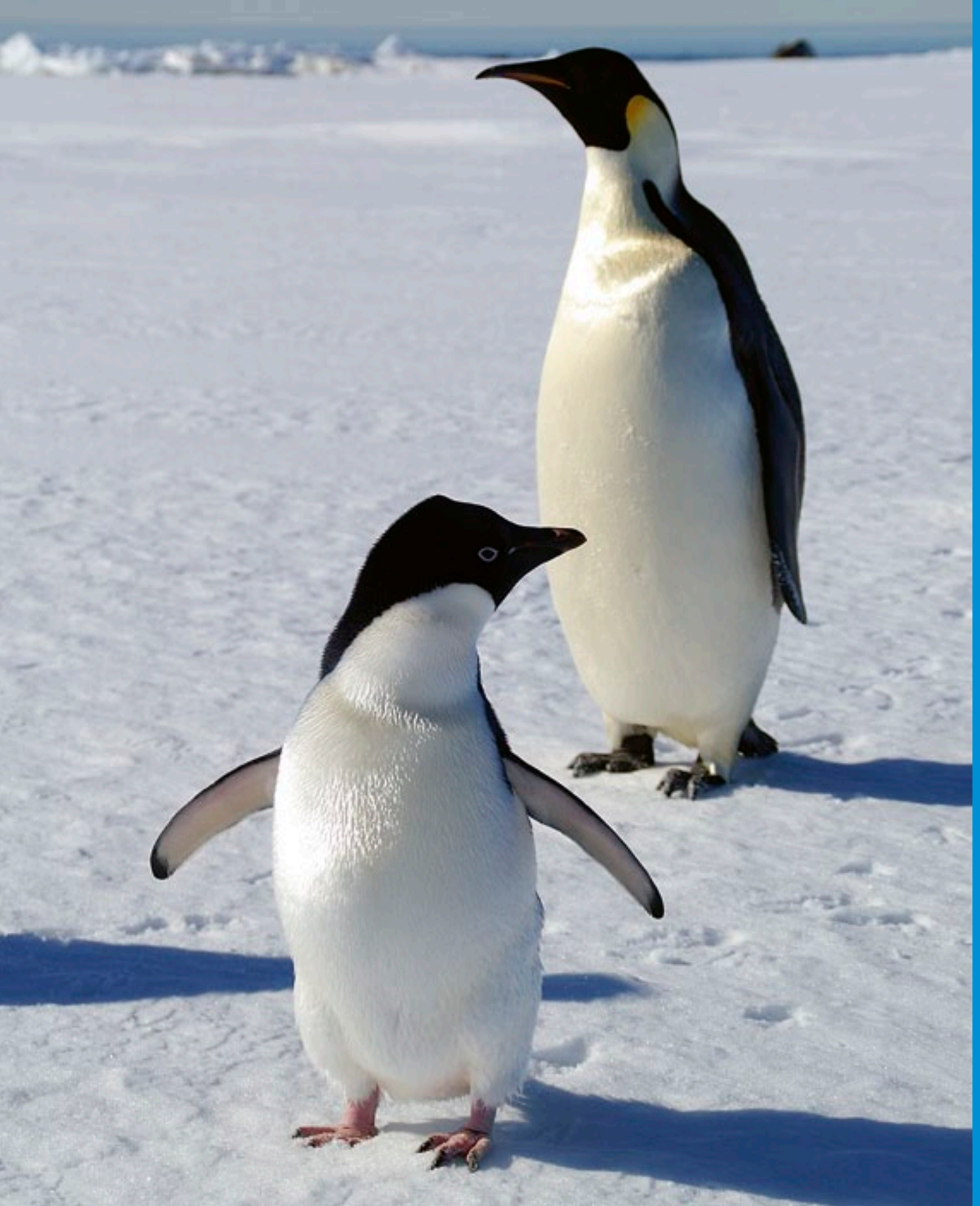


2
Life on Ice

The emperors inspect their own stylised form in Antarctica New Zealand's logo on the helicopter. ROB McPHAIL

On all sides rose great walls of battered ice with steep snow-slopes in the middle, where we slithered about and blundered into crevasses. To the left rose the huge cliff of Cape Crozier, but we could not tell whether there were not two or three pressure ridges between us and it, and though we tried at least four ways, there was no possibility of getting forward. And then we heard the Emperors calling.
– Apsley Cherry-Garrard, *The Worst Journey in the World*

Short of retracing Apsley Cherry-Garrard's *Worst Journey in the World*, midwinter and in starlit darkness, one has to be lucky to see emperor penguins. I was, and the encounter is one of my most exquisite Antarctic memories.

Antarctica is an unforgiving frigid desert surrounded by a frozen ocean. Any creature that manages to survive on land or in the water is operating at the limits of biology, and the freezing temperature is only one of many challenges to life. It is completely dark for four to six months of the year and food supplies fluctuate from feast to famine with the severe changes between seasons. Fresh water is abundant but inaccessibly locked up in ice. Any attempts to breed and raise a brood can be life-threatening endeavours for both generations. A small mistake or deviation from a finely tuned survival tactic is usually fatal.

Emperor penguins are champions of Antarctic survival. They may well be the only birds never to set foot on land. They forage from floating chunks of ice and breed on thick slabs of sea ice, in the depths of winter. They are so well adapted to their frozen home that they could not survive without ice. More than any other Antarctic wildlife, emperors have become a symbol of endurance and resilience in the harshest conditions.

My encounter happened at the end of a long day and at the fringe of the continent. With 24 hours of daylight during summer, everyone puts in long shifts. I had already made a bone-rattling Hagglund journey across the sea ice to Captain Scott's Terra Nova hut to meet a team of conservators. Then came a helicopter flight to the Victoria Valley to join geologists studying the strange polygonal shapes that form almost everywhere in the hyper-arid McMurdo Dry Valleys, followed by a skip across to the Taylor Valley and the permanently ice-covered Lake Fryxell to catch a group of biologists as they emerged from a dive to the murky lake bottom in search of life, microbial or otherwise.

Sitting still was the best strategy for getting a close view of the emperor penguins. Though they kept at a safe distance, they came closer to us than we would have been allowed to approach them. Scott Base chef Donna Wightman, right, and Antarctic Field Training instructor Abel Roche, centre, are closely observing with me. ROB McPHAIL

I wasn't surprised when our helicopter pilot decided to take the long route back to Scott Base. Rob McPhail has clocked up thousands of flying hours during more than twenty consecutive Antarctic summers and he knows this part of the continent like the back of his hand. Numerous scientists have relied on him to get to their field camps and back safely and, by way of thanks, lobbied to name a dramatic ridge of wind-sculpted granite towers at the entrance to the Wright Valley the McPhail Turrets.

During our return flight, everybody felt absolutely safe in his hands – safe enough to nod off despite the spectacular scenery. I only noticed a hint of concern when I realised he was flying midway across the frozen ocean towards the edge of the sea ice, and then dropping down to land. What followed was two hours of awed and blissful silence. There was no need to say much as we walked slowly along the ragged, frozen and ever-changing edge of Antarctica, under the biggest blue skies, surrounded by a group of curious emperors, frolicking in the ocean and jumping onto the ice to inspect us.

A waterproof coat of feathers and a thick layer of blubber protect emperors and other penguins from the cold. ROB McPHAIL

Emperors are the giants of the penguin world, easily eye to eye with a person squatting on the ice. The playful young birds we encountered were not ready to breed yet but a few seasons later they would join others in an epic and stoic effort to perpetuate their species. Their midwinter breeding cycle seems an almost suicidal mission, but biologists think that the strategy evolved to give fledgling emperors the best survival chances as they grow to independence at a time when the ocean opens up and food is plentiful.

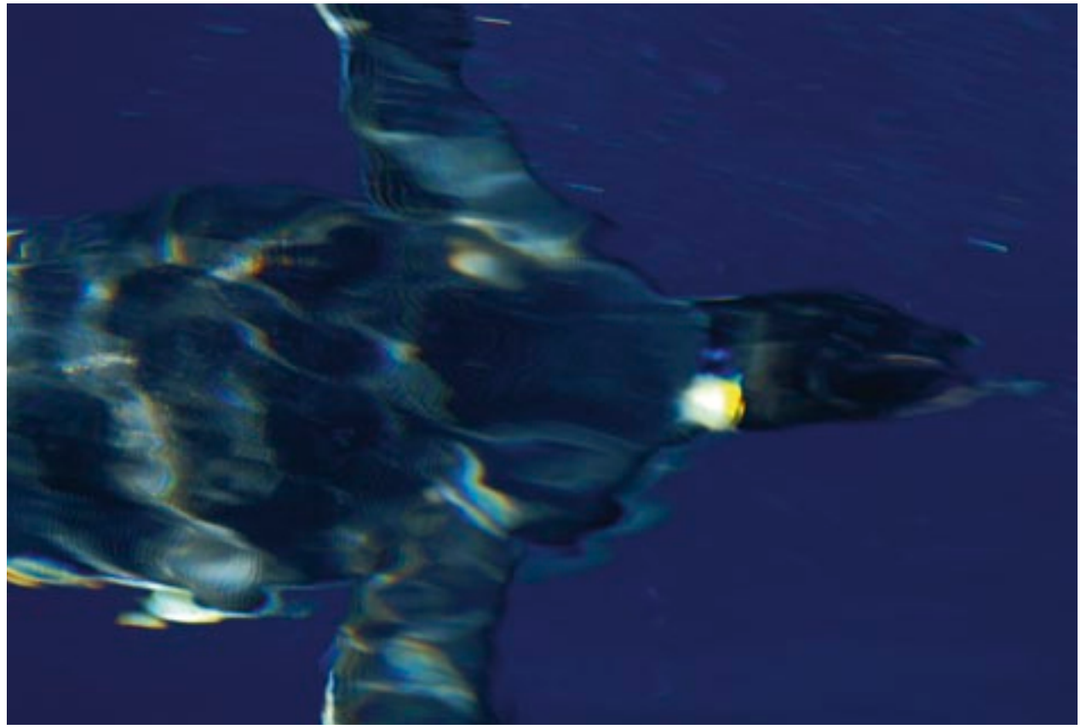
To start the annual breeding routine, thousands of adults have to trudge across more than 100 kilometres of rugged sea ice just to mate. They choose a site where the ice is stable, either near an ice shelf or in the lee of an island. All birds stay until the eggs are laid six weeks later. Then, the females trek back across the widening ice to feed at sea. The males stay put, incubating the egg between their feet and a roll of skin and feathers. By the time they get this far, there seems little point in building nests or defending territories. With temperatures down to minus 60 degrees Celsius, chilled even further by frequent icy blizzards, it makes more sense

A lone orca hunting at Cape Bird. ROB McPHAIL

Penguins and chicks covered in ice and snow. ANTARCTICA NZ PICTORIAL COLLECTION: RACHEL BROWN, GUS McALLISTER/K002 05/06

to cast aside any territorial aggression and huddle together as closely as possible. An individual penguin would have a slim chance of survival, but as a collective, with up to 6000 birds wrapped around each other in a huge crowd, the colony acts almost like a separate organism in its own right. As each egg-hogging male warms up in the centre of the huddle, he slowly shuffles back to the edge of the colony to take the brunt of the cold for a while, all the while balancing his precious cargo in his portable nest and going hungry. The eggs can be an astonishing 70 to 80 degrees warmer than the surrounding air.

By the time the females return nine weeks later to take a turn in parenting once the chick hatches and is ready to leave its brood pouch, the males have lost nearly half their body weight and are desperate to get back to the ocean to feed. As if their effort so far hadn't been enough, they return to take turns in feeding their growing chick. As the hatchlings grow and spend longer spells without either parent, they instinctively begin to practise the life-saving huddling in downy crèches.



Emperor penguins can dive deeper than 500 metres and stay under water for up to 22 minutes. ROB McPHAIL

They eventually shed their soft down at the height of the Antarctic summer, but when they enter the ocean they weigh only about 60 per cent of an adult's weight, the lowest value for any penguin. During harsh years only one in five survives the first year, but if they make it to the next summer, their chances are good. With a nine-month breeding cycle, the adults only have a few weeks left to fatten up again, moult and fatten up some more. Despite the exertion, adult emperors have remarkably high survival rates compared to other penguins, with an average of 95 per cent returning to the breeding site to do it all again next winter.

The emperors' extraordinary behaviour is only one of many adaptations that allow the birds to survive the extreme conditions of their icy home. Wrapped up in a waterproof coat of feathers and a thick layer of blubber, they are superbly insulated. Their size is driven by the physics of heat loss, which predicts that bigger is better when it comes to keeping warm. The only body parts that do cool down are their feet and flippers, and to cope with the temperature gradient between