

The Antarctic Sun



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



EXTRA! EXTRA! LC-130 halted by crevasse. Details page 2.

Isolated in a Quonset hut seven miles off McMurdo's coastline, Randy Davis, left, and Bill Hagey tinker with a sophisticated array of gear they use to study Weddell seals. Their sea-ice camp, 'Weddell World', houses enough technology to keep a team of seven researchers at work 24 hours a day. Photo by Alexander Colhoun.

Real-Time, Real Results

New technology ensures accuracy, speed

by Ginny Figlar

Lee Fuiman knows the value of gathering accurate data on the world's most remote continent.

Living through what could be considered a scientist's worst nightmare, Fuiman discovered upon his return to his Texas laboratory that the data he and his research team collected in Antarctica last year were flawed.

"We worked for months -- 130 hours of video and data to go with it -- and we didn't realize until we were done that our depth meter did not work the entire time we were here," said Fuiman, a scientist working with Randy Davis on the behavioral study of Weddell seals. "That's why it's so critical to be able to look at the data right away."

Now, Fuiman and other Antarctic scientists have the benefit of new technology that allows them to view and analyze their data while they're on the Ice. Using real-time or near-real-time technology, data are transformed from strings of unreadable numbers to graphs and other charts for quick analysis.

Looking at results on the Ice can enable scientists to identify problems with equipment and accuracy before it's too late. It also allows them to work more efficiently while they are here.

For Davis' Weddell seal research, the use of near real-time software has sped up the work exponentially -- from months to just hours. "This is the first time we've been able to do what we set out to do," Davis said. "Within an hour and a half we can actually see the dive the animal makes."

The key to the difference in response time is in the configura-

...story continued on page 5

INSIDE

Antarctic Station Monitors Nuclear Tests/ Page 3

Nothing Casual About Drill/ Page 4

Ancient Volcanic Eruption Discovered/ Page 7

The Dorm Room Where Anything Flies/ Page 14

Crevasse Curtails LC-130 Take-off

by Ginny Figlar

The ski of an Air National Guard LC-130 Hercules aircraft sunk into snow that bridged a hidden crevasse as the plane taxied for take-off on Nov. 16 from a glaciology research site on the West Antarctic Ice Sheet.

None of the seven crew members and four passengers onboard the plane was injured. The \$45 million plane remains at the Upstream D field site, 80 miles southwest of the Siple Dome camp, lodged in a crevasse that is estimated to be about 10 feet wide and "deep and dark," said Col. Rich Saburro, commander of Operation Deep Freeze. The crevasse had been bridged by more than 8 feet of snow, making it nearly impossible to detect.

"There was no way you could see this," said Col. Graham Pritchard, 109th Air Lift Wing Commander, based in Schenectady, N.Y.

Those onboard weren't sure what had happened when they felt the plane tilt from one side to the other and then stop. "At first I didn't realize it at all," said Hermann Engelhardt, a passenger and researcher with the Upstream D science project. "It was a very slow motion. Nothing at all dramatic."

Passengers and crew members evacuated the plane out the cockpit escape hatch and walked out on the wings to stay clear of the unstable area immediately around the crevasse opening.

With all involved safely transported out of the area via a twin-otter aircraft, the Air National Guard and McMurdo Search and Rescue mountaineers are

now focused on evaluating the site and creating a plan to recover the 110,000-pound plane. Experts from Robins Air Force base in Georgia have also been called in because of their experience retrieving planes from around the world in every kind of accident situation.

However, Pritchard said, "This might be the first time they're recovering one from a glacier in Antarctica."

One possible recovery plan involves placing large air bags under the plane to lift it. Special devices would then be harnessed to the body of the plane before it is pulled out by a bulldozer.

To get a vehicle of that size to the site and near the opening of the crevasse will require several LC-130 landings at Upstream D. The area is laden with crevasses, and a team of investigators and mountaineers are searching for a safe landing site.

Due to the varied movement of the ice stream, which can be 10 to 100 times faster than the surrounding ice, enormous crevasse areas called shear margins form in the middle of these big stream zones. Despite the hazards of the area, National Science Foundation representative Simon Stephenson said there was "promising" information from a recent fly-over of the site that there may be a safe spot.

The impact on this season's NSF science projects and South Pole reconstruction also looks promising. The Air National Guard, which owns the incapacitated plane, will send another LC-130 to McMurdo as a replacement. The plane should be in McMurdo by Nov. 27, Pritchard said.

That concern behind him, Stephenson is looking ahead for more answers about the aircraft incident. "The main concern must be how did it happen and how can we make it very unlikely that this happens again?" Stephenson said. "The last time we drove an airplane into a crevasse was in 84. That was a long time ago."

This was the first time an LC-130 had landed at Upstream D, and the Air National Guard has initiated an investigation to find out what it can do to reduce the chances of this kind of accident happening again.

Knowing the difficulties involved, the Air National Guard began preparation for this flight six months ago by reviewing satellite images and aerial photographs. On the day of the flight, visual observations were made by a crew with more than 100 years of combined experience flying in Greenland and Antarctica. Even with many hours spent studying the area, Stephenson said there are no givens in the unpredictable land of the Antarctic.

"There's always a potential for surprises," Stephenson said. "Anytime we go to a new site, we're probably at a little bit higher risk."

But, merely blaming the accident on the risks of doing business in Antarctica is not always the right answer, Stephenson said.

"I do believe in developing good procedures you can make those risks small," he added. "But, realistically, they probably won't vanish." *

Alexander Colhoun contributed to this report.

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Antarctica

Antarctic Station Aids in Global Detection of Nuclear Tests

by Ginny Figlar

Vibrations from underground nuclear tests are more difficult to detect than the explosive mushroom clouds of the past, but a seismometer set deep in the Earth's crust under Antarctica is recording every atomic vibration.

In conjunction with the comprehensive nuclear test ban treaty signed by 139 nations in 1996, seismometers in Antarctica are part of a global network of stations recording seismic activity for the purpose of monitoring nuclear tests as well as other major seismic events.

This year, a \$1 million upgrade to the Bull Pass seismic station near Wright Valley will enable year-round monitoring -- making it one of the primary monitoring stations in the Southern Hemisphere.

"This is the only station that's designed to do real-time monitoring in this part of Antarctica," said Scott Borg, National Science Foundation science representative in Antarctica.

To verify compliance with the test ban treaty, seismic readings from stations around the world continuously pour into a database at the International Data Center in Vienna, Austria. NSF became involved to ensure that the seismic data would also be available for scientific research. To that end, data are also sent to the Incorporated Research Institutions for Seismology. Complete funding for the project, however, came from the Air Force Technical Applications Center, a division of the Department of Defense.

Borg said it was a much-needed investment. The borehole for the Bull Pass station was drilled and a seismometer put in place in the mid-1980s. The station has relied on propane power and regularly ceased operating during the austral winter. This major upgrade provides the station with a reliable power source -- a combination of

wind, solar and diesel -- and a secure shelter.

The seismometer is located 150 meters underground within an 8-inch-diameter borehole. Seismic activity, such as nuclear tests or earthquakes, cause three masses on different axes to move within the sensitive apparatus. The voltage caused by the movement is then measured.

No single seismograph can pinpoint a seismic event. "The idea is if you have good seismic stations around the world you can detect signals and reasonably accurately estimate location and size of the event," Borg said.

The Northern Hemisphere is loaded with seismic stations. But, because the Southern Hemisphere consists mostly of ocean, finding good locations for the stations in the lower half of the globe is a big challenge.

And, Borg said, "Antarctica presents a whole different class of challenges."

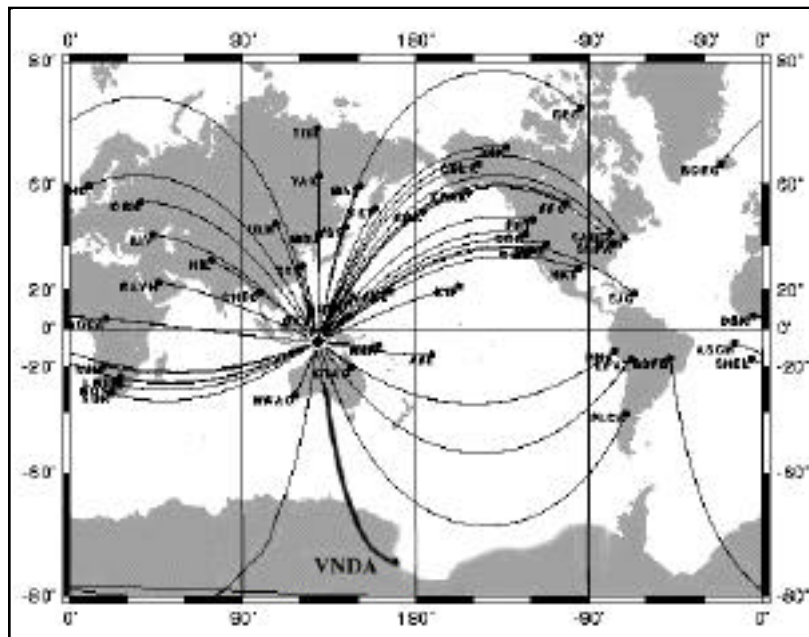
Communication ability is only as good as the weakest link. In the case of the Bull Pass station, signals to McMurdo are obstructed by Mount Newell. A repeater is located on the mountain, but if its power source fails so does any data coming out of the valley. For that reason, the million-dollar upgrade includes the installation of the same new equipment at Mount Newell.

International peace isn't the only benefit of the upgraded equipment. The seismometer is also helpful to scientists who are trying to map out the interior of the Earth. Borg said it's an opportunity scientists haven't been able to take much advantage of before.

"These passive seismic techniques are something that people didn't do a lot of in the past," he said.

Rather than cause man-made explosions to understand rock properties, passive seismology is the study of natural seismic events. With year-round data, Borg is excited about the answers the newly powered seismometer will provide.

"Ten years ago we didn't have this sort of technology in the Antarctic," Borg said. "If it works, it will be tremendous." *



VNDA, the Antarctic station at the bottom of the graph, is a vital part of a global seismic network that detects nuclear tests and earthquakes. Here, an earthquake on Nov. 9 under the Banda Sea, north of Australia, is tracked by stations around the globe. Graphic from SPYDER, a system that provides near-real-time seismic data received from the Incorporated Research Institutions for Seismology.



Nothing Casual About Drill

DidYouKnow_

by Brenda Joyce



Pauli Dietsche, a volunteer for the Mass Casualty Drill on Nov. 14, plays a victim with severe back injuries after hypothetically being thrown from the terra bus near Scott Base. Photo by Ginny Figlar.

by Sarah Ohlson

It was Hollywood's version of a safety test. Dead bodies lay motionless, injured people screamed in pain, and rescuers hurried to anyone they could find.

"Any dead ones you got, tag 'em black and move on," ordered one of the firefighters to a co-worker as he made his way across the snow-covered ravine toward another casualty.

Injuries ranged from a chipped tooth to blood-fuel contamination to dismemberment. Upon arriving at the scene, rescue workers weren't sure how many people were injured and where they all lay, strewn about in the pitiless Antarctic weather. But one thing was certain: time was of the essence in removing each living victim from the further peril of hypothermia.

A drill to prepare McMurdo's medical staff and rescue teams for a mass-casualty incident -- one that involves more casualties than hospital beds -- the scenerio Saturday, Nov. 14, simulated a Terra Bus crash involving 15 passengers on the road between Scott Base and McMurdo Station. A few passengers were thrown over a cliff. Others were burned by a fire caused when the bus severed a gas pipe.

While the situation was hypothetical and a lot was left to imagination, the drill had a real purpose for everyone at McMurdo Station.

"It helps prepare the community in case the real thing happens," said Dave Turley, fire chief at McMurdo.

Upon learning of the pseudo-incident, which occurred about 1 p.m., workers from every department were required to muster at points where their supervisors could count heads and administer instructions.

"With this size incident, you need a lot of people," Turley said. "We must pool from work centers to get the help we need."

A call for aid was made to at least several departments. The galley staff provided warm beverages and food to both workers and victims; housing provided blankets for the injured; and general assistants were recruited to bear stretchers and carry equipment.

While Turley said the drill was a success and he was "very impressed with my people," he said problems in communication caused the most need for improvement. "Communication is always the first thing to break down in these circumstances," Turley said.

"On every drill we learn more things," he continued. "On this drill we learned that some of our resources were depleted quickly, and we're going to look internally on how we can strengthen our resources." *

In 1873, a German whaler, Eduard Dallmann, took command of the steamer "Grönland", setting out for the Antarctic Peninsula. In search of whales, Dallmann led the first German voyage to the Antarctic, during which a wealth of geographic discoveries were made.

Farm tractors were the first wheeled vehicles at South Pole. Sr. Edmund Hilary equipped Massey Ferguson tractors for polar travel and arrived at the Pole in 1957 with only 20 gallons of fuel left. His men were the first since Scott's to reach the South Pole over land.

Females did not arrive at the South Pole until 1973 when Donna Muchmore and E. Nan Scott became the first women to undertake scientific work on the world's most isolated continent. The first woman to spend a winter at South Pole was the station physician Dr. Michele Eilen Raney in 1979.

Shackelton brought an automobile to Antarctica in 1907. It was an English Arrol-Johnson motorcar. Walls of supply cases once formed the garage for the car at Cape Royds. Tins of fuel and lubricants for the vehicle have been emptied by the Heritage Trust to avoid future pollution problems at the site.

The Bureau of Indian Affairs built one of the ships for Admiral Byrd's third expedition to Antarctica. The "North Star", a 1,434-ton wooden ice ship was used to haul supplies each summer to Alaska. Because of the opposite seasons in Antarctica, the Department of the Interior was able to lend the ship to the Antarctic Service without interrupting the Alaskan service.

Most of Byrd's crew of 125 men for his third expedition were from the ranks of the military, scientific institutions and civilian agencies of the government. The Department of the Interior employed a few volunteers at \$10 a month, food and clothing included.



Real-Time

....continued from page 1

tion of data collected during the seal's dive from a state-of-the-art video camera and data logger designed by team member Bill Hagey. Once the seal and the equipment return to camp, the magic begins. Using a sophisticated array of purpose-built software, numbers that mean nothing to an observer transform into easy-to-read spreadsheets and graphs.

Last year, Fuiman didn't have any data to work with while he was on the ice. This year, working with data is all he does, spitting out sophisticated graphs that mimic seal dives. Five such graphs are pinned up on the wall above his computer. So far this season he has made about 120 -- a vast improvement over last year's one 3-D graph.

"And there are going to be plenty more," he said smiling, adding that he is working fast enough to keep up with the seals.

Researchers onboard twin-otter planes over the West Antarctic Ice Sheet have accomplished an even greater feat -- keeping up with the speed of the plane. Taking advantage of a similar type of technology, they are able to view navigational data while still in the air.

The support office for aerogeophysical research, or SOAR, has been supplying data about the topography of the ice sheet by flying precise grid patterns for several years. But this year is the first time it will be able to verify its measurements just about as soon as they are acquired.

"We really are getting a chance to be sure we're getting good data on the plane," said Ken Griffiths, a SOAR research engineer.

In the past, Griffiths and others working for SOAR couldn't see trends in data, just numbers. But thanks to a new addition to the team this year, systems analyst Laura Connor, SOAR researchers are looking at their work in a whole new way.

Connor developed software that plots data on a continuously running graph for in-flight analysis of measurements such as pressure, gravity, vertical acceleration and magnetism. Each flight produces 1 gigabyte of data.

"It really is unique," said Scott Borg, NSF science representative in Antarctica. "This (project) in particular has really pushed technology."

For Connor, the thrill is purely emotional. "It just gives you a warmer fuzzy feeling to see things right away," she said.

Emotions aside, the ability to view data immediately is critical to science in remote corners of Antarctica, Borg said, especially when it comes to real-time communications.

"There are major benefits," Borg said. "If we can have reliable communications from the field, then the data acquired can be sent back to the states,"

Borg said, adding that the move could result in a reduction in infrastructure

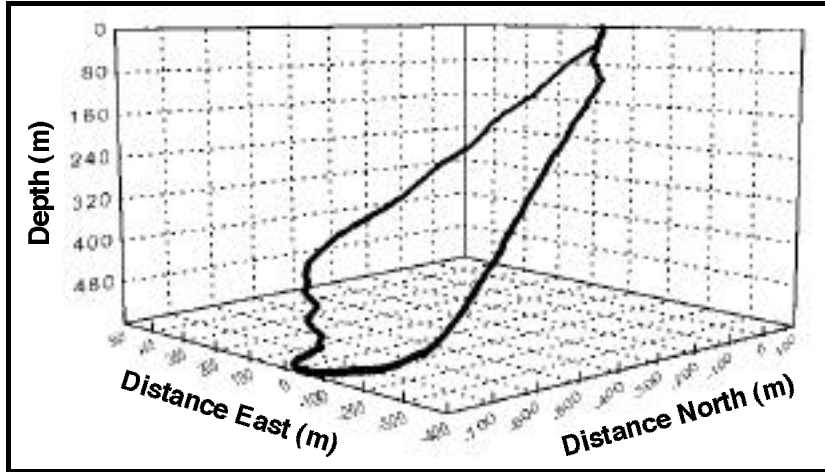
and, with less bodies required to come down to the Ice, the environmental footprint on the continent.

"The whole process of scientific advancement will be accelerated," Borg said.

While he said not all projects would necessarily benefit from real-time technology, he pointed out a few that would. The SOAR project could expand its real-time abilities to include communications directly back to the United States. And astronomical work at the South Pole could be enhanced. "Eventually we might be able to have astronomers operate telescopes remotely like they do in observatories around the world," Borg said.

Connor said it's just a matter of time before real-time technology is the norm in Antarctica rather than the exception.

"It's where computing is going -- toward real-time," she said.*



A look at a Weddell seal dive through the eyes of the computer. Near-real-time technology has enabled this type of three-dimensional view of dives within hours rather than months. Graphic by Lee Fuiman.



Views From Antarctica's Main Street

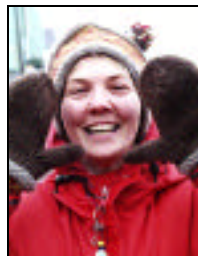
Q: What do you miss most about home?



Ruben Cashler,
Paint Shop
Manager

Home:
Buena Vista,
Colo.

"I'd have to say the tall pines of the Rockies."



Sunny Brock,
Recreation
Coordinator

Home:
Meridian,
Mississippi

"Smells. Smells of the pine trees and the grass."



Betty Wass,
Dining
Assistant

Home:
Northern
Minnesota

"My kids and grandkids."



Dean Jarosh,
AGE
Mechanic

Home:
Takotna,
Alaska

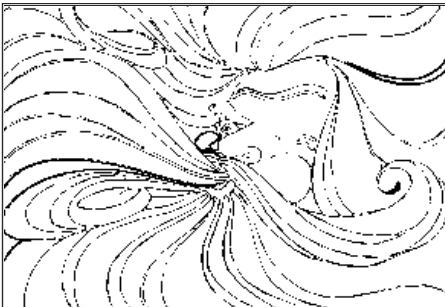
"Plant life. Trees. This is pretty barren here."



Chief for a day. Dressed in typical firefighter uniform, a McMurdo resident extinguishes a pan fire outside the fire station at the Firehouse Expo last Sunday. McMurdo firefighters were on hand to demonstrate climbing techniques, and the use of the water hose and paramedic equipment. The Firehouse chili was also a hot attraction. Photo by Ginny Figlar.



Weather Central



by George Howard

maximum amount of moisture the air could possibly hold. Looking at relative humidity under a few different circumstances can tell us where we might run into the driest air.

Consider a recent snowy day when the temperature was 25 F. By taking a few measurements and doing a little math, you would have calculated a relative humidity of 81 percent ... not dry in the least, in fact fairly moist.

On one of our recent sunny days with a temperature of 15 F, we had relative humidity of 38 percent. That's still not bone dry.

To find the source of driest air, we have to move indoors. All season long, outside air makes its way into our offices and rooms through ventilation and infiltration. We, of course, have to warm that air to keep interior spaces comfortable. Since the warmed air can hold more moisture, and the actual amount of moisture in the air doesn't change, proportion of moisture falls ... and it falls dramatically. On the snowy day mentioned above, when we heat the outside air to 70 F, we reduce its relative humidity from 81 percent to 15 percent. On the sunny day, the drying is even more drastic. By heating the air, we reduce the relative humidity from 38 percent to just 4 percent!

So, even though outdoor conditions can vary from moist to dry, living and working in indoor spaces as dry as any desert make the greatest contribution to our daily desiccation. *

McMurdo's Indoor Deserts

We're constantly reminded of how dry the southern continent is by our personal experiences with dry skin and chapped lips. But much of the driest air we encounter stems from a surprising source.

The most common way to gauge the dryness of air is to measure its relative humidity. Relative humidity is the ratio of the actual amount of moisture in the air to

Ruben and the Bohemian Painters' Top 10 Things to Do On a Date in McMurdo

10. Role play Mr. Rourke and Tattoo and pretend this is your Fantasy Island
9. Go dutch at the galley
8. Put on all your ECW gear, watch TV and get really hot and sweaty
7. Canterbury Draft and cod by the masticator
6. Go to ice caves and break out seal-lined condoms from the clinic
5. Underwear shopping at The Store Boutique
4. Sip champagne from size 13 bunny boots
3. Hot-tubbing in JP8 tanks
2. Go to ceramics lab and reenact love scene from "Ghost"

and the **NUMBER ONE** thing to do on a date in McMurdo is ...

Date? Just go to the chapel and get married.
Reception at the gym. Honeymoon at Hut 10.



Ancient Volcanic Eruption Discovered

by Alexander Colhoun

Evidence of a major volcanic eruption 25 million years ago, possibly equal in power to the Vesuvius blast that leveled Pompeii, has been discovered in core samples retrieved from under the Ross Sea at Cape Roberts.

More than a meter of cream-colored volcanic pumice was found in the core, sandwiched between layers indicative of a quiet sea-floor.

The coarse nature of these sediments and the depth of the most distinctive layer leave researchers describing a massive eruption that may have generated an ash cloud stretching far up into the Earth's stratosphere and later may have changed the temperature of the planet.

"Volcanic eruptions, seen in cores, are particularly important," said Scott Borg, the National Science Foundation science representative in Antarctica. "They are a geologic instant in time - a means to a precise date in geologic time."

And for these researchers, dating the core means everything.

"It provides an opportunity to get an accurate age for the rock," said Chris Fielding, an Australian researcher working on the project. "That's something special. We can hang all our fossil information on those dates."

Using the eruption to date fossils found in accompanying strata is just the

beginning. "We've been drilling through a succession of sediments, said Peter Webb, the United States representative of the internationally organized Cape Roberts project. "Every 50 to 60 feet we go through a cycle of glaciation and degradation."

Until now, Webb and his colleagues had no idea of the time involved in these cycles. "A volcanic eruption will help us date these cycles in time," Webb said.

And with a known date, scientists can extrapolate their data to locations around the world. "The Antarctic glacial cycle contributes to the rise and fall of oceans worldwide," said Webb. "This rise and fall has a major influence on histories of other places around the world. This is quite fascinating at the moment."

The Cape Roberts Project is designed to study both the climactic and geologic history of Antarctica 100 million years ago. Researchers from six nations are working together on the project and the drilling rig has recovered more than 500 meters of core.

If researchers' initial estimates are right, dating the eruption some 25 million years ago, the blast may be the oldest recorded eruption of its size in known Antarctic history.

In those days, the environment around

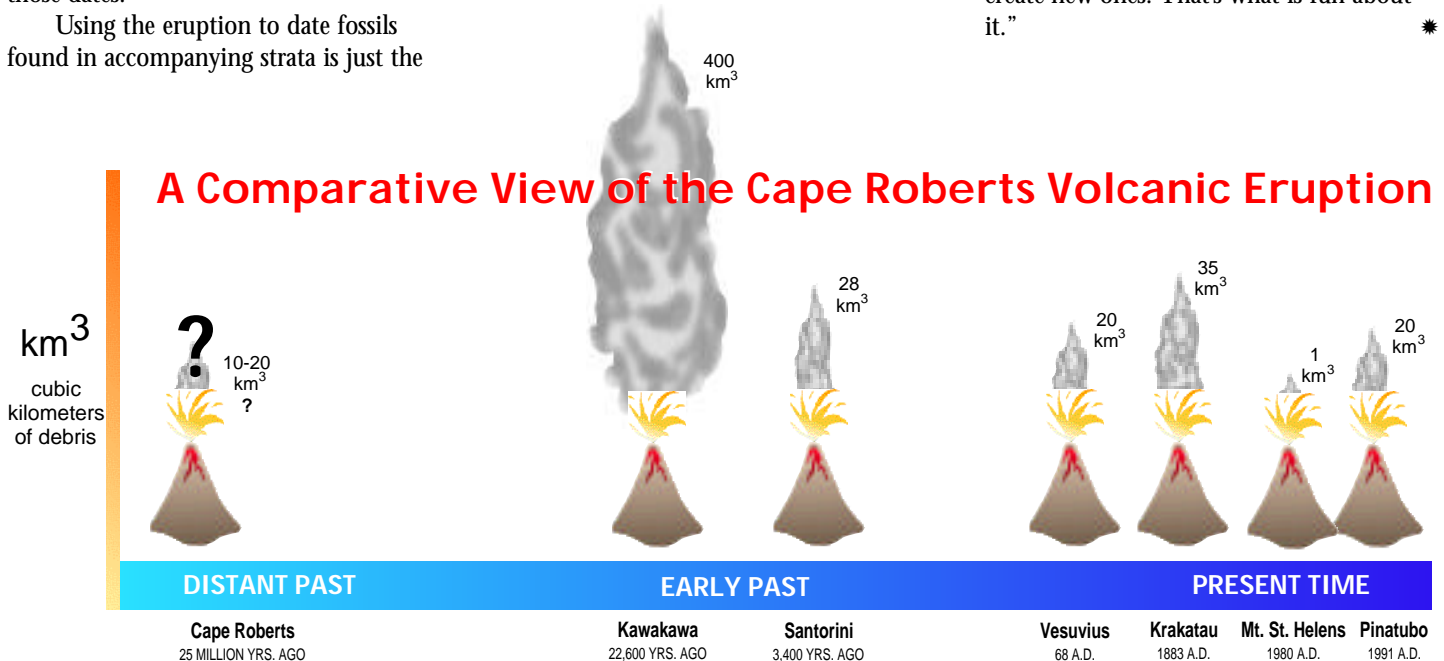
Cape Roberts was probably quite similar to modern day Alaska in wintertime. "It may have been very much like an Alaskan inlet," said Webb. "Perhaps like Cook Inlet with steep mountains, high valley and big deposits of sediments."

Slightly warmer, but still covered in snow, this ancient world might even feel familiar to today's McMurdo residents but for one major difference: volcanoes we see today would be missing. "Erebus was not here. Discovery was not here. The landscape itself would look quite different," Borg said.

While discerning what the view of this volcanic scene may have been is mostly educated guesswork, researchers can be much more accurate dating the volcanic debris. Fortunately, volcanic ash is particularly easy to date using isotopic techniques, and within the next month, researchers will have a much more reliable date.

Until then, scientists find themselves perplexed by the most fundamental question: where was the volcano when it erupted?

"For the moment, the embarrassing thing is, we don't know," said Webb. "But this recharges the batteries of young geologists. This will set off a detective hunt. These projects often solve problems and create new ones. That's what is fun about it."



Graphic by Christine Gamble



UPDATES

McMurdo Station

by Stan Wisneski

V-016, the Bidders walk, arrived at McMurdo on Nov. 20. These folks will be checking out McMurdo, South Pole and Field Camps until Nov. 26. This visit is a milestone in the contract re-bid to support the USAP.

The Mass Casualty drill was held on Nov. 14. Every organization responded as expected and performed their tasks well. There were a few things that need to be addressed, but all in all we are ready to respond if needed.

VXE-6 arrived and is ready to provide support for the season. This is the last season that the Navy will operate LC-130 aircraft in the Antarctic.

Palmer Station

by Ron Nugent

The R/V Laurence M. Gould visited the station last week at the end of LMG 98-09, the UV cruise. The ship dropped off cargo for the station while researchers from the cruise packed up their equipment in preparation for the trip back home.

The sea ice continues to restrict boating operations in the area, but researchers are finding creative methods of collecting data even when they can not work out of Zodiacs. We hope that the ice will clear out soon.

The ever-changing peninsula weather has kept us on our toes. It changes from gale force winds, to rain or snow, sunny skies, then back again in a very short time. The wildlife is beginning to appear in greater numbers every day. As far as human life, there are 30 persons on station at this time -- 19 support staff and 11 science.

South Pole

by David Fischer

South Pole is making considerable progress on both the science season and ASA's SPSE/SM construction effort. While scientists are maintaining and upgrading instruments and telescopes for astrophysics research, new groups are also arriving to work on seismic and climatic studies.

ASA construction continues on pace for the SPSE/SM project. On the Fuel Storage project, ASA has removed five old fuel bladders from the fuels arch and relocated them to the temporary fuel farm on the flight deck, and began piping for the temporary fuel farm and preparation for air testing the bladders. On the Garage/Shop project, ASA construction is on schedule, beginning work which will be completed by the winter crew. The new buildings will be complete early next summer season.

South Pole also hosted distinguished visitor events and the first tourist flight of the sea-

son from Adventure Network International.

R/V Nathaniel B. Palmer

by Tim Bjokne

This week the R/V Nathaniel B. Palmer reached the Bay of Whales in the eastern Ross Sea and set a new record for reaching its southernmost point: 78 Degrees 24 minutes South Latitude. Continuing to work in support of the ROAVERRS Project, the grantees, ASA and Edison Chouest Offshore personnel completed a sampling station at the site before turning back to chase the main Ross Sea Polyna. The N. B. Palmer encountered the polyna along 175 Degrees East Longitude and is now travelling northward along that line. The biologists are getting excited about phaeocystis bloom levels that are higher than anywhere else yet seen on this cruise.

This latest course takes the ship northward for several more sampling stations. A parallel southbound track at about 170 Degrees East Longitude will then follow. The vessel arrives within air-support range of McMurdo Station sometime next week for a planned Helo drop of needed supplies.

R/V Laurence M. Gould

by Tim Bjokne

The cruise is over. Or at least it should be soon if the 90-knot winds would abate. As the R/V Laurence M. Gould sailed out of the protection of the Antarctic Peninsula earlier this week, the Drake Passage, known for its penchant for inclement weather, has kicked up its heels once again. The ship is currently riding the storm out and may be delayed arriving in Punta Arenas, Chile.

After making a final stop at Palmer Station following science operations for a successful LMG 98-9 cruise, the L. M. Gould was slated to arrive in Chile on Nov. 20 and begin preparation for Island Hoppers, its final cruise of 1998. Aply named, the Island Hoppers Cruise will make brief stops at several islands to deploy GPS receivers and seismic gear, drop off a researcher to the Copacabana Field Camp, and along the way deploy ocean-bottom seismometers and pressure gauges.

ASA, Denver

by Jim Chambers

The major emphasis of the Antarctic support staff in Denver has now turned from deploying personnel to Antarctica to expediting materials for shipment to Antarctica via the annual resupply ship. Materials are being staged at Port Hueneme for transport to Antarctica via a chartered container ship, which is scheduled to depart the United States the first week of January. The annual fuel resupply order was placed last week at 3.4 million gallons of AN8, 3 million gallons of JP5 and 80,000 gallons of gasoline. The fuel will be provided by the Defense Fuels Supply

Command from a refinery in Hellas, Greece, and shipped via a Military Sealift Command tanker.

The ASADenver support staff has continued to shrink as many have now deployed to Antarctica. Those remaining in Denver wish the best to our co-workers in Antarctica.

National Science Foundation

by Guy Guthridge

The congressional appropriation of \$3.672 billion to NSF for fiscal year 1999, which started Oct. 1, is 7.1 percent more than in fiscal 1998.

This rise is helping, among other Foundation areas, the U.S. Antarctic Program. Of the NSF total, \$39 million is to continue the South Pole Station Modernization. A House of Representatives committee report states, "The South Pole Station/Antarctica construction project has been increased from the budget request of \$22 million to \$39 million, reflecting the Committee's desire to provide as much 'up-front' funding as possible so as to achieve maximum economies of scale and planning and purchasing flexibility at an early stage of the project. With this appropriation, the Committee will have provided some \$109 million of the \$127.9 million projected cost of the project."

The remaining \$18.9 million is planned for funding in fiscal 2000 and 2001. These numbers are additional to the \$25 million that was provided in fiscal 1997 for the South Pole safety and environmental upgrades, which are providing for current field work on fuel storage, the garage and the power plant.

Christchurch, New Zealand

by Brian Stone

The U.S. Air Force C-141 SAAMs have returned to CONUS, however, they'll be coming back to Christchurch to resume flights to and from McMurdo in the late January timeframe. The Royal New Zealand Air Force and the Italian Air Force are currently conducting wheeled C-130 operations between Christchurch and McMurdo. Wheeled flights will continue for at least another two weeks, possibly longer depending on the condition of the ice runway and the availability of aircraft.

Cargo and passenger movements are currently back on-track with the original schedule. To prevent further backlogs of cargo and personnel, 70,000 pounds of cargo for the ice has been shipped to Hobart, Tasmania to be loaded on the U.S. Coast Guard icebreaker.

As a point of interest, 14 Squadron from the RNZAF will be operating eight Aermacchi MB-339 fighter aircraft from the Christchurch International Airport during the month of November. The aircraft will be conducting low-level navigation exercises in the Canterbury region and will be utilizing part of the USA Papron for aircraft parking. *



Benthic Barometers:

Canaries of the Deep Ocean

Story and photo
by Alexander Colhoun

Divers call it 'the curtain of doom', a cloud of icy yellow-green water that clearly doesn't belong. Lurking amongst this cloud below the pristine sea ice of Winter Quarters Bay at McMurdo Station are old jeeps, parts of airplanes and countless metal drums -- relics of a bygone era.

Across the bay another story unfolds. A giant iceberg crashes into the ocean and drags its way over the ocean floor, riding tides, winds and currents on its way out to sea. Tearing at the sea bed as it moves, this naturally-made scour pad is a powerfully destructive force.

The first disturbance is man-made, the second is natural. Together they are significant mechanisms of biological change that have brought Hunter Lenihan and his team of researchers to Antarctica. "We are trying to separate the ecological impact of human activities from the background of natural variation," said Lenihan. "Surprisingly, communities disturbed by pollution resemble those disturbed by icebergs and anchor ice. However, the biological effect of pollution lasts much longer than ice disturbances because chemical residues break down slowly in cold water."

By looking at areas of natural disturbance and comparing these data to those from areas of anthropogenic chemical disturbances, Lenihan's team hopes to make conclusions about organisms reactions to various outside influences. "Our hypothesis is that impacts of two major classes of pollutants, organic enrichment and toxics, are detectable at very high taxonomic levels," Lenihan said.

To be exact, the team is interested in benthic invertebrate communities, a world of animals living on or within the sea floor that range in size from microscopic nematodes to arthropods and polychaete worms no larger than a grain of rice. These well-known organisms may be the canaries of the undersea world -- benthic barometers of the sea floor's health.

To test their hypothesis, the team has deployed an unlikely array of data-collection devices: a small army of Tupperware con-



Covered from head to flipper in a rubber dry suit, Kathy Conlan prepares to dive under sea ice from the Cinder Cones dive site just outside McMurdo.

tainers. "If it works it works," said Stacy Kim, a researcher with the team, of the inexpensive plastic containers. "Just so long as we get the job done."

Peering down into the aqua-blue silence as she prepares to SCUBA dive, the translucent Tupperware containers are barely visible to Kim. Neatly distributed across the sea floor, remnants it seems of some bizarre underwater picnic, the containers are filled with two types of treated mud.

A year ago these containers, 516 of them, were placed in different sites around McMurdo. Each location represents a different benthic environment. Winter Quarters Bay, one of the most polluted bays in the world, is the focus of the polluted arrays, while others, like the Cinder Cones site, are located in pure waters.

Each set of containers holds a mix of either organic material and mud -- an effort to replicate McMurdo's sewer outfall; or a mix of Copper and mud -- replicating the metals present on the bay's highly contaminated sea floor.

Like an Antarctic lobsterman, Lenihan is pulling his traps and scrutinizing what he finds packed away in the mud after a year under sea ice. Lenihan expects to find various effects on species diversity and abundance in the experimentally treated mud. Some muds provide food and should have attracted many animals; while the toxic muds should have attracted very few animals.

If their hypothesis is correct, this research could have significant ramifications on traditional pollution studies around the world. "Typically pollution testing requires expensive chemical analysis," said Jeb Byers, a researcher with the team. "Now we can reverse the process by looking at the biology itself." *



Dear Aunt Arctica,

For the past two Saturdays, the guy who lives next to me has engaged in late-night drunken arguments with his girlfriend. Things get ugly over there with name calling from both sides, but I don't hear any signs of physical violence. I considered calling the fire department, as the noise is not only keeping me awake, but the arguments are also rather disturbing in their content. I hate to do it, though, because getting authorities involved is a real bummer for everyone, including me. What's your call on such a situation?

-Sleepless in the Ghetto

Dear SITG,

It is upsetting that two people have to settle for such disharmony in a widely notorious and enthusiastic mating scene. That said, I'll get down to the answer you seek.

How you deal with this situation is entirely up to you. From

your description of the scenario, things sound pretty much mutually abusive, which negates any immediate call for intervention. Unless, of course, you do hear signs of physical violence, in which case, measures should be taken to stop it immediately.

I do not think, however, that you should eschew the values you possess in your life off the ice while you're here in Antarctica. This means that you should examine your options of how to deal with this situation based on the same options available to you at home.

For starters, do you feel comfortable approaching your neighbor and alerting him to your irritation, or is that more personal involvement than you're comfortable with? If so, is restful sleep enough of a priority to involve the authorities next time an incident arises?

You certainly are not responsible for the happiness of these people, but your actions should be based upon your own, personal code of ethics, not on a supplemented circumstantial set of ethics.

If you are a person who would be struggling with these choices off the ice anyway, you could always take my approach: pilfer your building's janitor closet for a bucket; fill it with icy cold water from the shower; knock on your neighbor's door and douse both of them as soon as it's opened. Not only will you make your point, but it will provide a sure-fire distraction from whatever the drunken pair is bickering about.

You can send your questions for the preceptress of Antarctic advice to sun_news@asa.org.

Around MacTown

New morning aerobics class! Mondays, Wednesdays and Fridays at 6 a.m. in the gym. Afternoon aerobics continues on Mondays, Wednesdays and Fridays at 6 p.m.

Entries wanted. The 11th Annual Ross Island Art Show will be held from 1:30 to 3:30 p.m., Dec. 20, in the galley. All media is welcome -- sculpture/poetry/photography/hand-crafted items, etc. Register by sending an e-mail to Brooke Grant. Questions? Call Ellen at x2392.

Artists rejoice. An art studio is open for the season. Contact Recreation for more information. And the ceramics lab will remain open for the rest of the season. Hours are: Sundays from 2 to 5 p.m., and Mondays and Thursdays from 7 to 9 p.m. Professional potters will be on hand to teach people how to throw.

Soiree at the Chalet. Performances by women, 7-10 p.m., Saturday, Dec. 5.

A sneak peak at science. Weekly Crary Laboratory tours are being offered every Sunday at 2 p.m. for the rest of the season. Tour content will vary depending on what science we have in house and what fish we have in the aquarium room. Come to the front door of phase 1.

Thanksgiving dinner reservations for 3, 4, 5 or 6 p.m. on Saturday, Nov. 28, can be placed at a table outside the galley during lunch hours. The number in your party is required.

Sing away at Women's acapella at 7 p.m. Fridays in the chapel.

Need Computer help? Call the Information Systems Help Desk at x3526 (this is a new number from last year's.)

Start training for the half and full marathon on Jan. 24.

Calendar

Nov. 23

Slide show on Tibet/Nepal

8:30 p.m., e-side galley

Nov. 25

Disco Bingo at Gallagher's, 8 p.m.

Nov. 27

Swing Night lessons at Gallagher's

7:30-8:30 p.m., open 'til 11 p.m.

Nov. 28

Open Mike night at Gallagher's, 8 p.m.

Nov. 29

Art Show, 4-6 p.m., Library

Turkey Trot (5k), 2 p.m.



BEAKER NEWS • BEAKER VIEWS

The Voice of Antarctic Researchers

by Randall Davis, LeeFuiman and Terrie Williams
BO-017, Weddell Seal Foraging

It is difficult to imagine a more alien environment for a mammal than the bottom of McMurdo Sound. The pressure is 55 times greater than at the surface, it is pitch dark, and the temperature is 29 F.

A mammal in this undersea world must also be able to navigate back to a tiny breathing hole somewhere on the surface, perhaps one or two kilometers away. Weddell seals make many such dives every day in pursuit of prey, and their amazing feats remain a secret locked in the cold depths of the ocean.

To better understand the amazing abilities of these animals is what brings us and other scientists to this natural laboratory adjacent to Ross Island.

McMurdo Sound is one of the best locations in the world to study the diving behavior and physiology of marine mammals. You may be surprised by such a statement, but it's true.

The reasons lie in a unique combination of animals, locale and logistical support. Weddell seals are among a premiere class of deep-diving seals. Their mild temperament makes them easy and safe to work with - a rarity amongst mammals of this size.

The seal's habitat in McMurdo Sound is an ice-covered bay for much of the year and located within a few miles of well-equipped research facilities. This combination of natural environmental and lab support gives researchers the unparalleled opportunity to conduct marine and oceanographic research on solid ground, which is a real benefit when delicate instrumentation is involved.

Weddell seals are perfectly at home diving in this sub-ice environment, and this gives researchers the opportunity to design experiments using an isolated ice hole strategy -- with no other holes for escape nearby, the seal must always return to the same location.

This is our second season investigating the foraging behavior of Weddell seals using this instrument. This equipment gives us the ability to view the under-ice environment and recreate the seal's three-dimensional dive paths using sophisticated computer software.

Because sunlight does not penetrate very deeply into the ice-covered sea, direct observations of marine mammal behavior at depth are difficult and rare. Our video system is opening a new window of discovery by allowing us to view the heretofore secret world of deep-diving mammals. Our goal is to study how Weddell seals search for, detect and capture their prey in a three-dimensional environment while holding their breath for up to an hour.

Each day that we have a seal with the video system attached is filled with surprises. A typical deployment of the equipment lasts six hours, after which we remove the main unit, replace the video tape and batteries, and reattach the instrument to the seal for the next recording session.



Randy Davis and Bill Hagey work quickly and gently to attach a complex array of equipment to the back of a Weddell Seal. This equipment will allow the researchers to track the movements of the seal in three dimensions as he forages for food 550 meters below the sea ice. Photo by Alexander Colhoun.

The tape and data are preliminarily analyzed in camp, giving us our first glimpse of the seal's activities. On Halloween, while many of McMurdo's citizens were partying at the gymnasium, Seal 7, also known as Shane the Mighty, was hard at work.

This 17-year-old male made two 550-meter dives below our camp to the bottom of McMurdo Sound. The dives lasted between 24 and 26 minutes and involved several minutes of cruising along the soft, invertebrate-rich sediment bottom of the sound, where we presume the seal was hunting for bottom fish or octopus.

Deep below the surface, the seal cannot breathe and relies on the oxygen stored in its blood and tissues -- sort of a biological scuba tank. This is comparable to an astronaut floating outside of the spaceship in deep space.

And, like astronauts on a space walk, exploring the world outside their space shuttle, each dive of Weddell seals brings us a new understanding of a world we know very little about. *

Davis' team members are: Terrie Williams, Lee Fuiman, Markus Horning, Shane Kanatous, Suzanne Kohin, Bill Hagey and Randolph Skrovan.



Everett Wilkerson scrambles up an aluminum ladder inside an ice cave. These caves form inside the 'ice tongue', a 40-foot-tall bulkhead of snow and ice that runs off the slopes of Mount Erebus on Ross Island. Photo by Alexander Colhoun.

"And I tell you, if you have the desire for knowledge and the power to give it physical expression, go out and explore...You will sledge nearly alone, but those with whom you sledge will not be shopkeepers: that is worth a good deal. If you march your Winter Journeys you will have your reward, so long as all you want is a penguin's egg."

*Apsley Cherry-Garrard, a member of Scott's expedition, in **The Worst Journey in the World.***

Job Walk 1998: Rebid Contractors Review Antarctic Program

Story by Bart Bridwell,
NSF contracts specialist

This week 25 individuals representing six potential contractor teams will travel to McMurdo Station to review first-hand the U.S. Antarctic Program as they consider submitting proposals for work currently performed by Antarctic Support Associates.

This process, known as a 'job walk', is being conducted by the National Science Foundation. The job walk and the associated competitive process are of concern to many, and one that is commonly misunderstood. Thus, I'd like to provide a few words about the acquisition process in general, and the job walk in particular.

The latest NSF Antarctic contract for USAP logistics support was awarded effective October 1, 1989, and expires March 31, 2000. This contract was awarded to ASA and constitutes the agreement under which ASA and its employees provide support to the USAP. A federal law, the Competition in Contracting Act, and its regulations require NSF to seek competition in fulfilling all of its contract requirements.

Given that the present USAP support contract expires in approximately 16 months, the

Foundation is in the midst of the competition. This award will be the latest in a series the Foundation has competed for USAP support since 1968.

This competitive process began in April 1998 when NSF sought qualification statements from interested parties. Organizations submitting statements for consideration were informed by the Foundation about their viability as a potential competitor. This preliminary evaluation was completed in July.

This visit to McMurdo Station and the surrounding area is the third in a series of five public events NSF will conduct. All events are being organized for the purpose of educating interested parties about the USAP, the science being performed, and the support necessary for the successful conduct of science.

Accordingly, the job walk itinerary is very extensive, including visits to Black Island, the Dry Valleys, Amundsen-Scott South Pole Station and Siple Dome in addition to spaces within the immediate McMurdo Station vicinity. The job walk is scheduled to conclude Nov. 26.

No restrictions were placed on the number of organizations that could participate in this job walk or the other public events. Not until after receipt of proposals on March 1,

1999, will the Foundation begin narrowing the field it will consider for the contract award. Proposals received will be evaluated against criteria established by NSF.

Once the initial evaluation is completed the competitors that NSF selects will be given the opportunity to improve their proposals. The improved proposals will be reevaluated using the same criteria. A selection will be made for the new contract award on or about Oct. 1, 1999. The selected organization will provide support to the USAP beginning on April 1, 2000.

NSF recognizes that these may be uncomfortable times for ASA employees. That said, I would also like to convey NSF's appreciation for your individual dedication, professionalism, and continued efforts in support of the USAP. It is your high caliber work that makes the USAP the highly respected scientific program it is.

The Request for Proposals No. OPP98001 entitled: Science, Operations and Maintenance Support for the United States Antarctic Program can be viewed at:
<http://www.nsf.gov/bfa/cpo/contract/sol.htm>



Perspectives

You Can Take It With You

by Ty Milford

Breathtaking photos of waddling penguins and frigid blue horizons were spread across the dining-room table of a close friend and Antarctic veteran.

As we sipped a steamy cup of java one evening last March, I chuckled with an almost nervous laughter as I was all too easily sold on applying to the program.

I had heard it said that the Antarctic continent was a wasteland; a crystalline desert where nothing of value could be gained. But I did not believe it or at least I wanted to make that determination for myself. As with so many situations in my life, I knew that I could find something of personal value and was eternally looking for new and greater challenges.

Admittedly, my friends and co-workers took a great deal more convincing. "You're going where? What are you, nuts?" was actually one of the more benign reactions that I received when I excitedly announced to my friends and co-workers that I was leaving my steady job for a season on the Ice.

My family, of course, knew better. They had come to expect such stunts from my wandering spirit. Even so, the mention of Antarctica raised more than a few eyebrows.

Everyone seemed to have his or her own rationale for my perceived lunacy, but isolation seemed to be the most prevalent. I had no luck in attempting to explain that I would not be alone and that McMurdo was something akin to a small industrial town. It seemed that the majority of my friends could only visualize me, my small tent and a vast wilderness of ice and snow.

One buddy in particular was convinced that I was going to be the subject of a covert military study on sensory deprivation and that I would surely return to the States in a straight jacket, crazier than I already was. Another could not imagine how I was going to be able to forgo my



Photo by Ginny Figlar

favorite Oregon beer for five months. The rationalizations droned on and on.

I guess when it comes right down to it, however, who's to say for sure what constitutes craziness?

I was taken aback by the overall fear of challenge and change exhibited by so many of these individuals. It seemed that they

I guess when it comes right down to it, however, who's to say for sure what constitutes craziness?

had grown so accustomed to the daily grind that even the thought of venturing beyond 60 degrees south seemed utterly overwhelming. To the contrary I thought, life is far too short not to milk out every last drop.

When I dreamed of Antarctica, I experienced a familiar tingling sensation from the beckoning of adventure. The one where follicles of hair stand to attention and my stomach begins to curl into a ball. As an avid climber and mountaineer I had

become accustomed to this pleasant uneasiness time and again while planning trips in an effort, if only for a short time, to placate my inexorable mind.

I marveled at being one of the exceptionally few individuals who ever gets to cast the print of their foot on this remote, yet dramatic continent. Not content to live vicariously through the adventures of others, I wanted to be shaken by the utter magnitude of Antarctica for myself.

There are those like me, and I would conjure more than a few, who enjoy pushing themselves. We like reaching out, trying to discover the extent of our comfort boundaries, and then going just a bit further. We enjoy the added perspective gleaned from placing ourselves in extreme situations and environments. We

like to keep life interesting by finding that we are capable of more than we had ever imagined.

For many, life on the ice is unlike anything that they have ever experienced. It is cold, windy, dry and, most significantly, a long, long way from home. Living conditions are crowded, work can be intense, and there is never enough free time. Going without many of the luxuries that we are so accustomed to challenges us to adapt. We are left with a greater appreciation of the subtle aspects of our lives; often discovering that many "necessary" items are really just frivolous distractions.

I know that in simply returning to New Zealand the grass will be that much greener for having gone without. The flowers will seem more fragrant and the stars of the Milky Way more brilliant.

So whether you fancy yourself a budding polar explorer, or as in my case, just want to find out how valuable that coveted frosty beverage will become after five months in MacTown, the Antarctic experience will undoubtedly give you something you can take home. *



FLY ON THE WALL

I'd heard about the flies, of their late night intruders and battles on McMurdo's sporting fields. I'd heard they were crude yet inspiring. To get the real story, I had only one choice. For one night I became a fly on the wall. This is my story, a glimpse at the life of McMurdo's Shithouse flies.

A half-finished bottle of Bushmills stands like a hungover sentinel on the spittle-strewn floor. Well-ripened socks dot the room like maligned cabbages, and in the corner, face down, next to a well-thumbed copy of Winesburg, Ohio, lies a special edition of Playboy. It is an assortment of detritus that only five hard-working men are capable of generating.

"This is the Shithouse," says Tiny, a strapping 226-pound behemoth of a man. "And we are the Shithouse flies."

Room 123, a 30-by-16-foot immurement sits inconspicuously off a dingy corridor on the bottom floor of building 155 in McMurdo. The room is dark. Wooden shades cover the only window and, as if for effect, silver duct tape seals the package shut.

This is McMurdo's ghetto, a train hub of activity with flies coming and going 24 hours a day, and it is home to John 'Tiny' Hawkins, Mike 'Jésus' Sobel, AJ 'A-Bomb' Gmyrek, Glenn 'Kinko' Gordon and Reed 'Shithouse' Gard.

Shoe-horned into a six-bed dormitory that would leave better men claustrophobic, the flies scoff at the suggestion their plight is somehow unreasonable. "We're first year pukers," said Kinko, McMurdo's copier technician. "That's it."

A-Bomb, a cook from Colorado, was more prosaic. "It all comes down to karma," he explained. "It's just a matter of luck." While chance may have brought them together, it is a symbiotic blend of acceptance, respect and camaraderie that keeps them going.

"I like it a lot. It's better to have five roommates than two," said A-Bomb. "You get so many different perspectives on life. It's incredible. We have differences, but we put them aside, treat each other as humans and we all still manage to get along."

"We're like a Picasso," said Shithouse, the youngest of the flies at 18. "We're kind of out there, nobody understands it, but it all fits together."

Fit together they do, like a complex chemical equation bound with common interests, the cardinal of which is sports. Together they play in three different sporting leagues: bowling, volleyball and floor hockey. "We have a perfect record in volleyball so far," claimed Kinko, "0 and 7".

If sports are the flies' cocaine, then music is their valium. Two guitars trade hands amongst the flies throughout each day. Their band, with a no-surprise name, was just beginning to gel when their drummer and former roommate, The Dom, had to return home. "The Dom, that stands for dirty old man," said Kinko. "He had a one-track mind."

Dom's loss was not the first adversity the flies have overcome. Last week the situation hit rock bottom. "This guy came in late at night and pissed on the chair, the guitar, my shoes, the floor," said Tiny. "It was very upsetting. We felt violated."

Perturbed though he might have been, A-Bomb refused to acknowledge the incident. "I think it's fitting," he said with a sarcastic chuckle. "We're the Shitflies and it reeks in here."

"Yeah," Kinko said. "The place has a funk to it more often than not."

The scent wasn't strong enough to drive away Jésus, a former Peace Corps volunteer and McMurdo GA. "At first I didn't think I wanted to be here," he said. "Now that I consider these Shithouse flies my friends, I don't want to leave."

Jésus isn't alone. None of the flies wants to leave 123, leading some neighbors to wonder if they aren't just a little bit crazy. "I don't know," said Shithouse. "I guess we're all just two french fries short of a happy meal."

With that, Jésus picks up his guitar and a quiet melody, chords from Jane's Addiction, begins to fill the room. A-Bomb clambers up into his bunk and Tiny reaches to turn off the TV. Another day is winding down

for the flies.

"It's an experience," said Tiny. "It's like you get thrown into a situation, you have no idea how it's gonna' be. It's different than anything you could have prepared for ... but you find out you pretty much have things in common. You just have to pitch in and make the most of it." *

EDITOR'S WARNING: The contents of this story may be offensive to some readers.



The flies, (clockwise from top left) Reed Gard, John Hawkins, AJ Gmyrek, Mike Sobel and Glenn Gordon, swarm Scott's cross atop Observation Hill

Profile

Story and photo by Alexander Colhoun