

# Antarctic Peninsula Journal

by Sheldon Bart

The landmarks had slipped away. We were surrounded by sheer whiteness (see photo at right). Endless white joined seamlessly to an overcast sky. A whiteness without direction. A whiteness that could swallow New York.

Dr. Bulat Mavlyudov drew a shovel from his backpack and quickly excavated a rectangular hole in the snow about a yard deep. A tall, pleasant man, he wore an orange shell, the better to be seen against a white background. Our Antarctic summer school watched as Bulat pointed out the layers of snow that had been clearly exposed. He filled a cylinder with snow, weighed it with a portable scale and jotted down the reading, meanwhile answering questions from the American and Russian professors and graduate students who had gathered around him.

Two of the scientists in the party, Dr. Ning Zeng, an associate professor at the University of Maryland, and Dr. Jay Gregg, who recently completed his PhD at that facility, were sponsored by my organization, Wilderness Research Foundation. Our group of 13 had assembled in Punta Arenas, Chile, and flew to King George Island in a C-130 Hercules transport operated by the Uruguayan Air Force. King George is the largest of the South Shetland Islands, situated just off the Antarctic Peninsula. Approximately 90 percent of King George Island is glaciated. We landed on Fildes Peninsula, a stubby limb of exposed, broken tableland on the southwest tip of the island, and were billeted at Russia's Bellingshausen science station.

The southern foot of the ice dome that covers the island is some two miles north of Bellingshausen, which is located on the



PHOTO BY SHELDON BART

east coast of Fildes Peninsula. The perimeter of the engulfing whiteness we had ascended, trekking through snow up to our shins, has receded inland approximately 20 yards in the past 20 years, Bulat told us. A glaciologist, he traverses the ice cap alone a couple of times each week to compile data. The summer school, a joint venture of the University of Alaska and Moscow's Obukhov Institute of Atmospheric Physics, was organized to provide young scientists with an on-site orientation from Bulat and other senior investigators working on King George Island. The receding icecap, however, had lured Ning, Jay and Wilderness Research Foundation to the Antarctic Peninsula. For my scientists, it provided an opportunity to seek physical evidence for a new theory of the mechanisms of climate change. For Wilderness Research Foundation, it meant a chance to demonstrate a new model of scientific exploration beyond the limited regime of government funding.



Bellingshausen Station occupies a coastal stretch of muddy, snowy ground riddled with tractor tracks and surrounded on three sides by undulating elevations, dark and dappled with snow. The fourth side is a pebbly beach, where a small contingent of Gentoo penguins can usually be found attending to penguin business. The station is a large compound consisting of numerous

small buildings. There is an administration building; a combination mess hall and recreation center with pool and Ping-Pong tables, a library and film library; a generator room; a chapel on a hill; and trailer-style dormitory buildings. Our accommodations were on a steep hill near the chapel and a good climb up from the admin building. The buildings were all painted orange — a color Admiral Byrd selected after serious investigation of the most visible hue against a white background. Our visit took place in January. The temperature averaged in the 30s, and a misty overcast lay above the outlying slopes.

LI-COR Biological Sciences of Lincoln, NE, had loaned Ning and Jay an LI-8100 Automated Soil CO<sub>2</sub> Flux System — a sensitive carbon-detecting instrument. I watched them squatting on the living room floor of our hilltop hut, unpacking the device. Ning, a soft-spoken professor of atmospheric science, has arrived without fanfare at an intriguing insight about carbon dioxide build-up and glacial cycles. When glaciers advance, they advance over trees, soil and vegetation, all of which are compounded of carbon. The glaciers compress and bury the organic carbon as they advance.

“No one asks what happens to the buried carbon,” Ning said. He suspects that when the glaciers recede and the buried



PHOTO BY SHELDON BART

LI-COR Automated Soil CO<sub>2</sub> Flux System in the field.



Photo by Sheldon Bart

*Bellingshausen Station (Russia) and Frei Station (Chile) in distance*

carbon is exposed it dissipates back into the atmosphere, accounting for a significant part of the increase in carbon dioxide that currently obtains. A well set-up fellow with short, bristly hair, he suddenly became expressive. “I submitted a paper to the National Science Foundation on my theory. Basically, I was ignored. But if I can find physical evidence....”

Less than 20 percent of the scientists who apply to NSF are actually funded. That leaves a lot of science derailed. Our expedition to King George Island as members of the international summer school set the stage for Wilderness Research Foundation’s pilot project.



From a distance, the ice cap looks like an immense white cloud sitting on the dark ground. The closer you approach, the more it resembles an ordinary snow-covered hill. But when you reach the bottom of that “hill” and brush some of the snow away with the toe of your boot, you see ice underneath. A jagged moraine runs across the slope at mezzanine level like a brown belt running east to west. A moraine is a ridge of sediment collected by a glacier in its travels. Ning and Jay had noted various loamy sites below the moraine from which the glacier had steadily retreated. It was feasible at these sites to prospect for ancient buried carbon. Accordingly, we headed along the western sweep of the moraine, accompanied by two members of the summer school group who were also conducting research in the field: Dr. Les Werner of the University of Wisconsin, and his

research assistant, Christopher Johnson, a graduate student at Michigan Technological University. Les, a soil specialist, studies the evolution of microorganisms in glacial environments.

There were no obvious signs of carbon at the western moraine site. The LI-COR machine, carried into the field, disassembled, in our backpacks and assembled at the moraine, detected only a negligible carbon signature in the muddy ground.

*From a distance, the ice cap looks like an immense white cloud sitting on the dark ground.*

Color matters in the Antarctic. Streams of melt water and rain water spill over on some parts of the trail, and you can tramp through them, the water coming up to your ankles. You notice pools of blue water in various spots, and you learn not to walk on them. Blue is the color of young ice that is not yet firm. It will give way under you, and you’ll sink. Within a day or so, the blue turns to gray. The ice has now firmed up enough so that you can walk on it without sinking.

Observing these signs, we hiked a couple of days later to a site along the eastern moraine. Again, the LI-COR CO<sub>2</sub> Flux System was separated into its components and carried in our backpacks. The trail threaded through a narrow, rocky aisle between a wall of snow at the base of the ice dome and the lapping waves of Maxwell

Bay at the eastern shore of Fildes Peninsula. We eventually reached a cove where, below the eastern moraine, Ning observed an area of reddish-brown, crumb-like tufts—dead moss, an obvious sign of carbon. The LI-COR machine was assembled and engaged, and at length a strong signal registered of carbon in the soil.

With the fold-out spoon of a Swiss knife, Ning scooped hunks of gook out of the mud and filled numerous plastic bags with the samples. He carefully labeled each bag. Every pocket of his windbreaker bulged with these prizes when we loaded our backpacks and started out under the weight of them for Bellingshausen.

Plastic bags filled with gunk. We had gotten what we came for. The samples will be subjected to laboratory analysis and hopefully tell us something about the buried carbon theory.



Meanwhile, a howling storm struck King George Island. A window of opportunity opened a day later as the storm pushed the overcast out to sea and sunny skies prevailed. Multiple flights were therefore scheduled, and the group departed on the last flight of the day of a C-130 Hercules transport operated by the Chilean Air Force.

While the summer school was in session at Bellingshausen Station, lectures were held each night in a spacious conference room at the rear of the administration building. Seven professors and four graduate students made interesting presentations on such subjects as permafrost, glaciology and global climate models.



Before we left, I asked Bulat, the glacier man, what, beyond the science, he feels and reflects on when he is alone up on the ice cap. He has limited English. But this is what he told me. “White,” he said, looking to one side. “White,” he repeated, looking to the other side. “White,” he said, turning half around. “Boundless. Especially when fog.” Then he paused a moment and added, “Complete freedom.”

I knew what he meant. Roald Amundsen would have said the same thing. □

Sheldon Bart is president of Wilderness Research Foundation (WRF). For information on WRF please see [www.wildernessresearch.org](http://www.wildernessresearch.org).