

Where rivers run uphill: An expedition to the West Antarctic Ice Sheet

“It is the banana belt of Antarctica,” says Slawek Tulaczyk. He’s talking about the place where we’ll camp in tents on one of Antarctica’s most desolate ice sheets. He makes light of the fact that we’ll spend our days wearing down parkas—and our nights embracing our laptop computers as if they were lovers, in hopes that the computers stay warm enough to boot in the morning. It’s no surprise that Tulaczyk should jest.

For two months each year, he braves frigid weather to study the West Antarctic Ice Sheet (also called the WAIS). He grew up in a small coal mining town in Communist-ruled Poland, and briefly worked in the mines himself. He has since risen to become one of the world’s better-known glaciologists, now based at the University of California in Santa Cruz. Tulaczyk explores the WAIS not out of curiosity—but rather urgency.

At 700,000 cubic miles, it weighs in as the second-largest hunk of ice on Earth. This sleeping giant has lain dormant for a million years, but climatologists now fear that global warming will awaken it. The WAIS is already losing 40 cubic miles of ice per year, and in theory it could sweat off enough melt water to flood Miami, London, and dozens of other low-lying cities around the world.

The weight of that question—what happens to the WAIS and to coastlines around the globe—rests on the secret world hiding beneath the ice. Countless rivers and lakes lie buried beneath the WAIS—even 9,000-foot mountain ranges that human eyes have never seen. Bizarre laws of nature rule this hidden landscape. Rivers actually run uphill, and lakes cling to the slanted sides of valleys. Thousands of pounds of pressure per square inch forces water to run uphill (the pressure comes from the mile-thick ice above).

Tulaczyk is obsessed with that world below the ice. He believes that water lubricates the WAIS’s movement over Antarctica’s rocky hide. Subtle changes in the water’s flow could tip the WAIS into rapid decline, sending large swaths of ice sliding into the ocean. Some people fear it will begin sometime this century.

That is why Tulaczyk will embark, this November, on his fifth expedition to Antarctica—to assess the stability of the WAIS, and its risk of collapse. I will accompany Tulaczyk and two other researchers on the expedition. I’ll enjoy a level of unabridged access that few in the media ever see (most journalists who visit Antarctica are tied to established research stations).

We’ll spend 6 weeks in Antarctica. At McMurdo Station, I’ll undergo 10 days of survival and crevasse rescue training. A ski-mounted Twin Otter airplane will then drop the four of us at a remote location on the WAIS. For the next 3 weeks we’re on our own, camping in tents amidst a million square miles of empty ice.

Our campsite lies on the Whillans Ice Stream, a 2,500-foot-thick conveyor belt of ice that oozes toward the ocean. Tulaczyk plans to place sensors to monitor the ice’s movement and the flow of water beneath it, for the next 2 years. It’s an important step in his quest to understand the future of the WAIS. It’s never been done before, and although much has changed since Robert F. Scott’s expedition foundered and froze to death alone on the ice 95 years ago, our task won’t be easy—or risk-free.

We’ll travel up to 100 miles per day on snowmobiles as we place sensors and map the landscape below the ice. Radar mounted on our snowmobiles will help us to detect crevasses in our path—some of them 300 feet deep, 30 feet across, and concealed beneath brittle snow bridges. We’ll navigate the featureless white using GPS.

Slawek hopes to visit the ice atop a large lake that was discovered just a few months ago (satellites caught this lake belching forth a cubic mile of water under the ice). Satellite photos show this lake surrounded by a dense ring of crevasses, making our job all the nastier. As I write, Tulaczyk is reviewing new satellite photos every few weeks in hopes of finding a route onto the lake, but trial and error on the ice will ultimately determine our success.

I will distill the best (and worst) moments of the expedition into a feature for *National Geographic Adventure*. Regardless of the expedition’s outcome, it will be a story worth reading. I will narrate the team’s activities, and Tulaczyk’s do-or-die quest to predict the fate of the WAIS. I will describe the rigors of working in a place nearly as isolated as the Moon. During my time in McMurdo Station I’ll also mix with other research teams and blue collar rank-and-file at McMurdo’s two bars—*The Southern Exposure* and *Gallagher’s*. I will sketch the scene at McMurdo—consummate frontier boom-town at the bottom of the world.