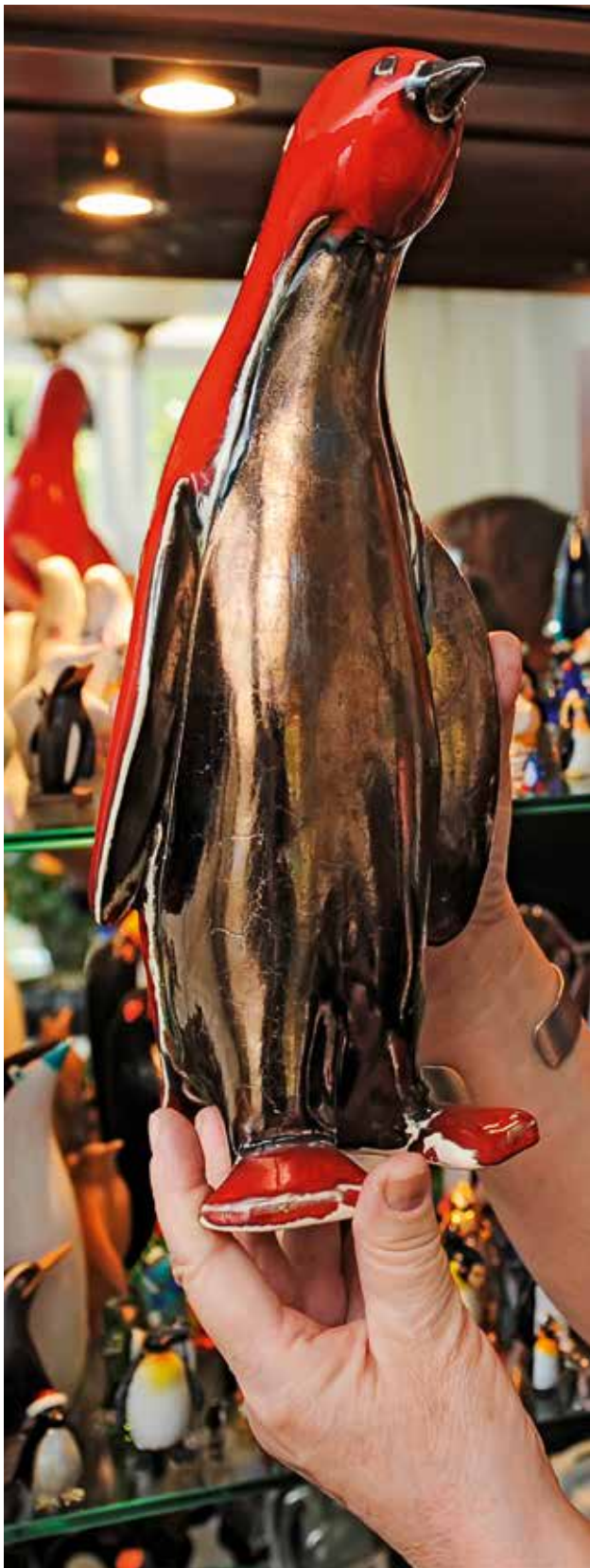
Lady of Ice

ACADEMIA: **You have an unusual job and a fascinating specialization: lichenology.**

MARIA A. OLECH: Once upon a time lichenology was a branch of botany, but it has since been reclassified as a branch of mycology. Lichens are fascinating compound organisms: they are algae or cyanobacteria living in symbiosis with fungi. The fungi provide shelter, collect water and nutrients and so on, while the algae are responsible for assimilation. This is likely what makes lichens so durable and resistant to extreme conditions, in particular droughts and low temperatures. They can be found at the farthest reaches of the globe, close to the north and south poles, and at extreme altitudes. Lichens have been launched into space where they are exposed to cosmic radiation, yet they immediately resume normal life processes on their return to Earth. On the flip side, they are highly sensitive to contaminants, especially air pollution. This particularly applies to epiphytes – lichens which grow on trees.

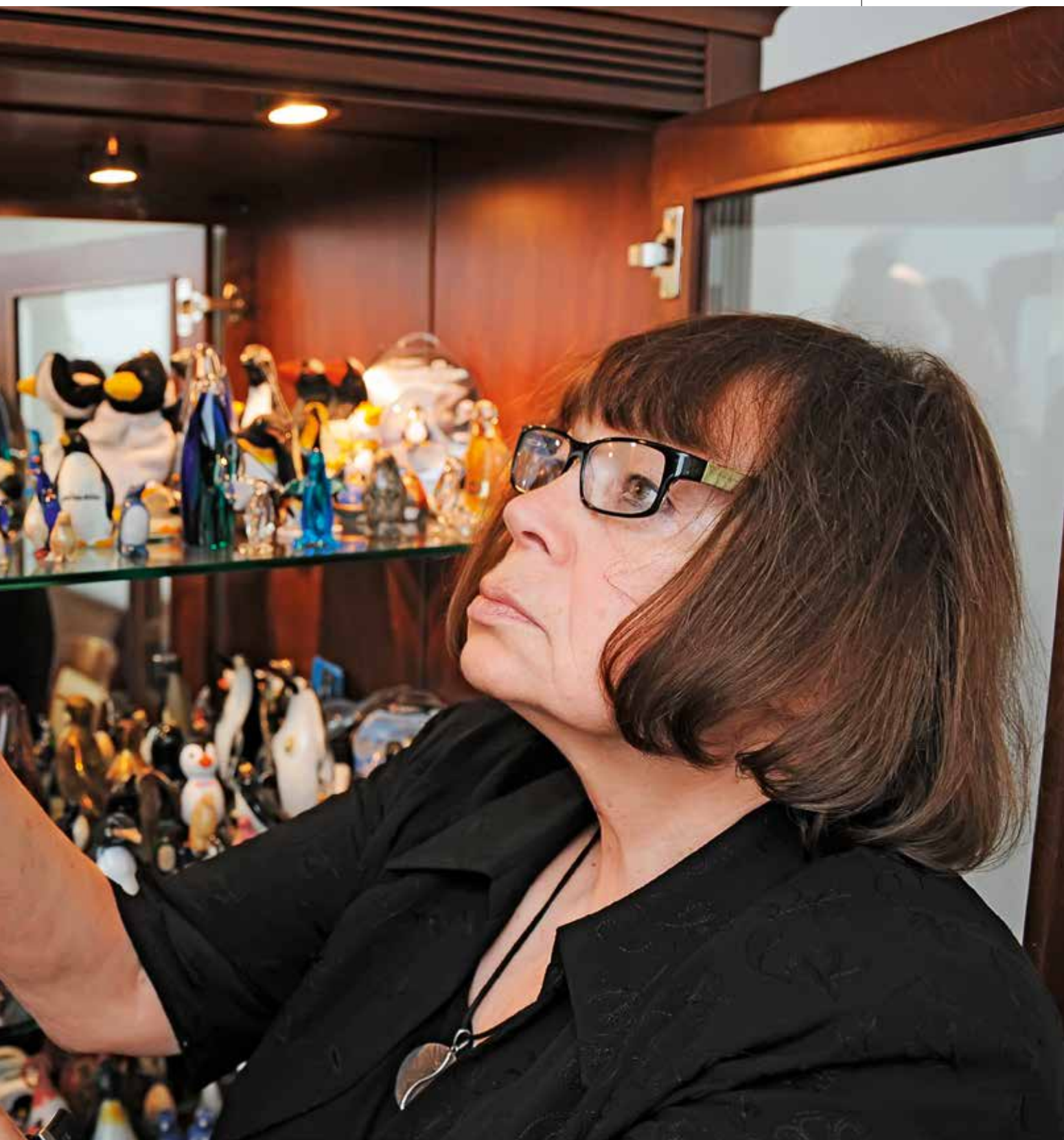
Where did your interest in lichens stem from?

I first became interested in them thanks to my dad – he graduated from the Faculty of Agriculture at the Jagiellonian University and he was a passionate naturalist. He also took me on my first trips to the mountains. When I started studying biology at the Jagiellonian, I quickly got into alpinism and started hiking in the Tatras and the Alps. That was when I first started thinking about lichens – these incredible pioneering organisms growing on sheer rock. I decided to study lichenology seriously, although there were no specialists in the field at my university. As the first lichenologist at the Jagiellonian, I organized a research laboratory and accumulated scientific literature; I set up a lichen herbarium, and founded the Laboratory of Lichenology at the Institute of Botany. I started conducting field studies at rocky outcrops on the Kraków-Częstochowa Upland, and used the results for my master's thesis. I completed my PhD on lichens in the Beskid Sądecki mountain range and my DSc (*habilitation*) on those found in the Tatras. But what I really dreamed of since childhood was travel, in particular to polar regions. I was hugely influenced by books by Alina and Czesław Centkiewicz and other amazing polar explorers, so as soon as an opportunity arose to travel north, I jumped at it.



PROF. MARIA OLECH

We talk to **Prof. Maria A. Olech** from the Laboratory of Antarctic Biology at the PAS Institute of Biochemistry and Biophysics.



How exactly did you manage to secure that placement? The competition must have been fierce...

...and I was already a post-doc, so not exactly a spring chicken. I came late to polar exploration, but I got into it anyway. My dreams came true! To start with, I was invited by Prof. Zdzisław Czeppe, initiator of the Jagiellonian's expeditions to the Arctic, to join the interdisciplinary research team in Spitsbergen. He was looking for a botanist specializing in lichens to create a map of the flora of the Arctic tundra. After two trips to southwestern Spitsbergen, my colleague Eugeniusz Dubiel and I prepared the first ever detailed maps of Arctic flora using the Braun-Blanquet method, as well as describing dozens of sites of Arctic tundra. The results formed the foundation for monitoring Arctic tundra for signs of changing climate and intensified human activity. Both expeditions were highly successful in spite of the harsh conditions we endured. We stayed at a tiny trapper's cottage with no toilet, bathroom or electricity – we had to walk 1.5 kilometers for drinking water.

Prof. Olech shown here in the Antarctic. The other photos show her with the penguins figures she has collected on her travels around the globe, for example from Mexico (p. 54)

That would have been difficult for anyone, but it must have been even harder for you as a woman, if only for purely physiological reasons.

It certainly wasn't easy. I had to lock my colleagues in the cottage so I could bathe in the nearby cold pond. But I have very fond memories of that trip. I actually think that difficult living conditions are good for field work.

Tell us more about it.

For lichenologists, work starts by looking at the flora around them. I was studying virtually virgin territory. We had to learn as much as we could about the biota before we could start our main research into lichen ecology, phytosociology and so on. This was especially difficult in the Antarctic, where lichens had never been described before, since botanists didn't start travelling that far south until relatively late.

My work frequently involved climbing rock faces, reaching mountain summits and drilling into rock, frequently in inaccessible places, and extracting fragments of the lichen substrate. And, just like a geologist, I described my samples, loaded them into my backpack and hiked back to base. I have to admit that your hands get rather cold in polar regions. Field work is physically challenging, and I usually hiked and climbed alone. I was never afraid – the experience I gained in Europe was extremely helpful – except my backpack was so heavy that on the occasions when my colleagues helped me carry it back, they'd split the weight between two or three of them. They declared me a world champion in weightlifting.

How did your winter trip to the Antarctic come about?

It was incredibly difficult for women to travel to those regions anyway, and wintering there was out of the question. I really wanted to spend an entire year in the one of the polar regions to study how nature changes with the seasons. For a woman, spending a year at the PAS base was out of the question. In my determination, I'd decided to spend the winter alone at a trapper's cottage anyway, but it didn't come to that in the end. Prof. Stanisław Rakusa-Suszczewski, founder of the Arctowski Station in the Antarctic, invited me to take part in a year-long expedition which included winter. There were many obstacles, but I was the only polar lichenologist in Poland, so I was the obvious choice.

We already touched on the physical aspects – what are the mental effects of spending such a long time in polar regions?

Almost a year and a half at base makes you feel rather isolated. The loneliness and homesickness are the worst part. It's hard to reconcile yourself with the fact that your home is 14 thousand kilometers away, or that help often isn't at hand, and dangers lurk around every corner. During my thirteenth and last expedition, I broke my leg and spent the last two months

hobbling round the base and working on crutches. It wasn't until I got back home that my leg was set and put in plaster.

What is it like for a small group of people stuck in a cramped space for a long time? For example, how do you solve conflicts? Surely they are inevitable?

Yes, it's tough. You see the same faces every day, faces of people you're trapped with. Monotonous winter landscapes, months of darkness, frequent storms – it all breeds conflict. Frequently, tiny glitches escalate into major problems.

I had several unpleasant experiences during my first trip. Some of my colleagues from the technical team believed that the Antarctic should be reserved for men, and women just went there for thrills. I made my position very clear, which ended up with my being issued a formal reprimand for hitting my colleagues. I laugh about it now, but it was dreadful at the time.

In the early 1990s, you were the first woman to lead winter expeditions. What responsibilities did that bring?

The Academy nominated me, albeit very reluctantly, as leader of the 16th Expedition to the Arctowski Station. It was a huge responsibility, and I knew it. The first comical element was the relationship with our neighbors. Most of the other Antarctic stations were run by the military, so finding a woman leading a winter mission came as a shock. When they radioed us asking to speak to mission leader, they'd refuse to talk to me – they wanted to speak to the leader, not his wife.

My colleagues thought it was hilarious, but it was difficult for me. I had problems assembling a technical team including electricians, cooks, doctors, metalworkers, engineers, mechanics and so on. Before I'd even finished, our trip was brought forward by three months and my budget was severely cut. We flew to Buenos Aires and onwards to Ushuaia, where we took a Spanish ship to our station. The group who'd stayed there before us used up all the fuel intended to run our power generators for two years – and the station's entire life depends on power, from pumping water to running the heating, the kitchen, telecommunications, scientific equipment, everything. This was a very difficult period. The most dramatic moment came when we were ordered to send people home and abandon the station.

Because of the fuel shortage?

Not only that. Poland's Education Minister wanted to shut down the Polish Academy of Sciences altogether, since he decreed it had been founded on "red" money and followed Soviet standards. Our own department, the Institute of Ecology, suffered staff cuts and the station's existence was under threat. So I had to fight for its survival.

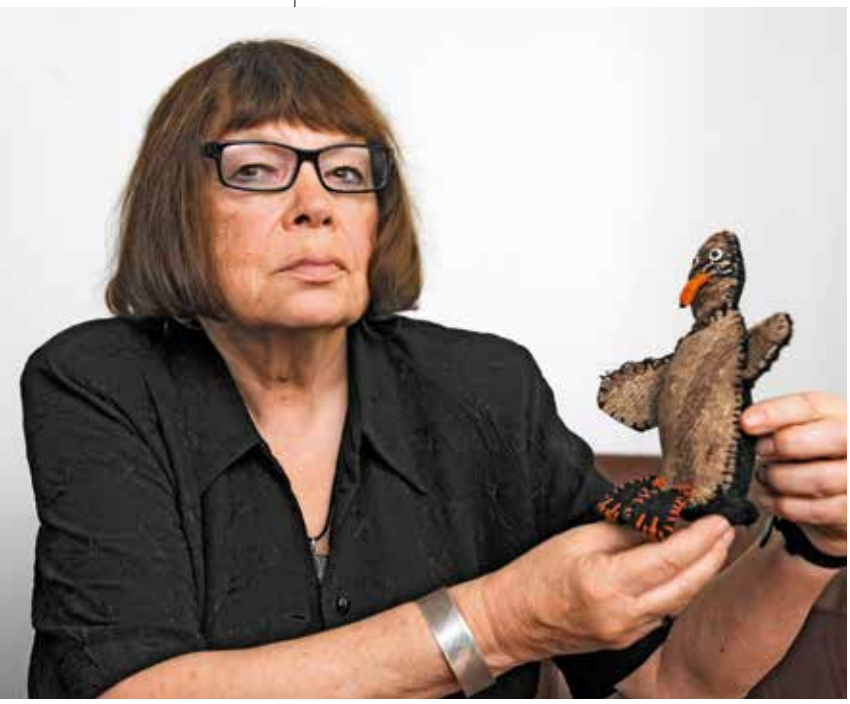
We should add that the battle was a victorious one in the end. How did you achieve this?

I gathered opinions, I left no stone unturned. I grabbed anyone I could and asked them to intervene – with the government, the Academy's authorities, friends abroad. As a result, an association dedicated to saving the station was founded in Florida. They ran lotteries for Polish communities around the globe, organized fundraisers and wrote letters. Finally we got a message from Warsaw that we were to send back five people, and the rest could stay (and feel grateful for it). This broke my heart. No one wanted to leave after a month or two out there – we were all determined to winter in the Antarctic. Unfortunately I had to choose five people who had to go home. Next we had to get more fuel, but that's another story, worthy of a film.

> I had to break through obstacles and barriers, and overcome stereotypes and various systems, to conquer spaces which had been the exclusive domain of men. I was incredibly lonely.

Tell us a bit about it.

In those days, loading and unloading fuel was difficult and dangerous. Diesel was pumped from a ship anchored some way off the coast into special barrels. These were then transported to dry land and the diesel was decanted into a huge reservoir at the station. You had to be extremely careful not to endanger the people or the environment. In the Antarctic, weather can change at any moment, and the windswept ice fields are treacherous. In previous years, the station was attended by a special fueling team, but this time we were left to our own devices. Additionally we were a very small group, so I'd learned to drive amphibious vehicles and small motorboats in case of emergencies. We made a dry test run before the arrival of the fuel ship. As the ship reached Admiralty Bay, I had to convince the captain to leave a dozen barrels, even though he was only expecting to drop off one. The process went quickly but not without problems. My colleagues



Prof. Maria Olech

- Master's degree: 19633
- PhD: 1968
- DSc (habilitation): 1985
- Professorship: 1992

Maria Olech is a polar lichenologist. She became the first Polish specialist in the field and a world-class expert on lichen taxonomy and the ecology and biogeography of polar regions. She founded the first lichenology laboratory and herbarium at the Jagiellonian University. She took part in and led 13 expeditions to the Antarctic and 7 to the Arctic.

She was the first woman to lead research expeditions in the Antarctic. She also took part in the 23rd Indian research expedition to the Antarctic as scientific leader. Prof. Olech is the founder of the Polish School of Polar Botany. She founded and managed the Laboratory of Polar Research and Documentation at the Institute of Botany at the Jagiellonian University. She also led the Polish/French research program "All Lands and Seas Around the North Pole." She is the author of five books and 400 research papers and popular science publications, including 100 descriptions of taxons new to science (lichens, algae, fungi).

She also conducts monitoring of environmental pollution (heavy metals and radionuclides) of polar regions and studies lichen adaptation to the extreme conditions found in the Antarctic. She investigates how Antarctic ecosystems respond to climate change and human activity in Antarctic regions. She has also introduced new research fields: alien species in the Antarctic and environmental monitoring in the Antarctic.

thought the ship was too far from the shore to make a safe delivery, so I asked the watch officer to move a bit closer. Hearing the anchor being raised, the captain flew into a rage and threatened to call the whole thing off, refusing to be ordered around by a woman. Things were made even worse by the custom – a superstition, really – that the anchor mustn't be raised twice in one day. I finally brought the captain round by explaining that he was the only one who could save our station. I also managed to convince him that superstitions from other parts of the world don't apply in the Antarctic. The ship moved closer, the unloading took much less time and effort than during trial runs, and we received thirteen barrels of fuel. I was incredibly proud of my team and their efforts, and we cherished a photo of the kind captain until the end of the mission.

You've certainly encountered many setbacks and adversities during your expeditions to the poles.

I had to break through obstacles and barriers, and overcome stereotypes and various systems, to conquer spaces which had been the exclusive domain of men. I was incredibly lonely. I was given the nickname "She". My colleagues would say "*She* arranged it", "That was *her* decision", and so on.

It accompanied me as far as the Maitri Station, run by India. I was taken there by my desire to work in the Antarctic and study local lichens. The PAS Arctowski Station is on King George Island in the South Shetland archipelago. The vast continental ice sheet, on the other hand, is home to oases where streams and lakes thaw and the land is free of ice and snow for around a month in the summer. It is a dream location for lichenologists. Prof. Rakusa-Suszczewski was keen on comparative analysis, so he signed an agreement on international scientific exchange between the two stations. This landed me a secondment to the Maitri Station at the Schirmacher Oasis. I'd never been to India before, so it was a real culture shock. When I arrived, I discovered that the team on site included eighty Indians, four helicopter pilots from New Zealand, and me – the first woman ever to work at the station. That was where the nickname really took hold.

How did that exotic trip go?

We arrived in Cape Town where we were met by the station director from Goa to discuss the agreement. He'd thrown a party for me, but when I admitted that I wasn't an observer for the Scientific Committee on Antarctic Research (SCAR) but just a regular participant in the mission, all the compliments and favors came to an end and I was treated the way women are treated in India. After the first leg of our journey on an icebreaker, we were taken to the station by helicopters, and that's where the real fun started. All the guys, around eighty of them, felt obliged to talk to me, and

they kept asking me how I am in all kinds of English accents. I felt incredibly isolated. The food was also a problem – it was too spicy for me, and the dishes it was served in weren't exactly clean.

As soon as I realized the conditions – everything focused on men, and I could only use the bathroom and toilet once per day around 3am – I decided I must complete my research as quickly as possible and get out. But there was no escape; it's the Antarctic and there aren't any tourist ships. So I went out, day in, day out, to conduct field studies. I was accompanied by two assistants. They were really dedicated and they really wanted to learn. I was working as fast as I could, but there was still no way I could leave early.

The Schirmacher Oasis had been discovered relatively recently, so I was conducting basic research on the biodiversity of lichens, mosses and fresh-water algae there. I also collected material for studying the ecology and adaptation of lichens in extreme atmospheric conditions. But to start with, even going outside was a major challenge. When other scientists were too tired to accompany me, I was given "guards" from the technical team. This encounter with such a different culture, at the far reaches of the world, was a huge challenge and difficult experience. Fortunately things changed after a few lectures about my scientific achievements. My colleagues finally appreciated my experience in polar regions and my physical condition. At one point I ordered that the station be cleaned, and I led by example. They warmed to me gradually.

Around six kilometers from there in a straight line, at the same oasis, lies the Russian Novolazarevskaya Station. The winterers there were very kind and helpful. They didn't have a great deal of food themselves, but they baked their own bread and delivered it to the Indian base. They also helped me leave early. They were visited by an official delegation from Moscow, and the leader of the Russian expedition put in a good word for me. In the end I was flown out from the makeshift base to Cape Town.

Towards the end of my stay at the Maitri base, my colleagues' attitude towards me finally thawed and we became friends. They threw a big party for my birthday, starting with a ceremony in the chapel on the building's first floor. The space was very low – you could only shuffle round on your knees – and it held altars of the four main religions. After prayers led by a designated mission participant, I was honored with a bindi and I became an official participant in their mission. I even became an authority at the station – my colleagues sought my advice on such important matters as building a new station.

Two years later I was invited to the Institute of Antarctic and Marine Research in Goa, where I set up a biology laboratory and a herbarium of Antarctic lichens and mosses. I played an active part in the institute's daily life, in particular as the only woman on the institute's advisory board. There were other women there, all wearing dazzling saris, but they were only employed as technicians. Science was the exclusive domain of suit-clad men. That was India.

Coming back to our own continent, do you think women have the same opportunities in science as men?

Until very recently, participation in polar exhibitions was a great privilege reserved for men. I wasn't always able to overcome barriers I faced. I still recall my great disappointment when I wasn't able to take part in the Russian/Polish expedition to the Dobrowolski Station in the Bunger Oasis in the Antarctic for the simple reason of not having been born a man.

During all my expeditions and missions to polar stations I stuck to the rule that we're all scientists and our gender is irrelevant. But that's simply not the case, especially given that research in polar regions involves missions taking several months at a time. Generally speaking, men have fewer responsibilities and misgivings; for women, the situation is far more difficult if they have a family and are forced to be separated from them.

> Women are tough; we care about the places we are responsible for as for our own homes, our hearths. We are dependable and diligent when we are in charge.

Women are considered more emotional. How does that affect our ability to cope with managerial positions?

When I think back to my time at the Arctowski Station, I think women make far better managers. It's also what Prof. Rakusa-Suszczewski thought when he put me in charge while its existence was under threat. Women are tough; we care about the places we are responsible for as for our own homes, our hearths. We are dependable and diligent when we are in charge. The only drawback is that we are more affected by setbacks than men. But, after all, potential mistakes are a risk of taking any kind of action.

Interview by **Jolanta Iwańczuk**
Photography by **Jakub Ostałowski**