SCIENCE

Out of the Blue

by STEPHENIE CAHALAN

A giant game of Marco Polo played out over the late summer months of 2013. In this game the backyard pool takes the form of the expansive Ross and Davis Seas edging the Antarctic ice shelf; the seeker is a small boatload of scientists and the caller is the elusive Antarctic blue whale.

To describe the blue whale as iconic is no mere cliché. The largest animal ever to occupy the Earth, more colossal than even the biggest dinosaur, the Antarctic blue whale can measure up to thirty metres in length. However, we know very little about the animal, a situation that scientists assembled by the Australian Marine Mammal Centre at the Australian Antarctic Division are endeavouring to rectify.

One hundred years ago the Southern Ocean whaling industry was in full swing, providing whale parts to make into a range of products, including whale oil for lighting and baleen for trussing up women in corsets and crinolines. All species were fair game, but their enormous size made blue whales a particularly lucrative catch. Whaling operations occupied many of the subantarctic islands scattered along the higher latitudes, such as Macquarie and Heard Islands, until the invention of factory ships in 1923 allowed whalers to roam further afield. These longer journeys liberated them from the expensive logistics of maintaining stations and increased their profits.

From this point onward the killing accelerated at a ferocious pace until, in 1964, the International Whaling Commission (the global body charged with the conservation of whales) banned the slaughter of blue whales. By then nearly one-third of a million of the blues had been killed. It is estimated that, at its lowest ebb, the population plummeted to just 360.

Continuing Australia's hundred-year history of pursuing science in Antarctica, the Antarctic Blue Whale Project is endeavouring to estimate the circumpolar abundance of the animal, to determine if numbers are recovering post-exploitation, and to refine new scientific methods for obtaining this

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information. The project is the flagship of the Southern Ocean Research Partnership, a collaboration of ten countries, initiated by Australia and reporting to the International Whaling Commission. The Partnership is also conducting research across five other projects focused on the recovery, mixing, movement and migratory patterns of minke, fin, killer and humpback whales. All projects will employ a variety of research methods, both traditional and new, and all these efforts have one thing in common – the science is strictly non-lethal.

In January, eighteen scientists boarded the *Amaltal Explorer*, the fishing boat chartered for the Antarctic blue whale voyage, with quarters converted into sound labs and a bespoke medical facility housed in a shipping container to provide a surgery for the voyage doctor.

The Antarctic blue whale has a very deep and resonant song, which can be picked up hundreds of kilometres across the Southern Ocean – but only if you happen to be under the water, which is little help to those seeking them from above the surface. Using hydrophones previously employed by the Navy to detect submarines, scientists dropped directional sonobuoys from the *Explorer* to eavesdrop on the blue whales. They then monitored their computer screens day and night, waiting to detect the telltale 'up sweep' and 'down sweep' of the distinctive vocalisations.

Once a song was detected, the ship honed in on the call, with observers scanning the horizon to spot the Antarctic blue whale blow, which can rise about nine metres into the air. On sighting the whale, the ship's crew then launched a small inflatable boat, the *Remora*, to approach the colossal animal. On board the small boat, sharpshooters with steady hands and good sea legs used biopsy rifles to obtain small skin samples and attach a satellite tag to the animal, transmitting a signal which would track the whale's journey.

Also on board the small boat, photographers captured a multitude of shots of the fins, flanks and flukes, which act like fingerprints in helping to identify individual animals.

Remora coxswain, Mick Davidson, said approaching a pod of Antarctic blue whales in the small boat 'was like sitting in a Mini-Minor with six huge trucks bearing down on you at full speed'. He noted that the largest whale was an estimated twenty-five metres in length.

Virginia Andrews-Goff was one of the taggers poised on the bowsprit of the *Remora*, lurching above the heaving Antarctic waters trying to get a perfect shot at the whales below. 'This was a big chance and I was acutely aware of the expectations,' Virginia said. 'We bounced along trying to keep pace with this fast-moving whale. I aimed carefully just as the whale surfaced alongside the boat. Time seemed to slow as I spotted the perfect site for the tag. For optimal performance, the tag should be forward on the body, just in line with the pectoral fin. To my relief I deployed the tag in a great spot.'

The Antarctic blue whale voyage has collected data never before gathered and, for this reason, even before the analysis has begun, it is already a success. In just seven weeks the voyage surveyed nearly one-sixth of the Southern Ocean, identifying fifty-seven Antarctic blue whales, recording 626 hours of acoustic recordings, and analysing 26,545 calls of Antarctic blue whales in real time. Most thrillingly, two Antarctic blue whales have been tagged with satellite transmitters, one of which sent signals for several weeks, providing previously undocumented information about the whale's movements.

The Antarctic Blue Whale Project has showcased the excellence that can be achieved through international scientific collaboration. Tasmania has become headquarters to both the secretariat for the Southern Ocean Research Partnership and its lead project, attracting top-order acousticians, observers, data managers and scientific survey designers. The impressive data set collected during the voyage has shown the success of tracking the whales through their calls, and the viability of conducting science with living, active, vibrant animals. In short, the Antarctic Blue Whale Project has further illustrated that whales do not need to die in the name of science.

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