Happy New Year!
January 3, 1999

The Antarctic Sun

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STATION IN DISGUISE:

An Alaskan flag, raised by one of many Alaskans working at Siple Dome, snaps in the crisp breeze of a snow storm as it pounds the remote field camp.

Down home at Siple Dome

Story and photos by Alexander Colhoun

SIPLE DOME -- The view from Rhonda Ecker's blue Sierra Designs tent is a magical yet achingly simple union of earth and heaven.

The sky is unlimited. The horizon an oval-like expanse that stretches, mightily, around and around. A sustained flatness rolls out to greet the far corners of the sky like a thin pancake running to the edge of a griddle. On clear days, the air above rockets out into the stratosphere in a blue so vast it leaves an aching, hollow feeling in the soul.

This is a polar desert. This is Siple Dome.

Situated near the center of the West Antarctic Ice Sheet on a stable expanse of ice rising 1,100 feet above the sea, Siple Dome camp is in fact an Antarctic station in disguise. At its maximum capacity of more than 70 inhabitants, Siple Dome has double the population of America's Palmer Station on the Antarctic Peninsula. "We're big," said Tim Coffey, an ASAemployee. "It's more of a station than a camp, but a little more Spartan in terms of trappings."

Spartan indeed. The vast expanse of white is broken only by the domes of 11 Jamesway tents, 13 Scott tents and 13 Sierra Design tents. Just 100 yards from camp even these structures merge to become little more than small black dots resting on a thin margin between ice and sky. Walk two miles across the ice and Siple Dome camp, like a dream, ceases to exist at all.

Unwelcomed by mother nature, humans here are merely visitors, and short-timers at that. "When I came to Antarctica, this is what I had in mind," said Ecker, a driller from Alaska. "Out here you don't see any signs of the real world. You are out of contact with everything, no e-mail, no phone, just a little mail every now and then."

Which is just how most residents of this camp like it. For some, life at Siple Dome means getting back to basics, the way life might have been for early explorers. "Out here we do a lot more journal-writing, letter-writing, it's a more subtle lifestyle," said Coffey. Snuggled inside his 'hooch', an 8-foot-by-4-foot space inside a Jamesway, Coffey spends his evenings tuned into a

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INSIDE

Two Guinness Records Set at Pole

'Polie' Glides into World Record Book

Story and photo by Ginny Figlar

AMUNDSEN-SCOTT STATION -- It took more than a wing and a prayer, but John Penney made history on Nov. 22 at the South Pole with the coldest remote-controlled airplane flight ever documented.

With the temperature down to minus 39 C, Penney attached hand warmers to the batteries of his 85-inch-wingspan, six-channel, electric sailplane and sent it airborne for five minutes and 40 seconds. Using a prototype plane by SR Batteries, Penney flew loops and rolls, and glided gracefully into the Guinness Book of World Records. The record will be published in the 2000/2001 edition.

"I had butterflies the size of woolly mammoths," said Penney, who is known as "Big John," around the station. "You're pretty sure that it's going to work, but it's an unknown, a big unknown.

"But I'll tell you what," he continued, "when I launched that first one and she started taking off, it was a huge weight lifted off my shoulders. That was a magnificent flight. That was beautiful."

The 43-year-old's passion for flying model airplanes was sparked 15 years ago, but it wasn't until within the last four years that he's been able to afford his favorite past-time. Back in the '80s, he said, the cheaper planes ran close to $1,000. Now, the prices have come down. As a result, his interest has taken off.

"For me, model airplanes are not a hobby, they are an obsession," Penney said. "It's all-consuming."

Which is why Penney carefully packed his $700 electric sailplane in 10-inch PVC piping and mailed it to the Pole for his first season in Antarctica. He has a couple more planes on the way, and he's building an "air force" of planes during his upcoming winter at the Pole. Rather than building planes from a kit, Penney will "scratch build" the planes from the 22 sets of plans he has designed. While some spend the long, dark months of winter watching movies and reading, Penney said, "I just need a little more stimulation than that."

Penney said he's content with flying planes from the ground rather than the pilot's seat. "At least this way, if I crash I can still go home at night," he said.

He learned that first-hand recently when his sailplane took a turn for the worse. Rounding a loop, the G-force was too much for the long wings. One of the wings snapped, sending his prized plane into a nosedive for the ice. The wreck was a sore subject.

"Us R/C guys don't like to dwell on the negative," he said.

With reinforcements on the way, Penney said he will try to better his record as the temperatures dip down to minus 100 C. In the meantime, he is not too worried about the competition he'll drum up with his world record.

"Most people who do this kind of thing are wearing t-shirts and shorts," he said, not bunny boots. ✹

John Penney holds together the pieces of his plane, which crashed a few weeks after his world-record flight.

Youthful Journey to 90 Degrees South

Story and photo by Alexander Colhoun

AMUNDSEN-SCOTT STATION -- Ola Skinnarmo, a 26-year-old Swedish adventurer became the youngest person ever to reach the South Pole under their own power, skiing from Hercules Inlet on the coast of Antarctica.

Skinnarmo arrived at Amundsen-Scott South Pole Station on Dec. 21 at 6:30 a.m. to little fanfare. Most station residents were asleep or working as Skinnarmo made his way to the geographic South Pole, marking the end of his one-way journey.

"As I look back on these 47 days, it went much faster than I thought," said Skinnarmo as he sipped a glass of red wine, given to him by one of the many new friends at the South Pole Station. "I've really had a good time."

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Guinness

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So good in fact, at least one South Pole resident told Skinnarmo it seemed as if he'd just come from a stroll in the park. In truth, however, Skinnarmo's journey covered 1,150 kilometers from its start on the Weddell Sea to its finish at the Pole.

To reach his objective, Skinnarmo hauled his sled, filled with 120 kilograms of food and gear from 9 a.m. to 7 p.m. every day, taking 10- to 15-minute breaks every 90 minutes. Crossing just six crevasses on the entire route and tent-bound a mere two days due to bad weather, the Swede's journey was nearly flawless in execution.

"The route is hard at the start," he said. " It goes up quite fast in altitude, but I had no real problems."

His success may be attributed to years of preparation, beginning with a ski traverse in Norway and a second trip across Greenland's ice cap. These successes emboldened the Swede to attempt the South Pole route and in November of last year he set to work gathering sponsors that include Iridium communications and Jack Wolfskin.

In total, the adventure cost more than $200,000, which has Skinnarmo looking forward to the lecture circuit and the income he hopes it will generate.

But from his roost in an elevated dorm at the South Pole, his glass of wine nearly empty, these concerns seemed far from his mind. "You think about a lot out there," he said. "How your life has been. You play up small events. It's amazing what you remember." ✹

On Dec. 20, Ola Skinnarmo, 26, a Swedish adventurer, became the youngest person ever to ski from the coast to the South Pole.

Siple Life

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world band radio, listening to the BBC world news while leafing through old copies of the *Cambodia Daily News* -- a newspaper he briefly worked for as a photographer.

For others, like Nola Chandler, the landscape holds a powerful allure. "It's the relationship between sky and land that is interesting," said Chandler. "The clouds change all the time and the light changes subtly. We go out on the ski trail, way on the back side, and when you stand still all you hear is grains of snow rubbing like sand paper. It's beautiful."

But Siple Dome isn't for everyone, Coffey explained. Several weeks earlier a team of scientists found themselves stranded at the camp amidst a week of fog-enshrouded weather that kept flights at bay. "They went looney," said Coffey of the scientists. "They couldn't bear it another minute. They spent the day listening to the (high frequency) radio waiting for a plane."

Twin Otter pilot Henry Perk relaxes inside Cafe de bubba, Siple Dome's galley, after a long day of flying. Siple Dome is primarily resupplied by LC-130 aircraft, however, Twin Otter's are often used to move researchers into deep field locations.

Chandler, the camp nurse agreed. "Self-contained people do better," she said. "You have to make your own fun. Knitting. Oh man, people are obsessed with knitting, and board games and writing."

In truth, however, books, games and wool can only go so far and even die-hard fans of life on the polar plateau sometimes yearn for a break in the monosyllabic vista. "The variety of landscape does not exist," said Jason Anthony, the camp's fuels operator. "I love to walk from A to B, but here there's only A."

And for most residents of Siple Dome, point A begins and ends with Cafe De Bubba, a gourmet kitchen amidst a sea of vanilla white. Six days a week, one gastronomical delight after another appears on the counters: eggs and bacon for breakfast; herb-seasoned bread and leek soup for lunch; and a few hours later, homemade pizza for dinner. Fresh cookies fill a deep, plastic container and scrumptious left-overs are always available. If nothing else, the camp residents eat like kings of the continent.

These gourmand rewards, however, are hard-earned. "It's always busy," said camp manager Sarah Gundlach. "It's non-stop from morning until the end of the night, answering a lot of questions." And working hard. Gundlach and her crew work around the clock to maintaining the ski runway; listening to the HF radio; fueling buildings and airplanes; sorting and packaging cargo; and troubleshooting problems for scientists.

All of which happens two hours by plane from McMurdo, the closest base. "We have finite resources," said Mark Wumkes, another Siple Dome resident. "When something out here breaks in half, you have to pull a rabbit out of the hat. That's the fun part about it."

Whether Wumke's rabbit and other propitious manifestations of life at Siple Dome emanate from the people who live there, or if it is derived from the intense, surreal atmosphere they live in is uncertain. Either way, there is clearly something magical afoot at Siple Dome. ✹

Life Not All Dried Up in Valleys

Story and photos by Ginny Figlar

LAKE HOARE -- Aside from the petrified seals and penguin skeletons that dot the McMurdo Dry Valleys, evidence of life in Antarctica's desert is almost impossible to spot with the naked eye.

But, searching within rocks, at the bottom of glacial-melt stream beds, inside glaciers and 10 meters below the ice cap, scientists are discovering a complex web of life. In its sixth year, the Long-Term Ecological Research program is keeping tabs on this extreme and environmentally sensitive ecosystem.

"It's a pretty dynamic place in some ways even though it doesn't look like it," said Paul Langevin, a researcher who is in his fourth season studying LTER at Lake Hoare.

The projects within the program are as intertwined as the elements of the ecosystem being studied. Glaciers provide the only water to this desolate region, and streams of glacial melt carry the water and the nutrients within it over soil and into lakes. The LTER program studies every aspect of this process.

"We all have our little parts of a puzzle," said Craig Wolf, a research scientist from Montana State University. "And now we're starting to get enough data where we can build this puzzle."

Wolf makes his contribution to this collaborative effort by gathering data in the lakes of the Dry Valleys, primarily lakes Fryxell, Bonney and Hoare of Taylor Valley. He and other researchers working under the direction of principal investigator John Priscu lower sophisticated casting equipment through drilled ice holes to profile the lakes for algae and bacteria production, nutrient chemistry and light penetration.

Although the jagged, grey peaks of the Kukri Hills and the barren soil that descends from them look nearly identical from one lake area to the next, what the team has found is that the make-up of each lake is quite divergent.

"All these lakes are so different from one another and they're in a 20-mile span of one other," Wolf said. "The big question is why they are so different."

Lake Hoare, the simplest of the Taylor Valley lakes, consists of fresh water from top to bottom. Meanwhile, Lake Bonney, about 5 miles away, turns salty at a depth of 12 or 13 meters. At the bottom, Wolf said, it's about three times saltier than sea water. Bonney also contains a large amount of dimethyl sulfide, or DMS, which has been linked to greenhouse gases.

Lake Fryxell, just to the east of Hoare on the other side of the Canada Glacier, starts going anoxic at 9 meters and has a build-up of hydrogen sulfide at the bottom. "And, boy, does it smell," said Laura Spinney, a research student with the project, of Lake Fryxell's bottom water.

Researchers Laura Spinney, left, and Craig Wolf lower a profiling natural flourometer 18 meters to the bottom of Lake Hoare to measure the amount of incoming natural light from the surface as well as flourescence from algae.

Not only are the differences in the lakes surprising to Wolf, also mind-boggling is the fact that life exists at all in any of them.

"I think that's the most amazing thing," Wolf said. "Less than 1 percent of the ambient light makes it under the ice cover. Just being able to exist in an environment like this, that's amazing."

Even more amazing to Wolf is how organisms survive in the winter, when temperatures dip down and the sun dips below the horizon. "We don't know what their mode of survival is," he said.

Research on the stream side of the LTER program has revealed some clues as to how microorganisms might make it through the dry, dark and cold season. An experiment performed last year on a dried-up stream bed revealed that these minute organisms freeze dry and come to life after they are in contact with the elements they need, especially water, which is something no organism can count on in these desert valleys.

"Really small changes in the temperature here can totally impact the streams and how they work," said LTER geochemist Kathy Welch. A few degrees in either direction can halt glacier melt or send it flowing.

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Dry Valleys

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"Species have to be adaptive because water can turn off at any time," Langevin said.

Welch and Carmen Nezat, both studying the geochemistry of water in the Dry Valleys, have been monitoring streams and the nutrients they carry from glaciers to the lakes. Walking up the west side of the Canada Glacier tongue, Welch said, "The more we know about stream chemistry, the more we know about the ecosystem."

The streams are the veins of life, carrying necessary elements to the valleys. Specifically, Nezat and Welch are measuring nitrogen and phospate, and looking at what happens to the chemistry of the water as it comes off glaciers.

Only a small part of glacial loss actually results in melt. The majority, 80 percent, is returned to the atmosphere through evaporation and sublimation.

"That's information you need to interpret how much water you'd expect to get in those streams and lakes," said glaciologist Karen Lewis, who is gathering such information at Canada Glacier.

Radiation and precipitation play big roles in the energy balance of the glacier, she said. A dusting of snow, for example, can make the glacial surface almost completely reflective, denying any radiation from being absorbed and any melting to occur.

"If it snowed tomorrow, the stream would stop running immediately," Lewis said. "Even a couple millimeters of snow on the glacier will turn everything off."

Conversely, silt or sand that blows onto the glacier heats up and sinks, melting holes in the ice. And, that's where life in the Dry Valleys is at its most extreme.

Within these holes, researcher Derek Mueller said he is looking at "who's living there and how well they are doing,"

Often the microscopic life found on the glaciers correlates to organisms found in the nearby lakes -- one more example of how interrelated life and the individual projects within LTER are.

"I really like knowing how it ties together," Lewis said. "There aren't many places a glaciologist can see how their work affects biology." ✹

Carmen Nezat, a geochemist studying the nutrient chemistry of the Anderson Creek, collects samples of the summertime stream of meltwater from the Canada Glacier. The streams are the link between the glaciers and the lakes, transporting nutrients that sustain life in the desolate valleys.

Did You Know...

by Brenda Joyce

Before WWII, Germany was in possession of 11,600 aerial negatives of Antarctica vistas. Their fate is uncertain but it is believed they were destroyed in the ashes of the Third Reich.

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During WWII, most northern nations were too busy with the war to send expeditions to Antarctica. Reconnaissance was largely limited to German raiders and submarine supply ships and the Allied Forces which hunted them. The British secretly established Operation Tabarin at several research bases on and near the Peninsula. After the war, Tabarin was renamed the Falkland Islands Dependencies Survey and its mission was changed to exploration.

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Hot and humid Florida holds the geological materials collected in polar regions. The Antarctic Marine Geology Research Facility and Core Library is located at Florida State University.

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A South Polar skua was found in Greenland six months after being hatched and banded on Shortcut Island near Palmer station on Jan. 20, 1975. It was recovered by an Eskimo at Godthabsfjorden, Greenland on July 31. The South Polar skua is believed to range farther south than any other bird and has been sighted at the geographic South Pole.

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Two alpacas were brought to Antarctica with the Ronne expedition of 1947-48. When purchased in Valpariso, the animals were thought to be llamas and were loaded onto the Beaumont with 1,000 kilograms of hay. On the journey to Stonington Island some of the huskies broke loose on the ship and killed the alpacas.

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At Punta Arenas, several men of the RARE expedition in 1947 bought a corgi, a whippet and "some sort of sheep dog" for pets during their winter in Antarctica.

Water's Mark in McMurdo

The first article in a two-part series on one of McMurdo's most valued resources

Story and photo by Ty Milford

Locked within the Antarctic ice sheet is approximately 70 percent of the Earth's fresh water resources. A sparkling glass of water on the southernmost continent, however, does not come easy.

Several key McMurdo residents are working around the clock 365 days a year to provide the station with an adequate supply of purified drinking water. In a process known as reverse osmosis, operators at the water plant utilize an intricate system of high-pressure pumps and filters to desalt the seawater of McMurdo Sound.

Installed in the plant four years ago, this state-of-the-art system is currently the most efficient and cost-effective method of purifying saltwater available. "Basically," explained water plant operator Joe Sanks, "by passing pressurized water over a semi-permeable membrane water passes through and solids such as sodium and chloride do not."

Water plant operator Al Berggren charges the hydrochloric acid tanks, a corrosive prevention measure that extends the life of the McMurdo water distribution system.

In reality, however, the process is much more complicated. A labyrinth of pipes, valves, filters and tanks serpentine through the warehouse-sized building, and an operator is required to oversee the functions of the plant night and day, winter and summer, to ensure that the highest standards of quality are continually met.

It all begins when 28 F seawater is pumped into the plant from 60 feet below the icy surface of McMurdo Sound. In an ingenious process that saves 200 to 250 gallons of fuel per day, the frigid water is warmed by a heat exchanger branching off the nearby power plant before landing in the seawater holding tank.

Next, it passes through a multimedia filter of Anthracite coal, sand and gravel and is then squeezed through a five-micron filter. It is here that the high-pressure pump forces the water with 800 to 1000 psi through the semi-permeable reverse-osmosis filter cartridge, which separates any remaining solids, including sodium and chloride.

Following the reverse-osmosis process, the water receives corrosive-prevention additives to help extend the life of the station's dendritic distribution system. A very small dose of hydrochloric acid is injected into the desalinated water. This decreases the pH of the water, allowing a calcium carbonate compound, which ultimately makes the water less corrosive, to be absorbed. Soda ash is then added to increase the pH, further aiding in the prevention of lead from leaching into the water in the distribution system. Prior to reaching the distribution pumps, the water is chlorinated and is then stored in three holding tanks boasting a combined capacity of 150,000 gallons.

"This process allows the town to have continual usage of water at its need," said night shift operator Madison Hall

With water being one of the central-most elements needed for life, the water plant, operated under the subcontractor Space Mark Inc., is undoubtedly one of the key aspects of operation at McMurdo Station. Because of this, the operators make it clear that they are always willing to educate residents.

"It's really nice when people are interested," Sanks said. "They are welcome down here anytime."

Views From Antarctica's Main Street

Q: What is your New Year's Resolution for 1999?

Greg Krauss, Recreation Materials person

"No longer going to make any sexual innuendo jokes."

Mimi Whitney, Janitor

"I don't have one. I never stick to them, so I gave that up a long time ago."

Liz Evenson, Recreation Coordinator

"To be a better Xena warrior princess."

A.J. Gmyrek, Cook

"To pursue untrodden paths. To learn to love unconditionally."

The bluegrass tunes of Icestock 1999 sent Sherri Fabre twirling about the crowd.

Icestock Rocks McMurdo

Photos by Ginny Figlar

Overcast skies and a chill in the air did little to dampen the energy and enthusiasm of McMurdo residents jamming to the tunes of Icestock 1999. More than 15 different musical acts took the stage during the day-long event, which was broadcast live on McMurdo TV across Ross Island.

"It was the best Icestock Ican remember," said Ice veteran Barb Propst. "There was a lot of great energy out there."

A chili cook-off, brisk t-shirt sales, basketball, frisbee and a day-long barbeque hosted by the Firehouse highlighted a day of down-home entertainment.

But it was the music that set the crowd dancing. A drum circle in the early afternoon established a Woodstock-esque, carnival atmosphere that continued throughout the day and well into the evening.

"It was a huge success,"said event coordinator Sunny Brock. "So many people worked hard to make this happen. It was just awesome."

Baby New Year made a grand entrance at Icestock 1999, boldy predicting, among other things, that Jay Burnside would finally be chosen as the next ASA station manager.

Ruben and the Bohemian Painters' Top 10 New Year's Resolutions:

10. Begin the seal blubber/penguin egg weight-loss program

9. Use e-mail for work-related business only

8. Return the 500 condoms I have stashed from Medical

7. Call off the 500-man march for fresh veggies, scheduled for next Saturday

6. Investigate station rat problem and get to the bottom of it once and for all

5. Turn in candles, incense, cat, aerosol cans, styrofoam, pet weasel, potted plants and hot plate to authorities

4. Get a DJ radio slot and call it "Radio Free McMurdo"

3. Learn my roommate's name

2. Organize a small army and invade VOSTOK

and the NUMBER ONE New Year's resolution is...

Will work for ride north

Story and photo by
Alexander Colhoun

Siple Dome

Recovering the Ancient Atmosphere: Ice Cores in Time

SIPLE DOME -- Joan Fitzpatrick's icy labyrinth of a laboratory rests 18 feet below the surface of Siple Dome. The temperature is a constant minus 25 C. Dressed in full extreme-cold-weather gear and donning a rabbit fur cap, she looks more like a modern-day Davey Crockett than a scientist searching for clues about the Earth's paleoclimatic history.

Fitzpatrick, a crystallographer and technical director of the National Ice Core Laboratory, is the first in a long line of researchers who will study ice cores being removed from underneath Siple Dome, a 1,004-meter-thick blanket of extremely slow moving ice located near the center of the West Antarctic Ice Sheet.

Because of its stability, scientists believe that layers of snow have accumulated on Siple Dome with little deformation. If they are correct, cores removed from under Siple Dome should yield a long, detailed and mostly uninterupted climate history for this region of Antarctica.

Using thin slices of the core, Fitzpatrick studies the fabric of the freshly drilled ice -- the sizes, shapes and orientation of individual ice crystals. These studies must be made immediately after the cores are removed from the bore hole, before recrystalization or ice-relaxation set in.

"All of our assumptions are based on depth and age," said Fitpatrick, whose job it is to scrutinize the basic precept that layers have been continuously laid down and are "well-behaved. If that assumption is not well-founded and there are discontinuities and deformations, it's good to know sooner than later."

Down to 560 meters below the surface, the theory appears to be holding up.

"Ice cores are pretty unique," said Gregg Lamorey, science coordination office manager for the WAIS cores project. "There are lots of sources of paleoclimate records, like tree rings, coral reefs and marine sediments, but ice cores have unique attributes. One of these is the recovery of a little bit of the ancient atmosphere."

Fitzpatrick echoed Lamorey's sentiments. "It's a true reading of the atmospheric composition," she said. "Ice cores are the only thing that give us that. They can tell us the relationship between greenhouse gases and temperature."

Recovering these trace gases, trapped in billions of minuscule bubbles within the ice core, is one of many experiments that will be carried out on the ice when it travels to its new home in Denver sometime in the next two years. Other research will include the study of volcanic ashes in the core; the study of the temperature record of the ice -- looking at stable isotopes; the study trace chemistry of the core; and the study of dust particles trapped in the core.

Working in a lab submerged within the ice sheet, Joan Fitzpatrick, technical director of the National Ice Core Laboratory, examines a sample of ice core removed from under Siple Dome.

For now, however, the focus is simply recovering the core. One blustery afternoon finds drillers working amidst a storm that would shut down business in even the hardiest towns, including Antarctica's own McMurdo Station.

The snow swirls in billowing gusts around the drilling rig, sending veils of ice crystals into every open crevice and coating the work area in a slippery blanket of white -- yet the work continues. With 500 meters of core yet to be recovered, there is no time to waste.

Stretching 110 feet into the sky, the drilling rig looks fragile in contrast to the vast empty stretches of polar desert around it. A lonely sentinel on an empty plain, the steel tower lances the ice below, removing a core no wider than a fire engine's hose.

Cutting through Siple Dome's icy mantle centimeter by centimeter is a time consuming process, especially as each drilling cycle recovers just one meter of core before being hauled back to the surface.

Time isn't the only enemy. Drilling for fragile chunks of compressed ice in an extremely harsh environment presents unusual challenges. In order to keep the hole from closing in on itself the hole is filled with butyl acetate, a chemical sometimes used as a paint additive that has a density slightly greater than ice.

The pungent aroma of butyl surrounds the drilling rig like some kind of industrial body odor. To protect themselves from prolonged exposure to the chemical, drillers wear full respirators and green protective suits from head to toe.

In time, the smell of butyl fades into the background like the sound of a ticking clock, and workers focus their attention on the drilling process. The bottom of the hole is reached with a blue-and-white-striped electromechanical cable that lowers a complex array of specially designed equipment including a motor, a screen that seperates ice chips created by the drilling process from butyl, a pump to suck up both butyl and chips, a core barrel to hold the new core and a drilling bit with three cutters.

"It's like a very intricate ballet," said Fitzpatrick as she shuttled across the ice-bound cellar she calls home. "When the weather is bad it is unbelievably awful; but (the drillers) are so diligent, they are amazingly resourceful group of people."

Science

Story and photo by
Alexander Colhoun

Life in the Margins: Will Ice Streams Unlock WAIS?

SIPLE DOME -- Five weeks of field work on remote sections of the West Antarctic Ice Sheet had left Charlie Raymond's nose in bad shape.

"I froze it and then I burned it," said Raymond, a professor of geophysics at the University of Washington, with a whimsical smile.

A tortured nose, it seems, was a small price to pay for the research and discovery made by Raymond and his team. A veteran of 10 seasons on the Ice, his latest foray onto the glaciers of West Antarctica focused on ice stream margins.

"What we're after are two things," explained Raymond. "First, what controls the speed of ice streams: how fast they discharge to the ocean? We do this looking at processes near the margin of the glacier. Secondly, what is the ice stream's recent history, meaning the last several thousand years? We do this looking at the inside of areas between the ice streams and the inter- stream ridges."

Ice streams are regions of fast-moving ice that run across the ice sheet like currents within the ocean. Researchers now believe that 80 to 100 percent of this movement can be attributed to basal sliding. Specifically, the base of these ice streams rest on a highly pressurized bed of super-saturated sediments that act as lubricants for the ice flow, greatly enhancing the speed of the ice stream.

Accepting this notion, Raymond, along with Nadine Nereson, a research associate at the University of Washington, focused attention on the margins of these ice streams and the relatively stable regions between them. "If the bottom (of the ice stream) is weak, it if forced to support a lot of weight along the sides," said Raymond. "There is a lot of force there, a lot of energy is dissipated."

Where energy is dissipated amidst frozen structures, melting often occurs, or so Raymond hypothesizes. Using radar to "look" at layers below the surface down to the bottom of these zones, Raymond hunted for evidence of melting that would show up on the radar like dark lines on a topographic map.

Identifying melting points on a radar screen may be the easy part of his work -- collecting the data itself can be a tricky business. As these flows of ice move relentlessly towards the sea, pressure builds at points of friction, namely the margins, resulting in highly crevassed zones.

To collect data, the team was forced to haul their radar system through these suspect regions. Roped to each other as if they were climbing a mountain peak, the team threaded the crevassed area, taking radar images as they traveled. "We had to snake through highly crevassed areas in a straight line without falling in ourselves," said Nereson of the experience. "It was more challenging than scary, you just had to be cautious."

Not all of their work required that the team dodge crevasses, and not all of their work brought foreseen results. While making radar images on ridge B/C, the inter-ice zone between ice streams B and C, Raymond discovered a mountain -- a submerged mountain.

Rising half the thickness of the ice sheet, Raymond describes the peak as "sharp, jagged and steep." Nereson said, "It shows the contrast in the geology in the inter-ice stream region. Now there's something more to think about in the geology of these regions."

Setting this discovery and basic quest for knowledge aside, one question remains: why all the fuss over hypothetical melting under a distant ice sheet thousands of miles away from what most people call civilization?

Raymond had an answer. "There is a huge amount of ice here, and if it dissipated the sea level could rise six to seven meters," he explained. What's more, evidence suggests that WAIS disappeared in the past, hence it can be expected it to disappear again.

Other research has shown that past ice sheets in the Northern Hemisphere, where much of the ice sheet sits below sea level, have disappeared rapidly. Like these departed glaciers, nearly half of WAIS's ice sits on a bed well below sea level. These factors combined constitute, to Raymond's mind, fair warning of future scenarios.

For now, however, Raymond and Nereson are headed back to Washington to take a closer look at the data they have collected, with hopes of finding new clues on the processes that effect ice streams .

As for this season's work, Raymond said it was too early to tell. "Our work doesn't spit out conclusions that quickly," he said. "I think it is very difficult to accelerate ice streams because the walls are so stable, but that is a hunch, not a scientific probability." ✹

Charlie Raymond makes final adjustments to a Nansen sled that carries radar equipment. Raymond used this high-frequency, short-pulse radar to look at the near surface layers of snow near the summit of Siple Dome. The small attached tire sends ground distance measurements to the computer inside the open box.

UPDATES

McMurdo Station
by Hope Stout

McMurdo Station celebrated Christmas in true Antarctic style with a Santa Sleigh Ride to the Dry Valleys, the Christmas party in the Vehicle Maintenance Facility and Christmas dinner in the Galley. As we head into the new year, we are gearing up for the second surge to the season with the arrival of part of a biology class that will study the Ross Sea.

The LDB project had a successful launch of its atmospheric balloon, and the Air National Guard plane, Skier 95, was successfully pulled out of the crevasse. It should be returning to McMurdo shortly depending on weather.

The Coast Guard Cutter, the Polar Sea is working it's way toward McMurdo with about 300-plus miles to go. Its anticipated arrival is just after the first of the new year. This will bring a new look to the station as it opens up the path in the sea ice to the pier in preparation for the resupply vessel which is due at the end of January.

Palmer Station
by Ron Nugent

The level of activity at Palmer Station will sharply increase during the month of January. The Long Term Ecological Research cruise arrives on station Jan. 6. A subcontractor event (T-537) will deploy to the station during the same cruise (LMG99-01) to clean up an old dumpsite used many years ago. Also during January a secondary containment liner will be installed in one of the station's two bulk fuel tanks and preparations for winter construction will begin. This month will also mark the beginning of the tourist season. Between now and the first of March, 12 tour ships and a handful of private sailing yachts will visit Palmer bringing a total of over 1,300 visitors to the station.

Most of the sea ice has gone away now and open water again allows boating operations. The weather has been unseasonably mild with very little precipitation and there is now wildlife in abundance around the station.

South Pole
by David Fischer

South Pole celebrated the holidays with the traditional gift exchange, dinner, and the Race Around the World. The season's first expeditioner, a solo skier supported by Adventure Network, arrived on Dec. 21. Due to Adventure Network flight delays, the skier remained on station at the end of the reporting period.

Science work continued on pace at Pole. The SOAR project completed two weeks of work, flying from South Pole to map a 750-by-100-kilometer grid running from the Transantarctic Mountain Front through South Pole to the Pensacola Basin. PICO, the Polar Ice Coring Office also arrived and began drilling four 170-meter-deep ice cores to support the AMANDAproject.

ASAcontinues work on the SPSE/SM projects. On the fuel arch project, temporary lighting and vent fan work has been completed, and electrical wiring and alarm work continues and is on schedule. On the fuel transfer pump house, interior electrical, communications and single point suppression work continues. Work continues on fuel tank modules A through F. On the garage/shops project, work is now complete on Grids 4 through 7 and work on grids 1 through 3 should be completed on or ahead of schedule.

R/V Nathaniel B. Palmer
by Tim Bjokne

The Christmas holiday week saw the end of one cruise and the beginning of another for the Nathaniel B. Palmer. The final ROAVERRS cruise ended on the evening of Dec. 20, when the vessel arrived in Port Lyttelton, New Zealand. The ROAVERRS sunset cruise was an overall success notwithstanding several equipment glitches that threatened the cruise's objectives. Along the way, a box core was lost when the tow cable parted. Major problems with the primary water sampling system also endangered the cruise. Hard work by the onboard techs, with help from the onboard grantees and support from ASA's Marine Operations Division got the system up and running.

The Palmer has again left Lyttelton behind, this time for several months. She is sailing in support of a Ross Sea Biology and Ice Dynamics multi-year study. Science begins in early January and will continue through early February when the Palmer steams into McMurdo Sound to gear up for a series of back-to-back marine geology and geophysics cruises. After departing McMurdo, the Palmer will complete several Chile-based cruises.

This cruise is also the swan song for Janet Barnes, ASAscience cruise coordinator, who is leaving ASAshortly after the end of NBP 99-1. Among many other things, Janet's colorful, entertaining Sit-Reps sent while she was MPC on the Palmer and the Polar Duke will be missed.

R/V Laurence M. Gould
by Tim Bjokne

The Laurence M. Gould also spent Christmas tied up to a pier, although she was half a world away in Punta Arenas, Chile.

The Gould is now gearing up for LTER, a continuing multi-year carbon flux and microbiology study in the Bellingshausen Sea. Work continues to refine and enhance all the Gould's systems. This port call and the next will be used to install an isolated hydraulics system for the remaining oceanographic winch still on the ship's main system. In addition to the greater reliability the new system provides, the vessel will also be ready for the installation of a larger winch with greater power and cable-handling capability. This new winch will likely be procured and installed in 1999.

The Gould departs Punta Arenas Jan. 2.

ASA, Denver
by Steve Kottmeier

The Denver staff continues to expedite materials for delivery to Port Hueneme, Calif., for shipment on the M/V Greenwave to McMurdo Station. A select number of staff members will travel to Port Hueneme this and next week to receive final shipments of materials and oversee loading of the vessel, scheduled to begin Jan. 4. The M/V Greenwave is scheduled to sail from Port Hueneme on Jan. 9 and arrive McMurdo Station on Feb. 2.

National Science Foundation
by Guy Guthridge

NSF and NASAplan to make some 20 awards totaling $7 million in fiscal 1999 for studies of life in extreme environments. The proposal deadline is March 5, 1999. The goal is to understand microbes and the extreme environments in which they exist on Earth to get insight into how organisms form and adapt, providing a basis for understanding life that may exist beyond our planet. Sea ice, ice sheets and polar deserts are among the highlighted candidates for studies, which can include interdisciplinary research, development of research methods, and establishment of long-term sites. Five NSF units and NASA's Office of Space Science will fund the awards. Contacts in NSF's Office of Polar Programs are Polly Penhale (Antarctic) and Linda Duguay (Arctic). See http://www.nsf.gov/cgi-bin/getpub?nsf994.

Christchurch, New Zealand
by Brian Stone

Operations in New Zealand have quieted down somewhat due to the holiday season. However, with the start of the new year, operations should be picking up rapidly as the second half of the season starts and redeployment approaches. The R/V Nathaniel B. Palmer was at Port Lyttelton for a brief seven days preparing for the NBP99-1 cruise. The NBP sailed on Dec. 26 and her next port of call with be McMurdo Station on or about Feb. 7.

BEAKER NEWS • BEAKER VIEWS

The Voice of Antarctic Researchers

by Ralph Harvey, Principal Investigator, GO-058

Thirty years ago, if you had asked me what I wanted to be when I grew up, I would have told you I wanted to be a spaceman and explore other planets.

Of course, what I envisioned was straight out of comic books; wearing some snappy uniform and wielding a raygun, my time would be spent piloting streamlined spacecraft and rescuing beautiful green-skinned (and usually scantily clad) women from sloppering tentacled giants.

Like many fantasies, it didn't quite turn out that way. By the time I was in college, Apollo was just a memory, Star Trek had been canceled long ago, and I was looking at geology as a much more down-to Earth career. But hindsight shows that the 9-year-old may have had clearer vision of the future than the 20-year-old did; because now I find myself making a living capturing aliens that have landed on the most other-worldly part of our planet.

The aliens I capture are meteorites, bits and pieces from across our solar system delivered to Antarctica by impacts between bodies in space.

But why Antarctica? There are two main reasons, the first of which is straightforward. if you want to find objects that fall from the sky, spread out a big white sheet and see what lands on it. The East Antarctic icesheet is nature's version of this sheet, and if you stay far enough away from the mountains, any rocks you find on top must have fallen from the sky. The second reason is both more subtle and dynamic. Over time, meteorites fall all across the Earth in a random fashion, and the East Antarctic icesheet gets its share. These meteorites, along with the falling snow, become a part of the icesheet as it grows and flows outward toward the edges of the continent. Eventually this ice is carried out into the southern ocean, and the meteorites are lost to the bottom of the sea.

But where the icesheet tries to squeeze through the Transantarctic mountains the ice can be slowed down and even trapped, and in the fierce dry katabatic winds of the plateau, this ice is lost by sublimation (ice changing directly into water vapor). Meteorites, however, can't evaporate. So, when the ice that trapped them is lost, they stay behind as a lag deposit. And if this process goes on long enough, say for tens or even hundreds of thousands of years, meteorites can pile up in a dramatic fashion.

As I write this, this year's ANSMET (Antarctic Search for Meteorites) field team is waiting to fly to Graves Nunatak, a relatively typical meteorite location. We last visited Graves (an ominous name) in the austral summer of 1994, and discovered 33 specimens in about one and a half days of preliminary exploration. This time we'll search more systematically, for about five weeks, and also visit a couple of nearby icefields we didn't have time to explore last time.

Camping right on the edge of the polar plateau, living out of Scott Tents and spending our working hours scouring the ice by snowmobile and on foot, we hope to bring back amazing specimens; pieces of asteroids, the moon, Mars, and maybe something never seen before. Fighting the weather is the hard part of our job; meteorite stranding surfaces are windy and cold almost by definition. But finding the meteorites makes it worth the discomfort. Think of it as Christmas morning, every working day. We know the specimens are out there, but we're not sure what we'll find.

Above, Ralph Harvey finds a meteorite at Graves Nunatak in 1995. At right, the author's early career ideals. Photos courtesy of Ralph Harvey.

And each time someone finds a meteorite they secure a unique reward -- to be the first to glimpse this piece of solar system history in four and a half billion years. This is the kind of present that any 9-year-old can tell you is worth getting up early for, and it is yet another example of the taste of uniqueness that all of us who work in Antarctica share. ✹

Dear Aunt Arctica,

I came down here with the agenda of "getting over" a person I love but doesn't love me back. Problem is, I think about him just as much here as I did at home. With my boring job, thoughts of him swirl around in my mind all day long. With nights filled with cheap booze and pushy men, I just want to run screaming back to him and the familiar misery he gave me. We've communicated through e-mail several times and talked on the phone once or twice. I'm beginning to get worried that I will return back home completely unchanged and vulnerable to his charms. Do you have any suggestions for meeting my goal of losing this loser?

Sincerely,
Hopeless

Dear Hopeless,

Sequestering yourself on the bottom of the Earth to thwart your romantic torment sure sounded like a good enough plan didn't it? And you know, 10 years ago, when there was no such thing as e-mail and the only telephone was at Scott Base, it might've been a reasonable solution. Welcome to the 1990s, baby, when running away from bad love requires a sport-utility vehicle, a four-season tent from North Face and cashed-in stock options.

All, however, is not lost. You are still an autonomous being, and if what you truly want is to 'get over' the cad, it will happen. Eventually.

There are a few things you need to do first, the primary of which is to forgive yourself for staying in love with him. You can do this by accepting the situation realistically. You mistook a dramatic, albeit, temporary life change for a mission statement.

The next thing you can do, after accepting the reality that you are now deeper into the problem from which you originally tried to run, is to find a healthy plan for damage-control. You need to sever your contact with this person if you want of get over him. Think of yourself in terms of the Alcoholics Anonymous credo, and just live day by day.

Don't consider getting him out of your system in a day-- it doesn't sound like you are capable of not thinking about him. Just focus on your emotions, thoughts and actions. Be responsible for them, because now that you are no longer in contact with him, what he does or says no longer has a baring on you.

Finally, take some pro-active measures in taking care of yourself. Don't put yourself in social situations that make you feel icky. Don't talk to men who are being pushy. Don't drink alcohol: it is a depressant and lowers your inhibitions. If these actions are not possible, then simply accept your thoughts of this man as part of your recovery process. If possible, when you leave the ice, take a vacation. It will give you a chance to have some fun and get some perspective before returning home.

Sincerely,
Auntie A

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

Around Mactown

What's in a Name? NSF wants to rename the galley and is looking for help from the community. Submit nominations to Sunny Brock or Liz Evenson in Recreation by Jan. 25. The person who comes up with the winning name will receive dinner for two at My Thai in Christchurch, New Zealand.

Science Lectures:

Saturday, Jan. 2
Steven Peterzen, Long Duration Balloon Project: Science of the Stratosphere

Wednesday, Jan. 6
Dave Besson, Ultra High Neutrion Detection at South Pole

Sunday, Jan. 10
Donal Manahan, History of Polar Exploration, North and South

Calendar

Jan. 4
Slide Show: Across Asia, by Sandy Colhoun
8:30 p.m., e-side Galley

Jan. 5
Slide Show: Parasailing
8 p.m., Gallagher's

Jan. 6
Bingo at Gallagher's, 8 p.m.

Jan. 7
Ballroom Dancing, 7:30 p.m., Chalet

Jan. 8
Swing Dancing, 8 p.m., Gallagher's

Jan. 9
Disco Dance Party, 9 p.m., Gallagher's

Jan. 10
Scott's Hut Race, 5 miles, 1 p.m.

Jan. 11
Slide Show: Nepal, by Doug Fink
8:30 p.m., e-side Galley

Jan. 14
Slide Show: Women's Antarctic Expedition
8:30 p.m., e-side Galley

Jan. 15
Gong Show, 8 p.m., Gallagher's

Jan. 17
McMurdo Golf Tournament

Perspectives

Remote is a Relative Term

by Ginny Figlar

As usual, the phone call came a few days too late.

This was several years ago, when doctors said my mom had developed a form of epilepsy after my younger brother found her in the midst of a seizure on the kitchen floor. They were still running more tests, my dad said to me days after she was safely back at home. While my immediate and utmost concern was my mother's health, in the back of my mind I wondered why I wasn't called right away.

"We just didn't want to concern you," my parents said in unison in an all-too-familiar, "we know best" tone.

Photo by Ginny Figlar

I was disappointed, but it was the response I expected. I've been out of the communication loop with my family ever since I went away to college more than 10 years ago and moved out of the house. As much as it hurt to feel constantly shut out, I always reasoned it was just a consequence of being first-born and independent-minded.

When I moved to Colorado two and a half years ago, I became a "pioneer" in the family -- the only member to move more than a few hours away from the coast of the East. And, now I'm as far away as I could possibly get. Surely, by the time I get back, my parents will have lost my phone number altogether.

> I've always thought that my progressive beliefs and free-spirit mentality would get in the way of being an integral part of my family. I hadn't realized, until now, that it was a road in.

But, coming to the bottom of the Earth has mysteriously skyrocketed me to the top of the phone list. Or in this case, e-mail list. My parents, who took a computer class to learn how to send e-mail to me, now tell me about everything from the trees they had to cut down in the backyard to their golf scores. And, stories of my grade-school-aged cousins' scarecrow-making parties and hockey games fill my in-box, allowing me to share in their quick-sprouting growth, which I had only been able to recognize once a year at Christmas.

Key to this influx of information is that my journey to the Ice gave me something to share with my family in the first place. Journal-type e-mails and a Web page of photos provided a foothold for building closer relationships. No longer was I the elusive daughter, cousin and niece. I am the Antarctic adventurer who underwent the trials and tribulations of trying to get out of Christchurch and ran to Scott Base against wind gusts approaching 30 to 40 mph -- and lived to e-mail about it.

The stories have made me the subject of a first-grade show-and-tell. Even my mom, who couldn't sleep the night I told her I was coming to the Ice, pulls up my Web page in true proud-parent fashion for anyone who comes to visit the house.

Following a family-filled Christmas celebration, my uncle Pete wrote, "We all missed you and spoke of you, everyone sharing their thoughts on your adventures. I could see how proud your folks are of you -- that you have the strength to be yourself."

Funny, I've always thought that my progressive beliefs and free-spirit mentality would get in the way of being an integral part of my more conservative-minded family. I hadn't realized, until now, that it was a road in.

More important, I've been reminded that the direction of travel on that road isn't one-way. The basic rule of any relationship, of course, is that you get back what you put in.

My return to my home in Denver will mark the end of my messages about how my nose hairs froze and my head felt like it was going to explode at the South Pole, and what it feels like to walk out of a bar at midnight to glaring sunlight. Yes, the Antarctic adventure will end, but the road to building stronger ties with my family in the Northeast will not.

One thing I know for sure is that my phone will now be ringing off the hook. ✹

Ordinary Woman, Extraordinary Accomplishments

Profile

by Terri Watson

Sitting across from Anne Dal Vera in McMurdo's dining hall, you'd never guess she was a polar explorer. Diminutive in appearance, the image of her pulling a 185-pound sled 678 miles through sastrugi that at times dwarfed her 5-foot-2-inch frame does not readily come to mind.

But, never judge a book by its cover. Accompanied by three other women, Dal Vera arrived at the South Pole Jan. 14, 1993, having covered a distance equal to a trek from Denver to the Mexican border.

As an encore, she returned to the Ice as a general assistant in McMurdo. "I fell passionately in love with Antarctica, and I can't stay away from the continent," she said.

A member of the 1992-93 Antarctic Women's Expedition comprised of Ann Bancroft, Sue Giller and Sunniva Sorby, Dal Vera departed Hercules Inlet on the Ronne Ice Shelf on Nov. 9, 1992.

The reality of her dream, conceived four years earlier, swiftly revealed itself as the expedition encountered strong winds, cold, and the physical and emotional challenges of traversing the polar plateau in a small group.

"We were all so different, and we used our different qualities to work together as a team, drawing on each woman's strengths," she said. Times of struggle, celebration, solitude and team unity punctuate her accounts of the trek.

Anne Dal Vera makes her way towards the South Pole on the 1992-93 Antarctic Women's Expedition. Photo courtesy of Anne Dal Vera.

Arriving at Amundsen-Scott South Pole Station two days after it became visible on the horizon, the team was first greeted by three construction workers, then by waves of scientists and support workers. "The warm welcome was completely unexpected. I felt very energized by the excitement these people had for our achievement."

Proud to have reached the Pole, their goal had been to continue their traverse of the continent to McMurdo. A delayed start and the realization that not enough time remained to finish the traverse caused the team to end their effort at the South Pole.

"Deciding to end the trek was one of the most difficult decisions that we made," Dal Vera said. "Although it was hard to give up the dream we had for four and half years, we knew it was the right decision"

While their achievement, to be the first women and among the first 30 humans in history to reach the Pole over land with ski and sled, was stunning, the preparation behind the trek was nearly as impressive.

The team raised over half of the expedition's $900,000 budget through small donations and T-shirt sales. To ensure that they and their equipment were ready for Antarctic rigors, the women trained by skiing in Yellowstone National Park, Northern Canada, and across Greenland.

After the expedition, Dal Vera realized she had contracted Antarctic fever -- a passion for Antarctica that keeps many workers returning to the Ice like moths to a flame.

Dal Vera applied to ASA in 1994, and Brooke Grant, in charge of hiring general assistants that year, recalls the confusion caused by the applicant who wanted to return to the Ice having just skied across it. Dal Vera wasn't deterred by Grant's dissuasion, "If this is how I get in the door and back to Antarctica," said Dal Vera, "then this is how I do it."

Returning again in 1995, she headed to the Pole, this time by the more conventional route, in a ski-equipped Hercules aircraft. "It was a lot more comfortable getting there in a Herc," she observed. This season she is back again, this time as a cargo handler in McMurdo.

"I really like working in cargo," said Dal Vera, who has worked as a wilderness ranger for the past decade. "I like moving things around with big equipment and the mental challenge of figuring out the problems we encounter."

In McMurdo, the quiet woman is often seen skiing the Castle Rock loop or enjoying time with friends. "She is so small and unassuming, you'd never imagine that she had done such a thing," remarked one friend around the lunch table.

At this, Dal Vera simply grins impishly, knowing that this is the most common reaction to the AWE team as a whole --- that four very ordinary women achieved a very extraordinary thing. This part of AWE remains their lasting hallmark, the awakening of the realization within each one of us is the power to achieve amazing things. ✹