

Soil Down South?

16 September 2020

Breaking the Ice: Women, Science, and Antarctica, Series

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Once upon a time there was a little girl who spent all her days at kindergarten down at the back of the garden playing in the mud. Fast forward 20 years and you will find her up the front of the class, eagerly discovering a new way of looking at the world, called soil science. Science that takes her outside, that empowers her to solve environmental problems with chemistry. That is my story, and soil science is inextricably linked with my experience of Antarctica. My disciplinary background shaped what I saw, smelt, heard, tasted, and felt during our incredible three-week exploration of ourselves and the Antarctic Peninsula. These experiences have consequently impacted on how I feel about Antarctica and my journey since December 2016. Let me share my soil story with you.

See

I see white. This quote of mine features in both of our publications ensuing from this work. As a soil scientist, I focus on color; I succinctly state what I see (colloquially, Australians call this “stating the bleeding obvious”), and I observe both at the landscape scale and the plot scale. I saw very little of anything even vaguely resembling soil in this snow, ice, and rock covered continent. Black and white—they hurt my eyes after a few days. I found myself drawn to the colors of the man-made objects, features that I normally avoid.

The absence of plants on that vast, white continent kindled within me an almost spiritual reverence for the plants that cover the rest of this planet, the plants on which our lives and, ultimately, all lives, depend.

By the final week of the trip, I was longing, yearning for green. On two occasions when we did encounter conditions conducive to soil formation, I became terribly excited. Sharing my excitement over some decomposing moss at Carlini Station, the beginnings of peat soil formation (in my mind, if not in reality!) with Ili Bare, the expedition film director, led to my eventual featuring as one of seven scientists in the documentary **The Leadership**.

I saw soil, and this year thousands of people around the world will see me juggling family and remote research! This opportunity to make visible the joys and challenges of combining science with parenting via **The Leadership** documentary is a part of my contribution to a collective effort to create change in academia in order to truly nurture equity and diversity, “You can’t be what you can’t see!” The senior women scientists whom I saw in Antarctica have helped me to reimagine what a professor, a dean, or an “expert” can look like, and she looks a little bit like me.

Smell

I smell lipbalm. And I know why. My soil science research spans the soil-plant-atmosphere continuum; micrometeorology and atmospheric sciences could be considered my second discipline. I immediately associate the lack of smell that we all comment upon in Antarctica with the cold air temperature and the lack of organic material. Away from the immediate vicinity of the dense bird colonies, there is simply very little organic matter to volatilize, move through the air in vapor phase, and reach our noses. Volatilization is also temperature dependant, so in the cold conditions of summer on the Antarctic Peninsula, even the penguin poo doesn’t smell as bad as you might expect. Little volatilization occurs when it is cold. My lips, in contrast, are warm, warm enough to volatilize some of my organic lipbalm and certainly close enough to my nose to ensure that lipbalm is the smell that dominated my experience of Antarctica.

Hear

I heard voices. During our last landing at Port Lockroy, I wrote in my Reflections Booklet “Silence can be very hard to find in Antarctica.” As a soil scientist, I regularly work in remote locations, alone or with a small team of intently-focused scientists. I am accustomed to long periods of silence and, in fact, enjoy and thrive on quiet. Antarctica is imagined as a remote, quiet place, but the reality for me was the opposite. I could never escape from the sound of people, chat, chat, chatting, and the low bass traffic noise, the

hum of our ship's diesel engine. Of course, there were moments when I delighted in the chorus of penguin calls, the crinch crunch of their little feet in the sand as they walked down the beach, the gentle crashes of tiny waves breaking on the rocky shore. I made dozens of beautiful sound recordings of melting ice dripping water onto sand, snow crunching underfoot, a cacophony of bird calls and ripples in the ocean. But as a scientist accustomed to working in remote natural places, the Antarctica I heard was filled with incessant people and machine noise.

Taste

I tasted delicious, fresh food. Every day on board our ship we were regaled with multiple-course meals, carefully crafted menus, lettuce, lasagne, and everything in between. I developed a special relationship with the kitchen staff, stretching the limits of my meager Spanish to help create a "World Soils Day" cake (5 December every year if you haven't been paying attention), which led to a spectacular entrance to my "Symposium at Sea" 3 minute talk about my research (see the 1980s film *Dirty Dancing* for the cult entrance line, "I carried a watermelon"). As a soil scientist, I was particularly attuned to the paradox of eating so well in a landscape without plants. Antarctica is inhospitable to most forms of life, including humans and plants. Our Antarctic expedition guide, Monica, enchanted us with stories of a Norwegian research team, shipwrecked on Paulette Island, who survived winter by eating penguins and a sack of carrots. Without the carrots, they would not have survived. My soil science-infused brain connects food with soil at every bite, heightening my sense of alienation, of otherness, from Antarctica.

Feel

I felt cosy. Antarctica is supposed to be cold, right? When I talk to people about going to Antarctica, most people ask about the cold. During our expedition, there was constant conversation about the cold. But I felt cosy, dressed for the weather and comfortable in my woollen layers. I even gave away my second layer of gloves to a chilly new friend. I did not experience Antarctica as cold, as I cut my teeth on research doing my PhD in the Australian Alps: yes, we have Alps and, yes, they get cold, considerably colder than the temperatures we experienced, midsummer in Antarctica, where it rarely dropped below zero. Research on the Tibetan Plateau after my PhD prompted me to invest in a solid kit of cold-climate gear. This workwear kept me cosy down south, enabling me to be first on and last off the continent on many of our landings, allowing me to focus my attention on my surroundings rather than my toes.