only source of certain amino acids necessary for organisms growing on the sea floor, Goes said.

"We hope that our research will shed light on how UV could impact not only the marine food chain, but biogeochemical cycling in the sea," Goes said.

One thing phytoplankton contend with in the wild that they don't in the lab is being constantly tossed around by the sea. Always at the mercy of the currents, an individual phytoplankton may spend a few hours or days on the surface, exposed to full sun, and then be drawn deep into the water where almost no sunlight penetrates. One day it may be growing on the open surface of the sea, and the next be in the dark, covered by sea ice.

"Plankton are living in a very dynamic light environment," said Linda Franklin from the Smithsonian Environmental Research Center. "We are interested in how the dynamics of exposure influence the degree to which phytoplankton and bacteria are damaged and repaired."

In previous research, expedition leader Pat Neale found that the recovery of photosynthesis is rapid in coastal areas near Palmer Station, but much slower in phytoplankton in the Weddell-Scotia confluence. This was the first season of research on the topic in the Ross Sea and unfortunately the cruise had to be aborted because of engine trouble. The researchers did take a number of samples from near the ice

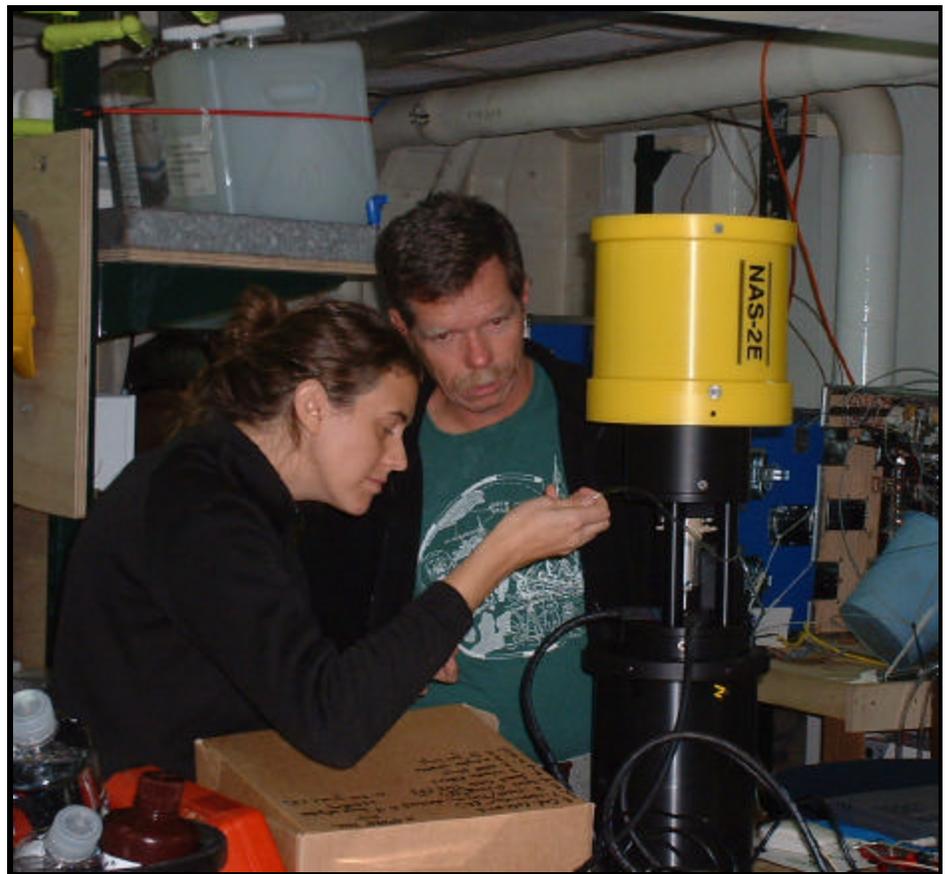


Photo courtesy of Walker Smith/ Special to The Antarctic Sun

Members of Walker Smith's research team work on a nutrient analyzer on an earlier cruise.

edge and will return for a second cruise in Jan. 2004.

"It has not been the experience we anticipated, but the captain and crew of the Palmer were, as always, highly supportive and helpful," Franklin said. "(They) allowed us to make the best of a bad situation. We are looking forward to getting to the Ross Sea with them next year."

Plankton patch

Another research team is studying a particularly productive area in the south-

ern Drake Passage, trying to understand why that area has measurements of chlorophyll 10 milligrams per meter while the water to the west is often lower than 0.1 milligrams per meter. It's like a particularly lush patch of garden, but nobody is sure why.

Biologist Greg Mitchell suspects it might be because of the amount of iron in the water. Plants require iron to turn sunlight into energy, among other things, but in much of the Southern Ocean there isn't

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Antarctic Photo & Writing Festival

Four photo categories:

(One entry per category per person)

- Scenic
- Wildlife
- People
- Other

Photos may be digital or traditional, preferably 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: Up to 300 words
- Non-fiction: Essays, letters home, e-mails, memos, journal entries, etc.; up to 300 words

More 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. Winners will be printed in the Sun, on the Web and posted on Highway 1. E-mail staff for more info.



DEADLINE: 7 A.M. DEC. 14

Outlook users, e-mail entries to MCM-Antarctic Sun, others to antsun@polar.org, or stop by the Sun office at Building 155.

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enough iron to go around.

The lush spot occurs alongside a submarine ridge called the Shackleton Fracture Zone, where the seafloor rises to less than 1,000 meters deep northwest of Elephant Island. Mitchell will go there in February on the *Laurence M. Gould* as part of an interdisciplinary collaboration between Scripps Institution of Oceanography, University of Hawaii Manoa and University of Boston. It will be his fifth research cruise in the Southern Ocean since coming as a graduate student in 1981.

The submerged ridge may influence the currents there, creating eddies that pump water from down deep to the surface or pull it off shore from the continental shelf, Mitchell said. Water being drawn up from the bottom or out from shore would have higher levels of iron.

Some people have even proposed fertilizing the oceans with iron to promote more phytoplankton growth, in order to increase the rate at which carbon dioxide is removed from the atmosphere. Like all plants, phytoplankton use up carbon dioxide as they photosynthesize, releasing the oxygen. As the phytoplankton eventually decay or are digested, the trapped carbon ends up sinking to the seafloor, causing the surface water to draw in more carbon. The importance of this carbon sink has grown as humans release more carbon dioxide into the atmosphere.

Smith considers the concept of iron seeding the oceans foolhardy. He warns that usually when humans try to manipulate the world on a large scale, we end up degrading the environment and causing unforeseen consequences.

Smith is studying the variations in phytoplankton growth from season to season and year to year. He cruised into the Ross Sea in 2001 to deploy his first instruments, then lost all of his instruments in the ice in 2002-2003. He's scheduled to return on the next *Nathaniel B. Palmer* cruise this year.

"The idea of the whole grant was we would have five consecutive years and then we would have an idea of the entire process," said Smith, who wants to relate the phytoplankton growth patterns to climate. He's also hoping to establish links between the phytoplankton and the penguins, seals and other animals higher up the food chain.

"Phytoplankton are the base of all marine food webs, so understanding what controls the growth of all phytoplankton is really key to understanding the growth of all 'charismatic megafauna,'" Smith said.



Photo by Pat Neale/ Special to The Antarctic Sun

Ann Gargett and Chris Powell from Old Dominion University deploy an instrument to measure vertical mixing, a factor that affects how much light phytoplankton receive.

Continental Drift

What is Antarctica's best contribution to people who will never be here?



"Knowledge that would otherwise be unattainable."
 Tammy McDermott, *South Pole air transportation specialist from Steamboat Springs, Colo., second season.*



"Global awareness. As people learn and hear more about Antarctica, one can hope the research findings and testimonies of people on the Ice bring home the point that our planet is a closed unit."
 Heidi Geisz, *Palmer seabird researcher from Boulder, Colo. fifth season*



"The scientific research and advances that are made that will benefit those that aren't here."
 Mark Bartram *McMurdo, mechanical engineer from Parker, Colo. second season*



Weddell seal mother and pup loll about on the sea ice near Big Razorback Island.

Photo by Kris Kuenning/The Antarctic Sun

Seal

From page 1

The world of Weddells

Eerie, almost human-sounding moans bounce off the steep, black face of Big Razorback Island. Shooting from the ice covered sea, the jagged comb of rocks block the prevailing winds and forces long cracks in the sea ice, which are taken advantage of by the well-adapted Weddell seal.

Stepping over snow-covered cracks and around pairs of mothers and fluffy pups, the researchers make their way to the morning's photographic subjects. Each pair is unique and each pup is at a different stage in the development of its coat.

One male lounges lazily amongst the suckling pairs, but the majority are below the ice, calling, brawling and defending their turf, surfacing only for a furtive breath.

Of the four types of Antarctic seals, only the Weddell seal has adapted to living on fast ice. Cracks provide valuable breathing holes, but most of the action in a seal's life is underwater - feeding, breeding and guarding the territory of an ice hole. After just a few minutes breathing at the surface, a Weddell seal can dive for up to 70 minutes at a time.

"Underwater they are graceful, agile and powerful, compared to up here where they really do look like slugs," Garrott said, gesturing to the collection of mothers and pups lounging near Big Razorback. "That's because this is not the environment they're evolved for."

By giving birth on the ice, far from open water, Weddell seals can protect their pups from predators like leopard seals and killer whales.

By the time the protective ice breaks free from McMurdo Sound, usually in late December, the pups have been weaned and have learned their first lessons in swimming and finding food.

Seals seem to compete for access to different colonies. The preferred colonies seem to be closer to Ross Island, but researchers are unsure if those areas make better breeding grounds because they are further from predators, closer to food sources or have better ice conditions for hauling out.

Photographic evidence

Without a lot of data about annual fish numbers in McMurdo Sound, the seal researchers are trying to gauge the status of annual food supply indirectly by looking at the animals' weights.

"If the females show up fatter, they can probably dump more energy into the pups. So then the pups get fatter and are more likely to show up later as reproductive animals," Garrott said.

The problem is that there is no easy way to weigh a seal. Seals never stop growing and the older and fatter of the animals can be up to 700 kg. In the past, seals were drugged and hoisted with a block and tackle but this was hard work and wasn't practical in large numbers.

"Seals are a bit like horses. They're too

big to force. The key to population work is to measure as many animals as possible," Garrott said.

Graduate researcher Darren Ireland is developing a formula for calculating a seal's weight using digital photography.

With a remotely-operated digital camera rigged to a boom, Ireland takes overhead and side-view photographs of mothers and pups. Another team member holds a measurement bar in the photograph to provide a scale for making various body measurements.

By comparing the photographs to the actual weight, now measured by luring the seal onto a specially designed trailer, Ireland is creating an equation that will calculate weight based on body size.

"Next year we will not do as much weighing," Garrott said. "Instead we'll switch to mostly photographing hundreds of animals."

Ireland is working with Kelly Proffitt to compare the weight loss of the nursing mother to the weight gain of the feeding pup.

A nursing mother can lose 200-300 kg during the 30-40 days of feeding. The pup seems to gain about half this much.

Adding weight calculations to the mix of data will help researchers see how lean or fat years affect the other characteristics of the population and give them more clues about how food abundance affects the seal's behavior and survival.

See Seal on page 11



Photo by Kris Kuenning/The Antarctic Sun

A tagged mother and pup look up from a nap near Big Razorback Island.

Seal

From page 10

Tracking population

To gather the annual census, researchers split into pairs and go looking. Covering the territory between Cape Evans and New Zealand's Scott Base eight times each season gives them a chance to spot and record most of the tagged animals.

Between 1,500 and 1,800 seals are in the census area. After 30 years of research, the age is known for about 60-70 percent of the population.

They still don't know how long seals live. One female, who was tagged as a pup, is breeding still at 28 years old. A few others, tagged as adults in the same year, must be at least 30.

This year, 372 pups were tagged.

"We feel pretty confident that we tagged every pup born in Erebus Bay this year," Garrott said. "The vast majority are pups that never show up again."

Survival is tough. Those pups that grow old enough to mate (six to eight years) have their reproductive history recorded.

After an initial spike, the overall population has remained steady for the last 20 years.

Garrott said the early rise was probably the population recovering from the slaughters that began in the late 1800s, when seals were killed in large numbers for food and fuel. Even into the 1970s, seals were being slaughtered to feed dogs at Scott Base.

The steady population indicates some other limitation on the colonies. It could be related to food resources, predators,



Photo by Kris Kuenning/The Antarctic Sun

A Weddell seal pup wakes up near Big Razorback Island.

access to cracks or other unknown factors. Weddell seals eat squid, mawsoni (commonly referred to as Antarctic cod) and silverfish in McMurdo Sound. These fish, in turn, depend on the water's source of microscopic plants. Plants need sunlight, which is filtered through the sea ice. How thick the sea ice is depends on a multitude of factors, including the weather and the movement of icebergs... but that's a different story.

"We don't know what's limiting the

growth and that's the really intriguing question," Garrott said.

Passing the torch

When Don Siniff retired from the University of Minnesota after 30 years of Antarctic seal research, he looked to one of his former PhD students to carry on the legacy of Weddell population data.

"Part of the reason I signed up to work with Don was because I thought it might give me an opportunity to work in Antarctica," Garrott said.

And though most of his graduate work was with wild horses in the Western U.S., Garrott did get to Antarctica in the late 1980s to study seals. He returned two years ago with Siniff to take over the NSF funded project and discuss its future.

While carrying on the consistent and thorough research of the established project is a major component of what he's doing, Garrott is also looking for a future that involves the bigger picture of the ecosystem.

He said the things learned from studying population dynamics of seals in McMurdo Sound are relevant to other ecosystems, including the work he does during the rest of the year with bison, elk, bears and wolves in Yellowstone Park.

Learning the big picture of the ecosystem will also be important for analyzing the potential impacts of human activities like global warming and commercial fishing in Antarctica.

Featured National Science Foundation funded research: Principal investigator Robert A Garrott, Montana State University Bozeman

"Underwater they are graceful, agile and powerful, compared to up here where they really do look like slugs. That's because this is not the environment they're evolved for."

-Bob Garrott

Profile

Adversity, boredom drove student to job he loves

By Kristan Hutchison
Sun staff

Dan Dixon went from high school dropout to Antarctic researcher following a single, guiding principle.

"If you don't enjoy something, then don't do it," Dixon said. "That's been my philosophy all through my life."

He skips quickly past the so-called formative years, growing up as the fifth of six children in a West London home. His dad died when Dixon was three, so his mother did the best she could alone on a teacher's salary, but there wasn't much money. Dixon struggled with school and dropped out when he was 15.

"I thought it was better to leave, rather than get bogged down with it," Dixon said.

For five years he worked a series of low-paid, dead-end jobs in London. One was at a video production factory, where he spent all morning putting blank videos into rows and rows of VCR's. As soon as the videos had recorded he'd go back down the rows collecting the finished tapes.

"I never want to do that again. It's an absolutely mind-numbing job," Dixon said.

During the summers he joined a traveling carnival, helping to assemble and take down the carnival rides in a different village in Norfolk County each week. His favorite was the bumper cars because he could drive them around backward.

"That just seemed exciting at the time, and it was. It was good fun," Dixon said.

In the winters he continued working temporary jobs, cleaning offices and filling orders at a music and video warehouse.

"I got so, so bored. I finally realized I was going to have to make a major change in my life," Dixon said.

So he decided to go back to school. The government was offering grants for mature students to go back to college and get degrees. Dixon applied, but found himself in a Catch-22 situation. The grant was supposed to help people like himself who'd left school early, but to receive the grant he had to be accepted into a university degree program. Without the equivalent of a high

school diploma no university would accept him.

So, for a year he slept on his sister's sofa in Norfolk and commuted to a course that would give him the equivalent of a diploma.

"I was just getting by," Dixon said.

After a year, at 22, he applied to universities. Only Southampton University accepted him, on the requirement that he do two more years of preparatory courses first.



Photo by Kristan Hutchison / Sun Staff
Dan Dixon is collecting ice cores while on the South Pole traverse, which will end in the Transantarctic Mountains, seen in the distance.

school diploma to go into effect, helping to pay for tuition, rent and food.

It took two more years of study and work before he took the exams to enter the university. He passed everything except math, which took him two tries.

"It was only by the skin of my teeth," Dixon said.

Finally a university student, he went to sign up for classes in his intended major—engineering—only to discover most of the requirements were math. Following his guiding principle, he decided he didn't enjoy math enough to do that much of it, and walked over to the new oceanography facility on the Southampton docks. That's how he ended up with a degree in geology and oceanography, graduating with high scores and heavy debt.

"But it's worth it, because I ended up here," Dixon said.

His final year of field experience was doing deep-sea exploration of the ocean floor sediment and geology off the coasts of

Portugal and Spain. The research was done from a Russian research vessel in the North Atlantic. The weather was sometimes so warm the students would burn their feet if they went on deck barefoot. Part of the students' job was to sort through the piles of sediment brought up from the seafloor, a task that often ended with a mudfight.

"That experience was what really got me interested in traveling and going around the world," Dixon said.

Back at university for finals, Dixon found he was one of the few graduating students without a job lined up. He didn't know what he'd do next. Then one of his professors forwarded an e-mail from Paul Mayewski looking for a graduate student to work and study in the United States and Antarctica. That sounded cool to Dixon, who borrowed money from his brother, mother, and grandmother to take the graduate school exam, pay his application fees, get a visa and buy a plane ticket.

Now Dixon is on his third Antarctic traverse, collecting ice cores from the East Antarctic plateau. By the time this traverse is over he'll have driven almost 6,000 km over East and West Antarctica, enough to have crossed the continent from the tip of the peninsula to the farthest coast. The ice cores are for the International Trans-Antarctic Scientific Expedition (ITASE), which is putting together, among other things, a 200 plus year climate record of the entire continent. He's also earning his master's thesis out of it, based on analyses of the ice cores back in the lab at the University of Maine.

In November 2003 he had his first paper accepted by the *Annals of Glaciology*, summing up the sulfate record from the ice cores collected on the U.S. traverses. He's been able to use the sulfate record to identify several global-scale volcanic eruptions in almost every core and determine that Antarctica has not been significantly affected by the sulfate pollution that coats the northern hemisphere.

The more he learns, the more Dixon is interested in researching further.

"At first the whole point of me getting an education was so I could earn lots of money," Dixon said. "But it's true, once you get sucked in, you want to learn more and more."