The New Zealand Curriculum
LEVEL
4
School Journal
JUNE 2023

TITLE	READING YEAR LEVEL
The Stunt Man and the Geologist	7
Pākehā Tapu Day	8
Paper Tiger	7
Valley of the Whales	6
Silk Robes and Big Hats	7
Beyond Imagination	8
Tokotoko	8

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School Journal

LEVEL 4 • JUNE 2023

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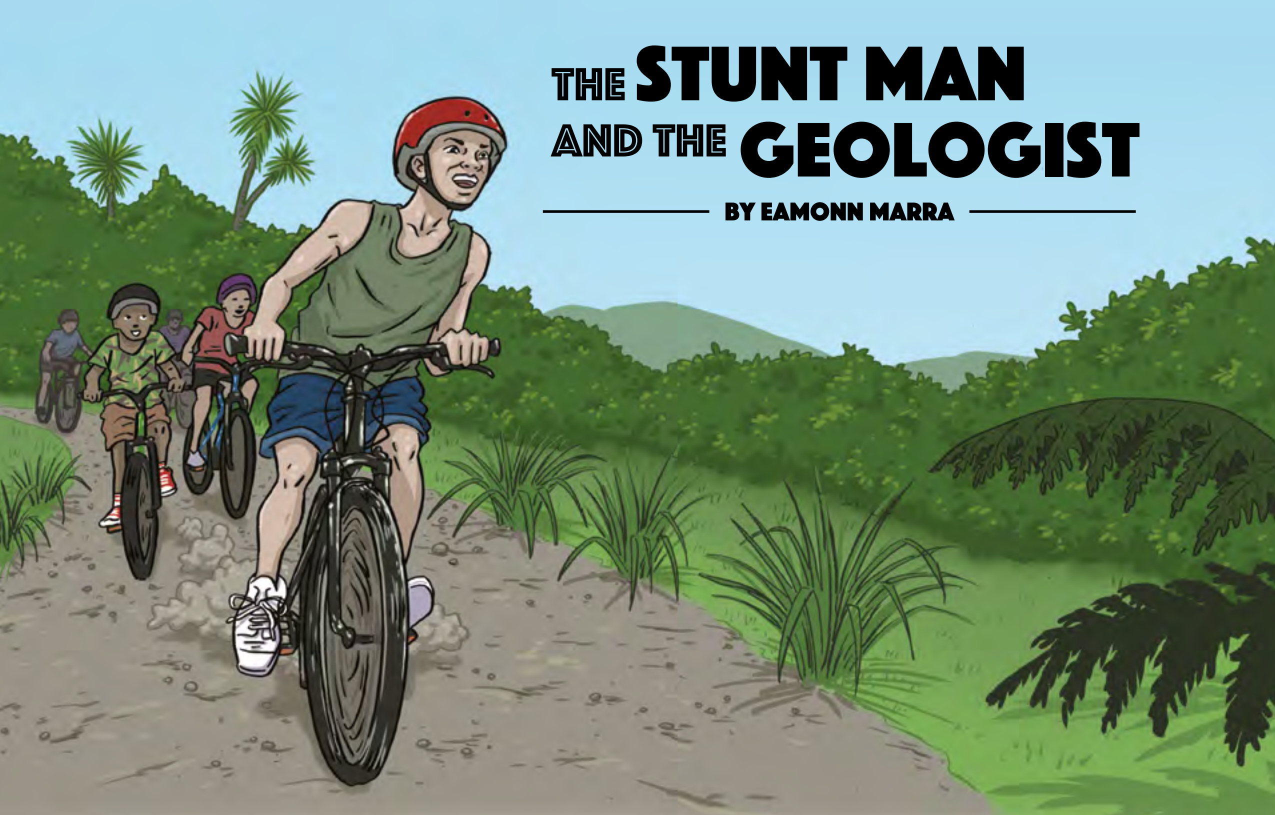


THE STUNT MAN AND THE GEOLOGIST

BY EAMONN MARRA

My older brother, Toby, told the other boys at the campground he was training to be a professional stunt man. He told stories about high school, where he'd been for a year, though you'd swear it was forever the way he talked. Toby said he learnt martial arts and stunt falls in PE. I knew he was exaggerating, but if I agreed, it made me the second-coolest kid there.

Toby spent his days biking the tracks in the nearby forest. His boys followed him everywhere, keeping their distance as he skidded round corners and sent dust flying. He was trying to make up for his bike being second-hand. After dinner, when the little kids had gone to bed, Toby and the others would take over the playground: Toby on the tramp, the rest of them hanging about, watching him do flips. He claimed he could do double flips but the "crappy tramp" didn't give him enough air. Sometimes he'd get me to help demonstrate wrestling moves. He'd start by knocking me over. I'd fall dramatically. Then he'd pin me down. He had names for his moves – the Gut Wrench, the Triple Pincer – but they were all variations of Toby wrapping his legs round mine and pressing his elbow into my side. It didn't hurt if I went along with him, but if I tried fighting back, he'd tighten his grip just enough for it to start hurting.

On the fourth day, a family set up next to us. There was a boy who looked about the same age as me. I noticed him sitting at the picnic table, surrounded by little plastic bags. He was pouring sand into a jar.

"What's with the sand?" I asked.

"It's from the lake," the boy said, clearly pleased I'd noticed. "Each colour comes from a different geological period." He screwed on the lid and handed me the jar. The sand had distinct layers: grey, yellow, white, black, and red. "I'm Elliot," the boy added.

"Joseph," I said.

"The lake weathered down different rocks at different times," Elliot explained. "If you dig around a bit, you can find all of them."

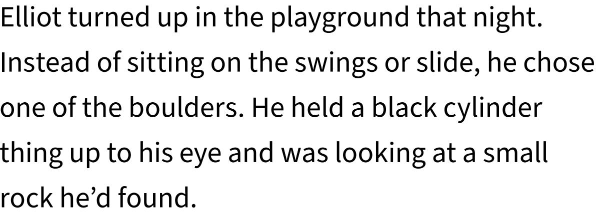
"Cool," I said.

Toby had noticed the new kid, too, and came over on his bike. "What's with all this stuff?" he asked. He reached over and picked up the bag of yellow sand. "Looks like fancy dirt."

"It's sand," Elliot said. "From the lake. If you dig into the –"

"Yeah, yeah," Toby said even though I knew he'd be interested. He'd collected rocks in year 6, but now he was all about mountain bikes and martial arts and stunts. Last year, it had been bass guitar. "Fancy dirt, like I said. Got it." Toby biked off. His fans were waiting.

"See you later, Elliot," I said, and I ran to get my bike.



Elliot turned up in the playground that night. Instead of sitting on the swings or slide, he chose one of the boulders. He held a black cylinder thing up to his eye and was looking at a small rock he'd found.

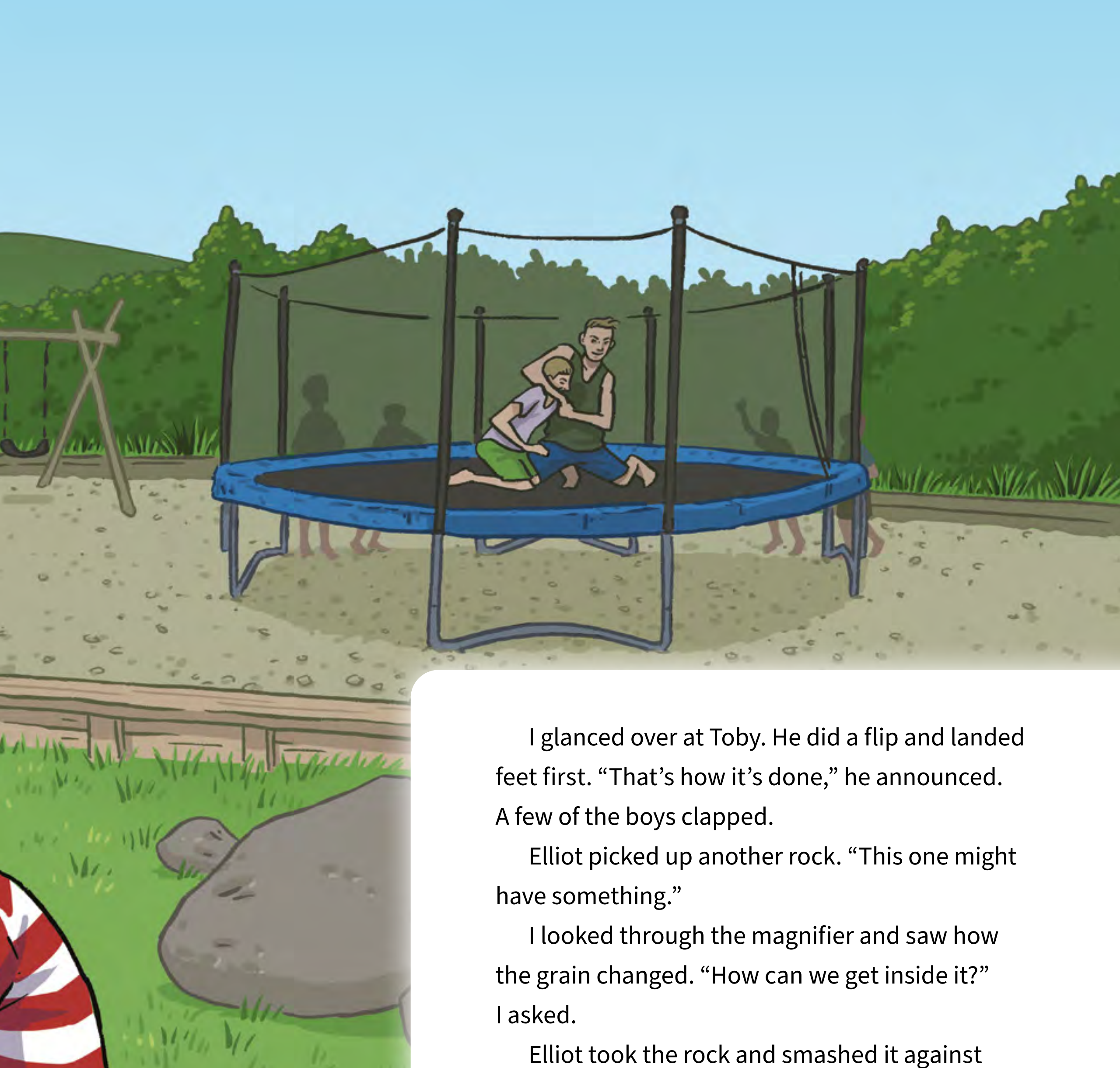
"The sand man has joined us!" Toby yelled from the tramp. Then he demonstrated the Stomach Buster. He'd learnt the move last night online. His fist pushed a little too hard into my gut, so I jumped off and went over to Elliot.

"What are you doing?" I asked.

"Looking for irregularities with my magnifier," he said. "There could be something inside."

"What … like gold?" I asked.

"Unlikely, though there was gold round here. We're more likely to find quartz. Want a look?"



I glanced over at Toby. He did a flip and landed feet first. “That’s how it’s done,” he announced. A few of the boys clapped.

Elliot picked up another rock. “This one might have something.”

I looked through the magnifier and saw how the grain changed. “How can we get inside it?” I asked.

Elliot took the rock and smashed it against the boulder. He’d angled it perfectly, and the rock easily split in two.

“Take it easy, kids,” Toby yelled. He had Stevie in a headlock. Stevie’s bike was only a hardtail, but it was still flasher than Toby’s.

Inside, the rock had a thin streak of shiny white. “A quartz vein,” Elliot said. “Nothing special. I can show you how to find gold tomorrow.”

The next morning, Elliot asked if I wanted to go sluicing. I must have looked confused. “Gold panning in the stream,” he explained. He had a map marked with red circles. He said it showed places where minerals might have built up. His dad had given him a wok. We could use it for panning as long as we had it back by dinner.

We walked to the closest point on the map – a stream I’d seen the day before. Elliot showed me how to scoop sand and stones from the bottom, then shake out the light stuff, leaving the heavier stuff behind. We didn’t find gold, but we did find tiny flakes of some kind of translucent rock that had different colours. Elliot put some in a bag. “Mica and quartz,” he said. “They’re not worth anything, but I still collect them.”

“You two are little year sixes playing treasure hunters,” Toby said at dinner.

“We’re looking at rocks,” I said. “It’s science.”

“Year sixes playing scientists then,” he said.

When Elliot showed up at the playground that night, I stayed away from him. Instead, I let Toby push me over with a Cobra Sweep. He followed up with an Anaconda Grip, both new moves. Dad had shared his free data hour again.

Elliot arrived with his wok the next day while we were still eating breakfast. Dad was cooking pancakes while Mum had a sleep-in.

“I’m gonna go biking today,” I told Elliot. “Maybe I’ll pan tomorrow.”

I went off with Toby and his gang. Earlier in the week, I’d been near the front of the pack, but this time, I found myself at the back.

On our way past the stream, we saw Elliot. He was crouched in the gravel, panning. Toby saw his chance. He stood on his pedals and biked hard before suddenly braking. He almost spun 360, throwing pebbles and dirt over Elliot before taking off, laughing. “Sorry, sand man,” he called.

Elliot wiped his face. “Want to hang out?” he asked.

I stood there for a bit, trying to decide. I could see the boys in the distance. “Sorry, Elliot,” I said.

Dad made us do the dishes that night. When we finally got to the playground, Elliot was there, bouncing on the tramp alone. The others had been hanging back, waiting for Toby. None of them were pleased to see Elliot.

“Get off!” yelled James. He had the fanciest bike in the campground. Then Stevie threw some bark – but Elliot carried on jumping.

“The sand man doesn’t know his place,” Toby said.

I took the bark from Stevie and threw it on the ground. “Come on, Elliot,” I called. “We can look for more quartz.”

Elliot ignored me.

Toby climbed on the tramp and started to jump, too. He was aggressively close to Elliot. They moved in unison, eyeballing each other, going higher and higher. Toby cracked a smile and began to bounce harder and faster, out of sync with their rhythm – but Elliot didn’t stop.

Then Toby did a massive jump, landing a split second before Elliot. When Elliot hit the tramp, he went flying. His body curled high in the air as he went into a controlled spin. He turned, head over heels, once, twice, before making the perfect landing.

They stopped bouncing, and everyone was quiet for a moment. “A double flip,” whispered James.

Elliot picked up his magnifier, which had fallen out of his pocket.

Toby stood there, slack-jawed. “Where did you learn that?” he asked.

“Gymnastics,” said Elliot.

“Show me how,” Toby said.

“Maybe another time,” Elliot said. “I want some sleep. I’m going panning in the morning.” He looked at me. “Want to try that other sluicing spot tomorrow, Joseph?”

In the silence, I could hear the sound of the stream. There was still a small chance we’d find gold. “Yeah,” I said. “Sure.”

illustrations by Ant Sang

Keith

by Lee McColl (aged 12)

My great-grandfather Keith Ernest Smith was an amateur photographer. The Leica camera he used is a family treasure and an emblem of Keith's determination and tenacity. After he lost the use of his right arm, he had to learn to operate the camera with his left hand. He would grip the leather casing so firmly that his finger marks still remain.

The Leica needed careful calculation and effort to handle. Small dials and buttons had to be adjusted to find the correct exposure, to focus the lens, and to wind the film on. Keith chose the Leica because with only one good hand, he needed a sturdy, precise camera.

Keith was born in Westport in 1925. He was the eldest of five: his siblings were triplet sisters and a brother.
In his early twenties, Keith fell off his motorcycle and seriously damaged his right arm. He had to support it in a sling for many years, and then, when he was older, the bad arm had to be amputated. At the time of the accident, Keith was working at the Air Force Training and Maintenance Centre, and he was unable to continue flying. He ended up being employed by the Ministry of Works, which was responsible for roadworks and civil engineering. Keith loved to build and fix odds and ends. He even helped build his own house. After he developed a passion for whitebaiting, he created a fishing stand for his net. Another of his favourite pastimes was to compose poetry. One of his collections was called *The Kaipara Killer*.

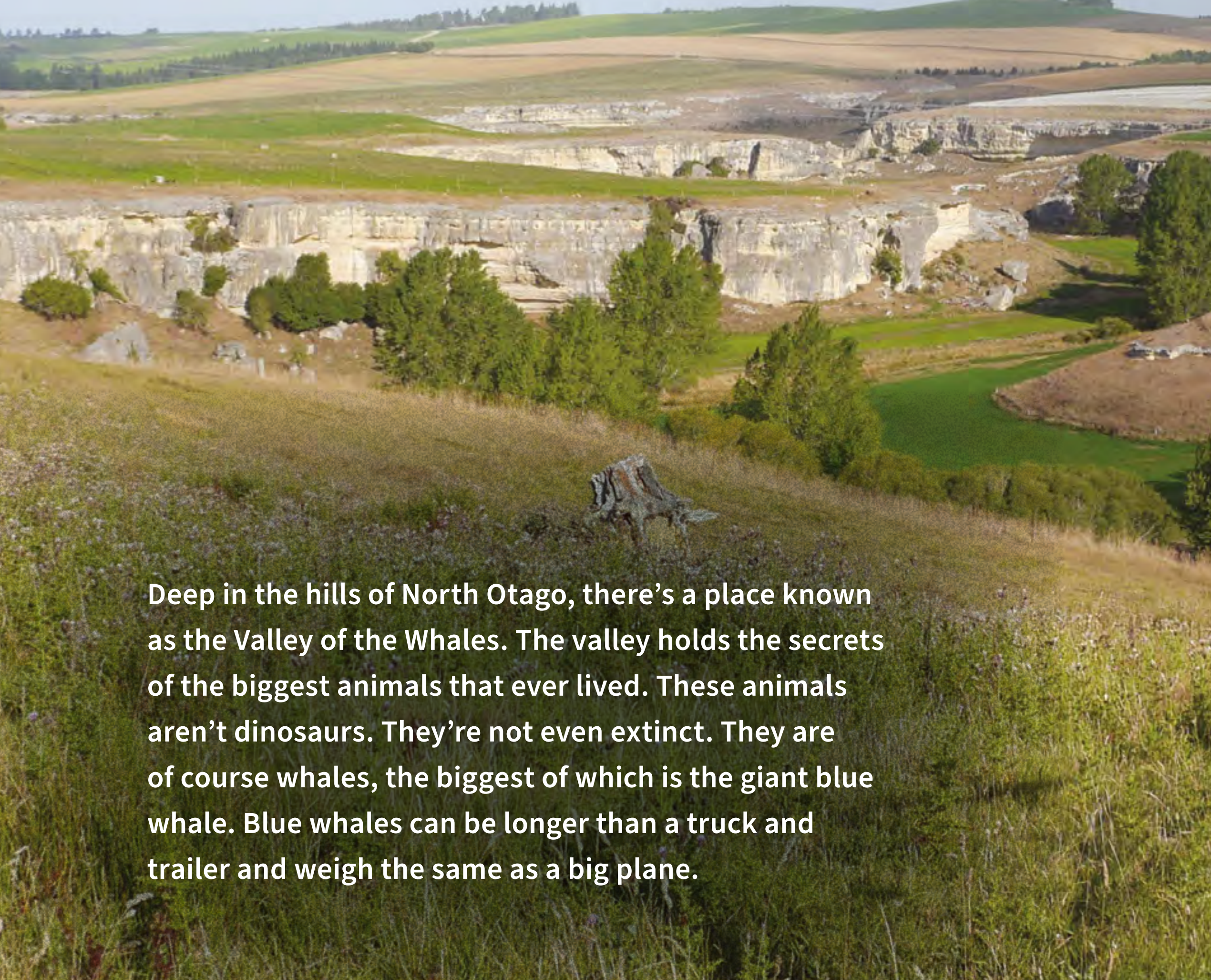
Keith married and had three daughters. After living a full, happy life, he passed away on 9 March 2017 at the glorious age of ninety-one.

Keith's Leica Camera

Keith's camera was a Leica IIIf – a famous brand. The company was the first to make a 35 mm camera, which was invented in 1913 by Oskar Barnack, a German photographer who worked for Leica. Barnack's idea was to use negatives that could be enlarged to print bigger, high-quality images. A 35 mm camera was small and easy to carry around. They became popular with amateurs like Keith as well as famous photo journalists.

VALLEY OF THE WHALES

BY BILL MORRIS



Deep in the hills of North Otago, there's a place known as the Valley of the Whales. The valley holds the secrets of the biggest animals that ever lived. These animals aren't dinosaurs. They're not even extinct. They are of course whales, the biggest of which is the giant blue whale. Blue whales can be longer than a truck and trailer and weigh the same as a big plane.

LIMESTONE LAYERS

How did these huge animals come to exist? To help answer questions like this, **palaeontologists** visit the countryside north of Dunedin. They don't look to the ocean for answers but to the ground beneath their feet. That's because the land there hides a layer of limestone, a kind of rock that formed over millions of years as shells, sand, fish bones, and corals slowly built up on the sea floor. Also buried in the limestone are the remains of some much bigger creatures, including whales, dolphins, sharks, and penguins.

SAVING TREASURES

Limestone is found in many parts of Aotearoa. Near Duntroon, a few hours north of Dunedin, the rock is an attractive creamy-white. This means it's dug up to be used as a building material, as well as for fertiliser, and sometimes diggers uncover the bones of ancient whales and dolphins. The digger drivers can't stop to collect everything they find. Most of the bones are crushed by their machines, but landowners and scientists work together to save a few fossil treasures before they're lost forever.

On a warm summer day, I head into the hills with one of these scientists. Ewan Fordyce is a palaeontologist at the University of Otago. We drive through the Valley of the Whales, a deep gash carved in the limestone by the Maerewhenua River. Incredibly, this place once lay at the bottom of the sea. I imagine strange species of whales and dolphins swimming high above the farmland, sharks and penguins zipping through clear, warm water.

We park at a **quarry** and start to walk. Ewan points out a whale bone sticking out from the rock. He explains that what we're looking at is just the end of the bone, which has been cut by a bulldozer blade. He doesn't know what else the rock might hide. There may be an entire skeleton. Getting any bones out is always a big job. Ewan and his team will cut into the limestone using special saws. Then they'll take the huge chunks to the university in Dunedin.

BACK IN THE LAB

Back in the university's lab, a team of people cleans the bones. Sophie White leads the work. She uses tiny picks and brushes and other tools to remove sand and dirt. Progress is slow. "We spend just a few days in the field, getting the bones," Sophie says, "but it takes a couple of years to clean them." Luckily, limestone is easy to work with, and the bones are in great condition. "It's hard to believe they are millions of years old," Sophie adds.

Once the bones have been cleaned, scientists study them for clues. This helps them to understand how different whale species **evolved**. "It's like dealing with a crime scene," Ewan says. "Only this crime scene is from long ago … It's important that we take our time."

First of all, the scientists want to find out which whale species the bones are from. They note important details: the position of a blowhole, the shape of an ear bone, the size of the teeth. The scientists also look for connections between the species to build a family tree. Having a family tree helps to answer another important question. How are the whale species related?

Sophie White cleaning whale bones found in the Valley of the Whales

Some ancient whale and dolphin species

Eomysticetes (or dawn baleen whales) were similar to modern whales, such as humpback, blue, and right whales. Dawn baleen whales had narrower snouts than modern baleen whales, and their blowholes were further forward on their heads.

Waipatia maerewhenua swam in the waters around Aotearoa 25 million years ago. This dolphin species was identified after a skull was found in North Otago. *Waipatia* had unusual teeth that pointed forward. Scientists think the dolphin snapped them together to trap fish and squid. Like many modern dolphins and whales, *Waipatia* probably hunted prey using sound.

Squalodontids (or shark-toothed dolphins) were found in our waters between 23 and 15 million years ago. They were named for their triangle-shaped, saw-like teeth. Shark-toothed dolphins are thought to have hunted *Kairuku*, an extinct giant penguin that's also been found in the limestone in North Otago.

A shark-toothed dolphin eating a giant penguin (*Kairuku*)

THE FIRST WHALES

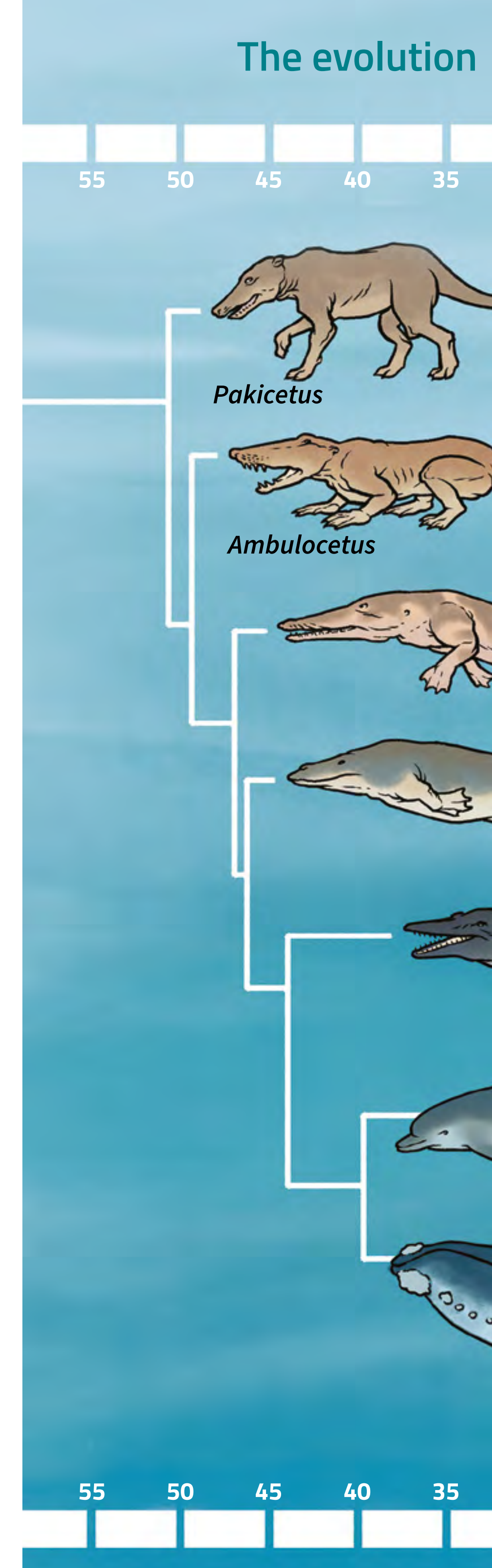
Every whale that ever existed can be traced back to *Pakicetus* or a species very much like it. This four-legged animal walked on land around 50 million years ago in the part of the world we now call Pakistan. Over time, animals that **descended** from *Pakicetus* and its relatives began to spend more time in the water. Scientists think some of the first whales behaved like crocodiles. They probably lived and hunted in water and crawled onto land to rest.

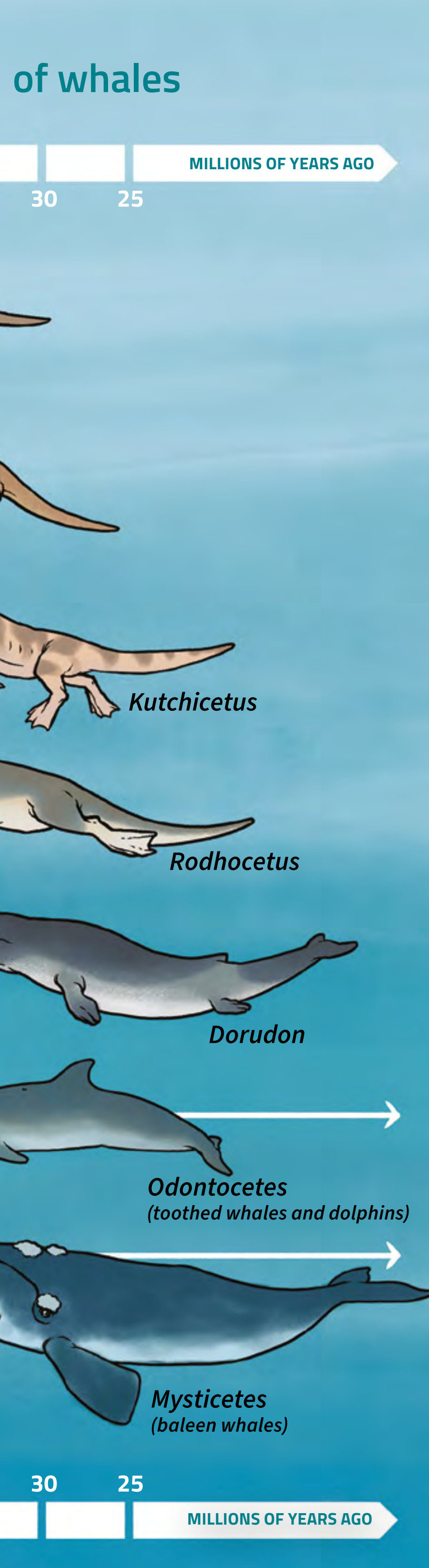
By about 40 million years ago, whales spent all of their time in the water. Eventually, they lost their legs because they no longer had any use for them. They evolved **flukes** on their tails for swimming, and their nostrils moved to the tops of their heads, becoming blowholes. These early whales became large predators. No longer stuck on land, they spread around the world, including the ocean near New Zealand.

25 MILLION YEARS AGO

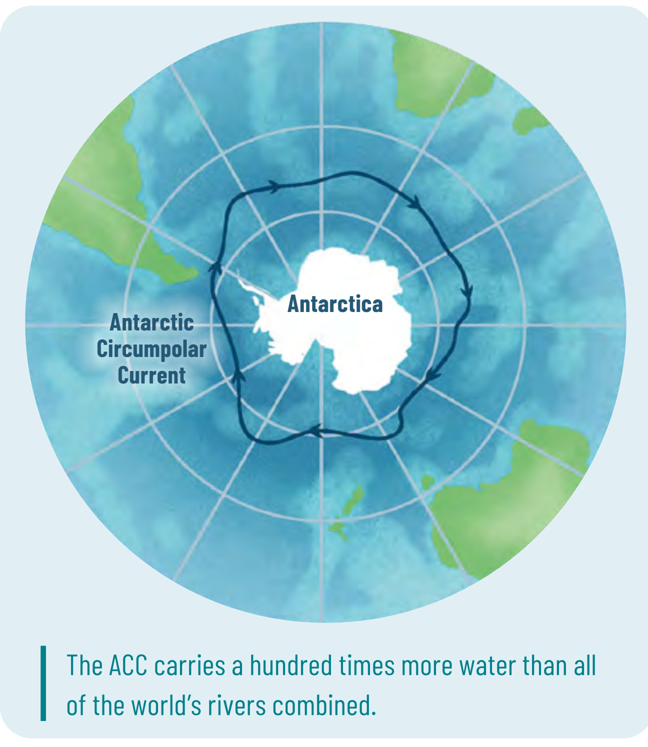
The limestone in Otago was formed around 25 million years ago. Back then, New Zealand was a string of islands surrounded by a warm sea. Turtles and other tropical species swam in this water. Coral reefs grew.

By this time, South America had separated from Antarctica. When the two land masses finally broke apart, an ocean current was able to flow around the bottom of the planet. We call this the Antarctic Circumpolar Current (ACC).





The ACC formed a belt of cold water that circled the whole of Antarctica. The huge movement of water caused nutrients to be drawn up from the depths, creating a zone rich in marine life, especially **plankton**. This led to an enormous explosion in sea life, including tiny creatures called krill, which feed on plankton.



The ACC carries a hundred times more water than all of the world's rivers combined.

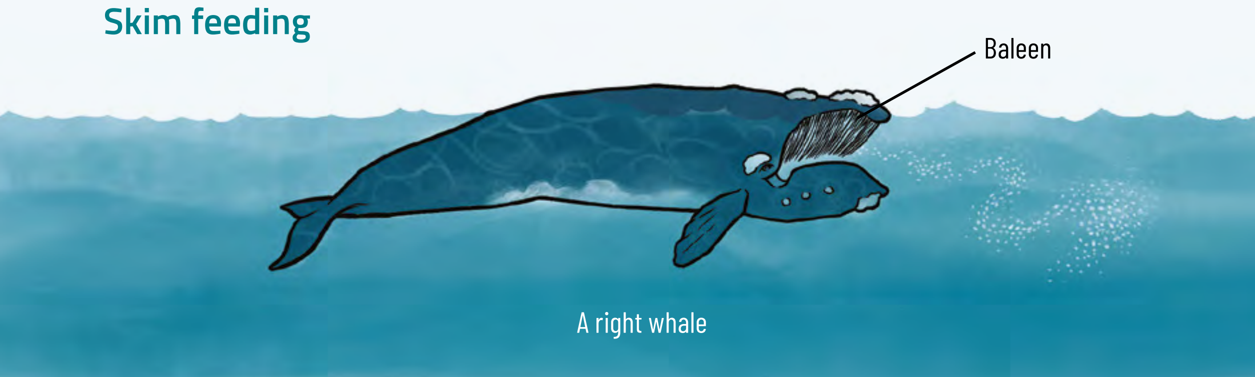
To make the most of this new supply of food, Ewan thinks some species of whales in the Southern Ocean evolved to eat krill and other small marine species. Because they were no longer hunting large animals, these whales had no need for their teeth. Instead, they grew bristles, called baleen. They used their baleen like a sieve to catch prey.

A MASSIVE FEED

Some baleen whales, including right whales, skim the water's surface to collect food on their baleen. Other whales have evolved a way to eat even bigger meals through lunge feeding. Whales that lunge-feed open their mouths wide, then push their bodies through the water with great force. The movement drives a massive amount of water into the whale's mouth. After closing its mouth, the whale pushes the water out through its baleen, leaving the food behind.

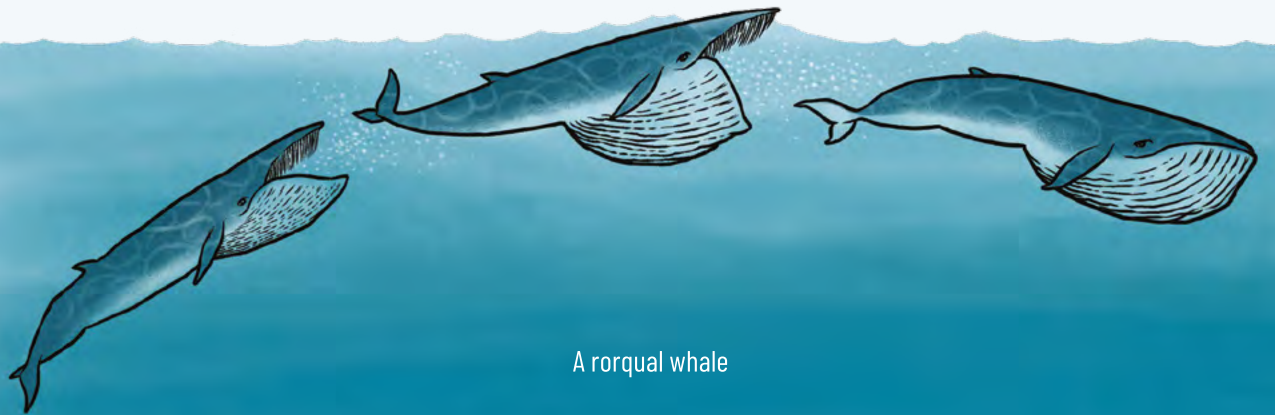
Scientists think that the evolution of lunge feeding was one of the things that allowed baleen whales to grow to a huge size. These days, **rorqual** whales have taken lunge feeding to the extreme. Before swallowing a swarm of krill, a rorqual whale is able to drop its lower jaw to almost 90 degrees. It can then take in 80,000 litres of water in a single gulp – along with half a ton of krill.

Skim feeding



A right whale

Lunge feeding



A rorqual whale

THE DEEP PAST

Ewan tells me that North Otago is one of the best places in the world to explore the evolution of whales. “The bones we find there help us learn what whales were doing in the Southern Ocean 25 million years ago,” he says.

For Sophie, the chance to peek into the deep past is a reward for all their hard work. “It’s an amazing experience, carving away the stone. Out comes this creature that hasn’t seen the light for millions of years. It’s like looking back in time to another ecosystem.”

Glossary

descended: came from (an ancestor)

evolved: changed very slowly over millions of years

fluke: the two pointed parts of a whale’s tail

palaeontologist: a person who studies plants and animals that lived millions of years ago

plankton: tiny marine creatures and plants that drift on ocean currents

quarry: a large pit from which rock is dug

rorqual: a kind of baleen whale with a pleated throat and dorsal fin

Pākehā Tapu Day

by J. Wiremu Kane
(Ngāti Toro, Ngāti Manu, Te Māhurehure)

Kororāreka, 1828

Mawhiti and Oma found their pāpā on the beach, giving orders to his men. It was early. Tamanuiterā had barely risen above Tapeka Point, his rays catching the first smoke rising from the cooking fires and the masts of the whaling ships anchored in the bay. Although it was Sunday, the whole village was awake. There was work to be done.

The missionaries across the inlet at Marsden Vale called Sunday the sabbath. The twins' pāpā – the great rangatira Uruti Te Whareumu – called it the Pākehā tapu day, when the Europeans rose late, put on clean clothes, and left off work. Mawhiti and Oma had their own name for such unusual behaviour, but it was too rude to share.

Pāpā and his men were with the waka taua. The great canoes lay in wait above the high-tide line while Pāpā readied his people for war. His mana was so great the Europeans called him King George, the name of their own king on the other side of the world.

"Tēnā koe, Pāpā," Mawhiti called.

Pāpā smiled. "Tēnā kōrua," he said. "About time! We're hungry."

For the next hour, the twins ran between the beach and the kāinga, relaying messages and fetching tools and kai. At thirteen, Mawhiti was on the cusp of being assigned her own duties, but for now, she ran the errands of a child. Her māmā had given her a kete filled with cooked fern root and fish to hand out to the men. She went to Pāpā first.

"Are our Pākehā still asleep?" he asked. Mawhiti nodded, then waited while Pāpā sucked at the fern root's jelly and spat out the clinging fibres. "Tino pai, but keep an eye on Mr Earle. I think he's starting to suspect something."

"His house was quiet when we went past," said Oma.

"Good," said Pāpā. "It will be a while before he stirs. We'll take our tea on the beach. If you could bring it to us, please."

Mawhiti gave a nod, but she saw a worried look flash across her brother's face. "Āe, Pāpā," she said.

As soon as Pāpā went back to work, Oma turned to his sister. "Pāpā's tea set!" he hissed. "We left it at Mr Earle's last night."

"Then we'll just go and get it," said Mawhiti. "Me haere tāua."

The artist's house lay at the far end of the beach. It was the largest of the whare built in the European style, a three-roomed cottage with windows and doors. The men in the kāinga had helped to build the house – they considered it as much their property as Mr Earle's, and King George and the other rangatira visited every night. They drank tea while the Europeans enjoyed their wine and rum, and they all smoked pipe after pipe of tobacco. Mawhiti would carefully pour the tea while Oma sneaked sugar cubes from Mr Earle's china bowl.

On any other day, the twins would have walked in and taken the silver teapot and milk jug and the mismatched cups with their saucers after a polite knock on the artist's kauri door.

But Mr Earle had been exhausted the night before. The circular conversation – in its rough combination of English and te reo – had gone on and on. Mawhiti remembered the way the artist's eyelids had drooped as the evening wore on.

"Surely you men need your rest," Mr Earle said at one stage. It was the closest he'd come to asking his nightly visitors to leave. "You have much to do tomorrow."

But Pāpā had shaken his head. "Tomorrow is your tapu day, so we leave off work out of respect to our Pākehā friends."

"You are too gracious," Mr Earle replied, bowing slightly. Oma had glanced at Mawhiti and smirked.

Now they stood uncertainly at the front door. “Do you think Mr Earle meant it when he said he’d teach us to draw?” Oma whispered.

“He was just being polite,” said Mawhiti. “You know he and Pāpā like to out-do each other. And Mr Earle is still making up for his hen.”

A few days earlier, the artist had needed tinder for his fire. He had taken tōtara shavings from the beach, not realising they came from a waka taua and were tapu. Mr Earle had apologised profusely. He was pardoned, and that would have been the end of it … only one of his hens had also turned some of the shavings into a nest and hatched a brood of chicks. Mr Earle was mortified further, and the hen duly sacrificed and eaten.

“He’ll be missing his eggs,” Oma said, sniggering at the memory.

“Shh!” Mawhiti hissed as the front door swung open.

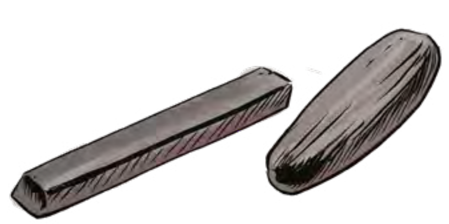
Mr Earle stood bleary-eyed in his trousers and shirtsleeves. Mawhiti had never seen him without a jacket and hat; he looked almost naked.

“Oh,” he said. “Tēnā kōrua, my good prince and princess. Why are you up so early on a Sunday?”

“We’ve come to fetch Pāpā’s tea set,” Mawhiti said.

“Of course, come in.”

Mr Earle was their pāpā’s favourite Pākehā. Many of the rangatira in the north had Europeans living under their protection, but King George of Kororāreka was the only one to house a renowned artist. He was also special to Mawhiti. The whalers were coarse-tongued, and the missionaries had no time for children, but this Englishman was different. In the evenings, as the shadows grew long, he would sketch the taua returning from their waka or the gardeners from the māra kai. He’d set up his easel in a quiet spot, and he always welcomed Mawhiti to sit alongside him and observe. She marvelled at the way the artist was able to capture the slaves pounding fern root with just a few deft strokes of his pencil.



Oma found the tea tray and started looking for stray cups and saucers. But Mawhiti was distracted. Every surface was covered in sheaves of paper. Some had beautiful, flowing handwriting; the rest were sketches and paintings. Mawhiti recognised a drawing of her older sister, Arihia, her lips shaded, and another of the tattoo artist Arangi. The lines and spirals on his mataora had been copied exactly.

There was also the drawing of the slaves Mr Earle had started on a few days before. He'd added low huts and raupō fences and had begun to colour the sky, using watercolours in soft blues and white. The hills were now gold and green.

Mr Earle noticed her inspecting the painting. "What do you think?"

"The colours are too dull," Mawhiti said after a moment.

Mr Earle laughed. "You're right. I can't seem to capture the intensity of the light here. I doubt the people of England would believe it even if I could." He tried, unsuccessfully, to hide a yawn. "Well, you two had better be off back to bed."

Mawhiti blushed. Why did the man look so amused? Was Pāpā right – had he guessed?

"Sorry to wake you, Mr Earle."

"Not at all," he said. "Your father needs his teapot, especially on the sabbath! In all my travels, I've never met a king quite like him."

Back on the beach, the tāne were busy patching and caulking the waka taua. Then there were muskets to be cleaned and oiled and barrels of powder and cartridges to be counted. In the fields beyond the kāinga, the wāhine had kūmara and corn to harvest, peaches and melons that needed picking. There was flax to be dressed, potatoes and hogs to be prepared for sale to visiting ships, fish to be dried and fowl preserved for the upcoming voyage of the toa. But all that work would stop the moment the first Pākehā stirred …

Carefully, Mawhiti poured the tea.

"Everything in order?" Pāpā asked. Mawhiti nodded. "Tino pai."

illustrations by Andrew Burdan

Note: This story is based on fact. The author is the great-great-great-great-great grandson of Uruti Te Whareumu. The English painter Augustus Earle really did live in Kororāreka in 1828 under Te Whareumu's protection, and the rangatira was called King George. Earle is thought to be one of the first artists to travel the world independently. He was definitely the first European artist to visit Aotearoa. He'd met Māori in Sydney and was curious to learn more. Te Whareumu had good relationships with the missionaries and traders. He welcomed all Pākehā, regardless of their status, to live on his beach.

Beyond Imagination

by Veronika Meduna

When I was getting ready for my first visit to Antarctica, I'd already explored the icy continent many times in my mind. This imaginative version was a frozen land at the end of the world, a white wilderness hostile to life. It was also limitless, beautiful, and empty. Above all, my idea of Antarctica was of a place that never changed. I'd read that Captain Robert Scott had left a dead emperor penguin in the hut his men built for their ill-fated expedition. The penguin was still there a century later.

A bell-wether

I was going to Antarctica to report on the work of scientists who were studying what the climate was like in the past. While I was filled with anticipation, two days before leaving, panic hit. What if something went wrong? What if I got stuck there? Can people even make phone calls from Antarctica?

As I boarded a cargo plane for the eight-hour flight across the world's wildest ocean, I was still anxious. I worried that the real Antarctica would be nothing like the place I'd imagined. And I only had three weeks – surely not nearly enough time. The latter turned out to be true. On that first visit, I spent most of my time sleepless and overwhelmed. I was determined to make the most of the constant daylight so I could understand a place everyone referred to simply as "the ice". Antarctica was so vast, so full of stories. It seemed not only different from my imagined frozen land but somehow *beyond* imagination.

Thankfully it wouldn't be my only visit. Over the next twenty years, I returned to the ice twice more. I learnt that far from being separate and never-changing, Antarctica connects us. It drives global weather patterns and ocean currents, and in a warming world, it's changing faster than most places on Earth. The continent is our bell-wether of climate change.

The world's largest ice cube

Antarctica is the world's largest ice cube, frozen on top of a rugged mountain range that disappears almost completely under the ice. The continent has so much ice (three-quarters of our planet's fresh water) that it comes with its own vocabulary. There is the huge, continent-covering frozen blanket that splits into two ice sheets, which in turn are made up of smaller ice caps, ice domes, frozen rivers, and glaciers.

Antarctica's ice moves in constant slow motion. From the sheets, it flows out onto the ocean. Here, beyond the fringes of the continent, it becomes ice shelves, floating but still attached to the land-based ice. The largest of these is the Ross Ice Shelf, the starting point of many famous expeditions, including Captain Scott's forlorn haul to the South Pole. It's also where New Zealand built its research station, Scott Base, in 1957.

Beyond the ice shelves, an apron of sea ice circles the entire continent. The sea ice moves to its own rhythm: expanding during the dark months of a polar winter and shrinking during summer, when the sun doesn't set for six months. This is Antarctica breathing in and out.

Tiny bubbles

All three of my trips took place during the summer, when most scientists work. Although there was a large gap between visits, I caught up with the same people each time. Talking with them, it became clear that the ice is changing at an accelerating pace.

Antarctica is one of the world's best-kept archives. It contains records of environmental conditions that stretch back millions of years. Climate scientists go there to work out what the future might bring. The ice is a looking glass on the past, and this was always my focus, as it was for many of the scientists.

On my first trip, after I'd completed survival training at Scott Base, a helicopter dropped me at the Dry Valleys, one of the few places in Antarctica not covered in ice. My destination was a field camp where a team of scientists had lived on a glacier for weeks. They'd dug out a massive cavern so they could reach deep layers of ice.

Nancy Bertler is a glaciologist. She told me that in Antarctica, falling snow encloses dust and bubbles of air. Over time, the fallen snow builds up in layers that turn to ice. The deeper the scientists cut down through this ice, the further back in time they travel. Bertler thinks of each icy layer as a treasure trove. The air bubbles are tiny samples of ancient atmospheres, and the mix of greenhouse gases they contain represents a snapshot of past climates. These bubbles tell us that Earth's atmosphere has more greenhouse gases now than at any time in the past 800,000 years, long before the beginning of our species.

The sea floor

A decade later, I had the chance to look even further back in time. I joined geologist Tim Naish and his team as they drilled deep into the sea floor beneath the Ross Ice Shelf. Like the ice, the sea floor also builds up in layers that hold information about the past. These scientists managed to reach back about 5 million years, to a time when greenhouse gas levels were similar to the ones today and Earth was a warmer place. It's these layers on the sea floor that tell us the area now covered by the world's largest ice shelf was once open ocean. For Naish, this window on Antarctica's past – and a warmer world – was also like looking at the future.

By the time I returned for my third trip, some of his projections had become reality. A warming ocean was melting floating ice shelves from below. Glaciers flowing out to sea were shrinking and retreating fast. Smaller ice shelves were collapsing. Antarctica's melting is now raising seas around the world.

Still there

I haven't been to Antarctica since 2019. In that time, we've learnt that the average temperature on the Antarctic Peninsula has climbed by 3 degrees Celsius – far more than the average rate of global warming. The massive current that circles the frozen continent is also speeding up, and scientists think this might be changing the way sea water carries heat and nutrients around the globe. Even East Antarctica, long thought to be a sleeping giant, has seen the collapse of ice shelves. And in the middle of the continent, the coldest place on Earth, temperatures briefly soared to more than 40 degrees above the normal monthly average.

The dead emperor penguin in Scott's hut is still there, but its living relatives have joined the list of endangered species. Emperors depend on Antarctic sea ice to raise their chicks. The penguins' ideal conditions lie within a narrow comfort zone. Too much ice means they have to travel a long way for food and their chicks might starve. Too little ice means the chicks might not have enough time to grow fat or develop their coat of waterproof feathers. If the current trend of global warming continues, Antarctica's sea ice is expected to decline at a rate that puts emperor penguins at risk of extinction by the end of the century.

Close ties

For a long time, Antarctica was a place we could only imagine. It has a very short history of research: the earliest land expeditions there go back only a little more than a century. But each team returned with evidence of Antarctica's close ties with the rest of our planet.

Scott's expeditions had a scientific purpose, alongside adventure. Even as his men were returning from the South Pole, disheartened and starving, they lugged 16 kilos of fossils they'd collected along the way. Among them were samples of *Glossopteris*, an extinct beech-like tree from 250 million years ago. The tree had also grown in Australia, Africa, and South America, and it was the first evidence that Antarctica was once part of a prehistoric landmass known as Gondwana.

Today, despite its distance from other land, Antarctica remains connected to the rest of the world through the atmosphere and the ocean. The continent drives ocean currents that push warm water up along coastlines in the northern hemisphere, where most people live.

Keeping promises

Antarctica is an early-warning system about global change. It's also a galvanising force, encouraging us to act. We've done it before. In the 1980s, finding the ozone hole above Antarctica led to one of the fastest global agreements governments around the world have ever made. They quickly banned the household chemicals that were causing that hole.

Now the continent is telling us that climate change is well and truly under way. For scientists like Bertler and Naish, the ice has delivered the strongest message yet. In 2015, almost two hundred countries signed the Paris Agreement, a legally binding international treaty to address climate change. Now we need to deliver on that promise to keep the ice frozen.

Tokotoko

what they don't tell you is
it took thousands of us to make you
let the vines grow and then
braid them together

you could be a tokotoko
they'll hold you to count the seasons
back to that first separation
worn smooth in some spots

others never even carved at all
we may not be sure what is missing there
but gaps are okay
gaps are where we keep all the stories

whakapapa is where you're from
it's who you are
when time winds back on itself
in double helixes

the strands our tūpuna carried
all the way from Hawaiki
twisting branches that
we can hold to remember

everything that came before.

Kōtuku Titihuia Nuttall

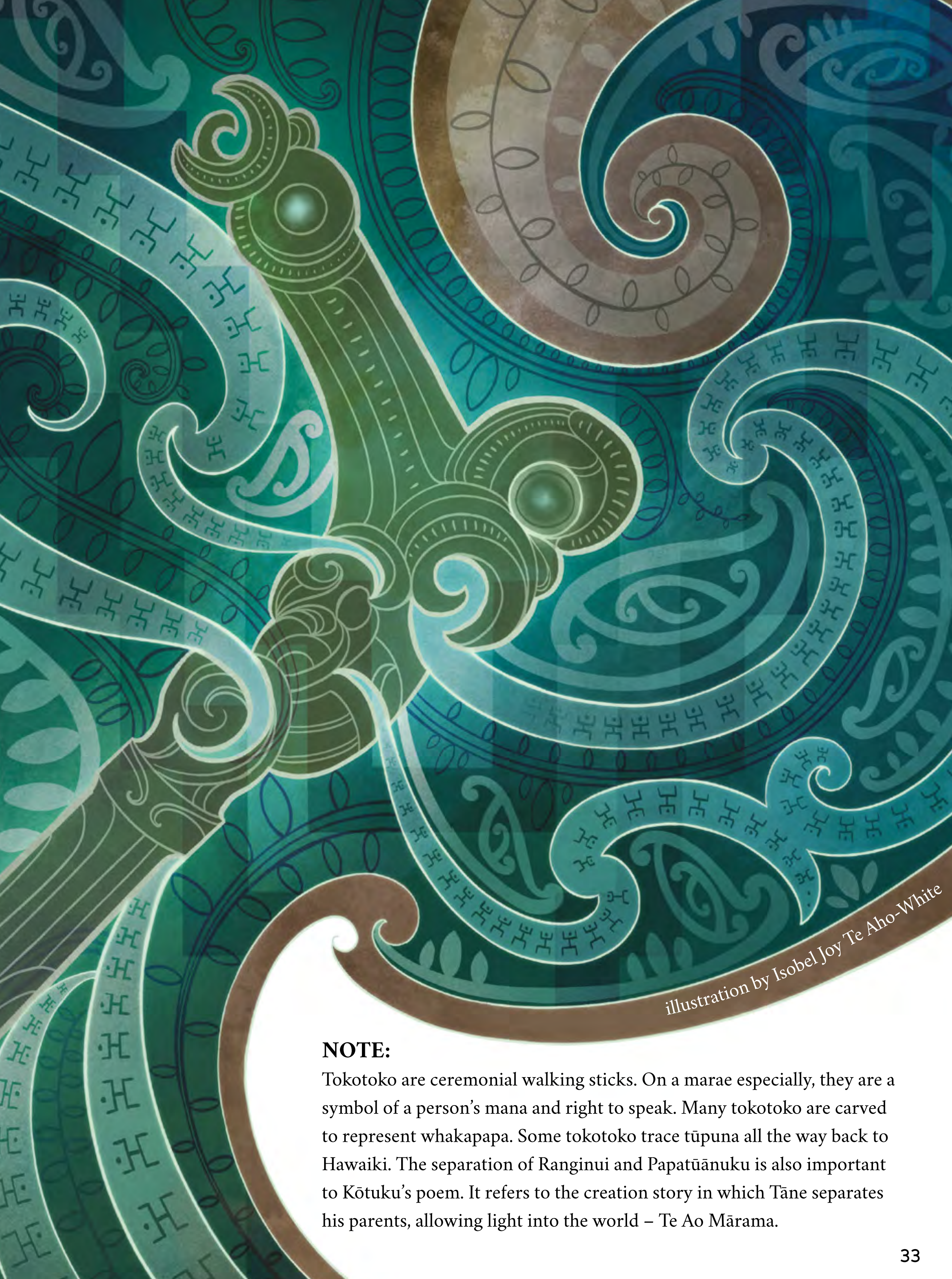


illustration by Isobel Joy Te Aho-White

NOTE:

Tokotoko are ceremonial walking sticks. On a marae especially, they are a symbol of a person's mana and right to speak. Many tokotoko are carved to represent whakapapa. Some tokotoko trace tūpuna all the way back to Hawaiki. The separation of Ranginui and Papatūānuku is also important to Kōtuku's poem. It refers to the creation story in which Tāne separates his parents, allowing light into the world – Te Ao Mārama.

Paper

Claire was the first up. The adults were still tired from the night before. They'd had dinner at a fancy restaurant, where the chairs had been covered in a cream fabric, backed with decorative bows. When the guests were seated, it looked as though they were wearing big, poofy wedding dresses.

The celebration wasn't a wedding – it was a birthday. Wai Po's seventieth. She'd wanted all her family to be there, and so Claire and her mum had made the long flight to China. Claire loved staying in her grandmother's apartment. Every surface was covered in photos: eldest aunty in a dance costume, smiling proudly; middle aunty hunched over her watercolours; Claire's mum receiving some kind of prize; all three sisters in front of the tiger cage at the zoo. Claire thought it must be fun to have siblings. For starters, you wouldn't have to play board games with your parents.

She stood on the couch to take a closer look at the photo of her mum, and there, down between the back of the couch and the wall, she noticed the edge of another photo frame. It must have slipped. Claire got on the floor, lay on her stomach, and fished around till her hand reached it.

Tiger

BY ROSE LU

It wasn't a photo but a tiger, cut from a single sheet of red paper. Claire had never seen anything like it. She couldn't imagine scissors sharp enough to cut the almonds of the tiger's eyes or the stripes on its tail. Carefully, she opened the frame to take a closer look. The tiger was even more impressive up close. The paper was so thin her breath caused the creature to ripple and dance. She wondered where it came from and why it was behind the couch.

There was a rap on the front door. A cracking yawn came from the spare bedroom, followed by slow footsteps. Eldest aunty had jet lag after her long flight from Canada. Still in her pyjamas, she opened the door. It was a cousin – Claire couldn't remember which one – and he held a bag of steamed buns.

All that day, she wanted to ask about the tiger, but the stream of visitors never stopped. It was exhausting, and everyone had a different title – Claire couldn't just say "uncle" or "cousin" like she did in English. Her mum had to whisper the right names in her ear. It felt as though the day would never end, but at least their guests brought snacks: milky white rabbit lollies, perfectly round longans, peanuts boiled in their shells.

It wasn't until dinner that Wai Po finally closed the door on the last visitor. When they sat down to eat, Claire held up the framed tiger. Middle aunty's face lit up in recognition, and she snatched the picture from Claire with a shriek. She started telling a story in Mandarin. Claire couldn't understand what she was saying, but it seemed to be funny. Middle aunty's voice and arms rose with excitement. Suddenly, she let out a squawk and slapped her hand down on the table, causing a piece of fish to go flying. Middle aunty was too busy laughing to notice the food narrowly miss her youngest sister's face.

Claire looked to her mum, wanting a translation, but she was frowning at her plate. Everyone at the table was laughing apart from them. Claire's aunties and grandmother were making as much noise as the entire family last night. When Wai Po laughed, she threw her head back so far that Claire could see up her nostrils. The best stories always ended like this.

"I'd forgotten about that tiger," eldest aunty finally said to Claire, wiping away tears.

"I found it behind the couch," Claire said. "It must have fallen off the wall."

"No. I'd say that's where Wai Po hid it!"

"Why would Wai Po hide it?" Claire asked. Again, Claire glanced at her mum, who remained silent, arms crossed. Claire had never seen her like this.

Eldest aunty had noticed, too. "It's been so many years, and you're still upset about it?" she asked. When Claire's mum didn't respond, eldest aunty turned back to Claire.

"Wai Po came home from a work trip with three paper cuttings. There was a tiger, a cow, and a chicken. They were presents – she always brought us presents – and she said we could pick one each. Of course we all wanted the tiger, and of course, your mum was given first choice.

We said it wasn't fair, but your mum cried and hollered, and Ma gave in, as usual. The baby of the family always got special treatment."

"Special treatment?" said Claire's mum. "Ma was only looking out for me because you two always ganged up on me. Saying things like I had to give you part of my lunch as an older-sister tax …"

Eldest aunty laughed. "That was only because Ma packed you treats!"

"I never got anything you didn't get too. Apart from hand-me-downs." Claire's mum stood abruptly. "And nothing's changed. You've got two voices in the story while I only have one."

To Claire's surprise, her mum left her rice half-eaten and walked out of the room.

The table was silent for a while. Wai Po took the paper cutting from eldest aunty and shook her head ruefully at her daughters.

"I guess that's why Ma decided none of us should have the paper tiger," middle aunty said.

The family was eating dessert when Claire's mum returned. She sat at the table, gazing down at her folded hands. Middle aunty was peeling longan. Wordlessly, she put the translucent fruit in front of Claire's mum. She waited while her sister put them in her mouth and spat out the shiny black seed. Middle aunty and eldest aunty exchanged words in Mandarin, and eldest aunty began to peel longan for Claire. "When we were younger," she said, "I should've looked after your mum. But I was jealous of all the attention she got."

"I thought siblings just meant having people to play with," Claire said.

"Oh, we had plenty of fun. We liked to go to the night market and watch the circus performers."

"I was a little spoilt as a kid," Claire's mum admitted. "We were only allowed one treat at the market … to share! We always got the candied hawthorne. My favourite."

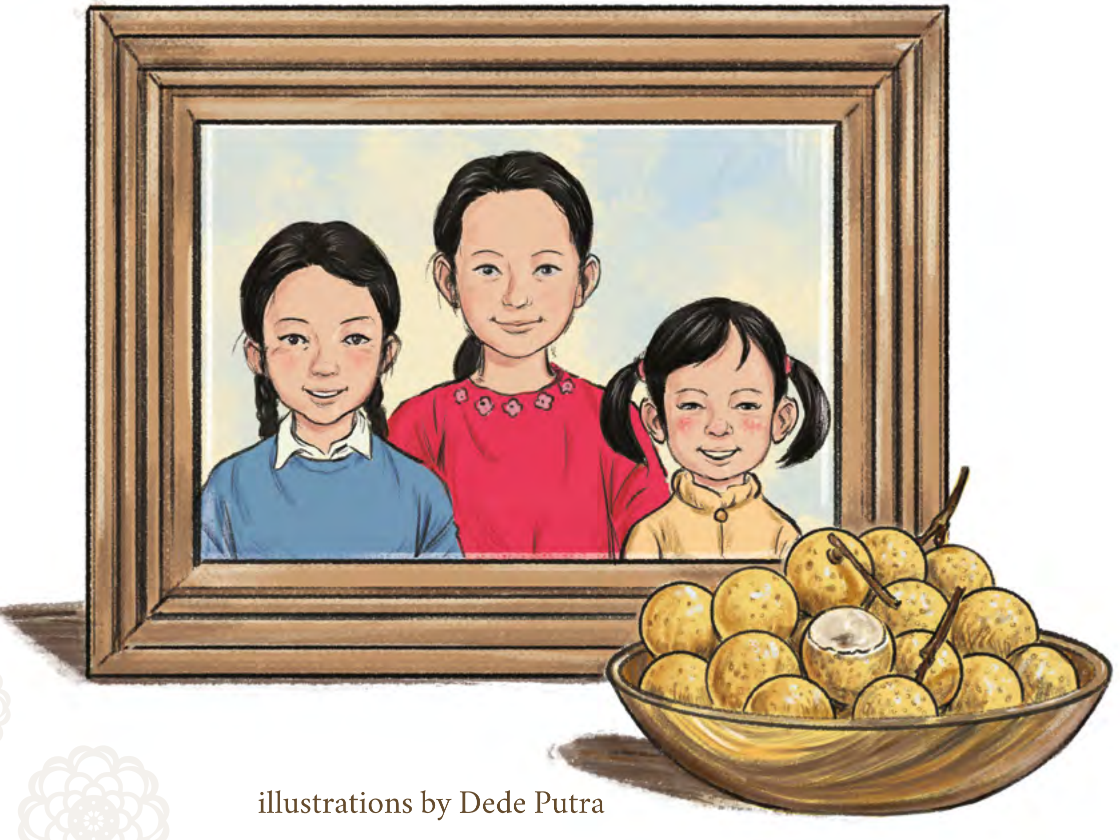
Eldest aunty laughed. "I think middle sister convinced you it was your favourite, but actually, it was hers! You always pulled a face when you got to the sour centre and gave her the rest."

Wai Po handed the paper tiger to Claire.

"Can I have it?" Claire asked.

Wai Po nodded. Then she said something in Mandarin.

"Your grandmother said it's a good thing you don't have any siblings," Claire's mum translated with a laugh.



illustrations by Dede Putra

Silk Robes *and* Big Hats

BY SARAH NATALIE WEBSTER

Sam Duckor-Jones lives in a bright pink church called Gloria in a small seaside suburb of Greymouth, on the West Coast of Te Waipounamu. The church wasn't always pink, and it wasn't always called Gloria. When Sam bought the building in 2020, it was a sad colour, a sickly grey like a forgotten sock.

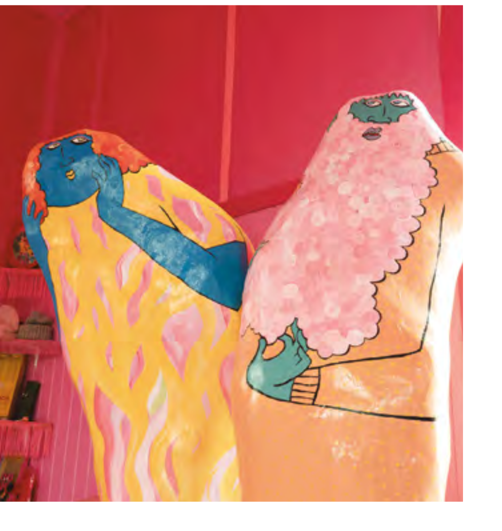
The grey church was also nameless, although it used to be called Andrew (more accurately, Saint Andrew's) before it was deconsecrated in 2018. After losing its name and official church status, the old building stood empty – unvisited and unloved – until the Wellington artist came along. Sam bought the building, and like a queer fairy godmother, he slowly turned it pink (although he used a paintbrush instead of a wand).

So the old place became Gloria, a kind of architectural Cinderella story. Now people come from all over to see the fabulous pink church, which is also Sam's home and his biggest artwork to date.

Pink and proud

Anyone who visits Gloria can see Sam loves pink. The walls are pink. The ceiling is pink. His bedspread and rug are pink. The altar is adorned with pink curtains and pink beads and pink flowers. Above all this, Gloria's name shines pinkly in neon letters. There's even a hot-pink piano with a matching furry chair.

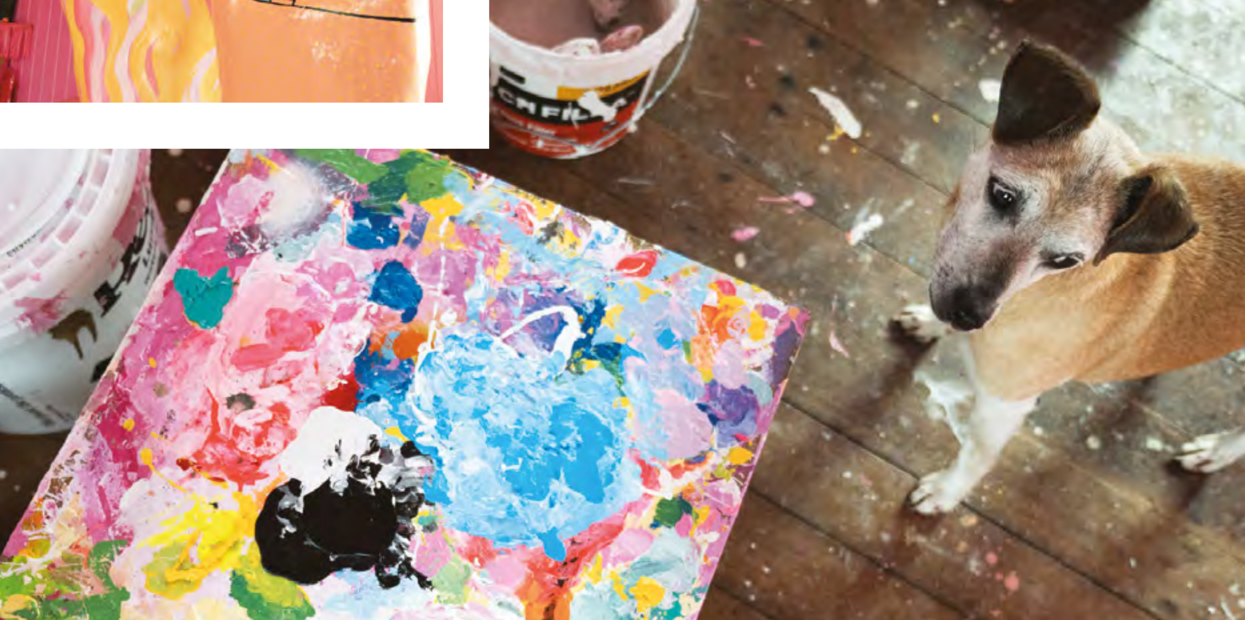
Pink has appeared a lot in Sam's art over the years. He says it's an important colour for him. On the one hand, pink is often used to represent queerness and gay liberation. But pink can take on many different meanings, depending on the shade, from romance to flowers to babies to kitsch to fantasy. "I like pink because it's still kind of shocking," Sam says, "even though it's cool now too." While Sam avoids assigning meaning to his own work, it's undeniable that painting a former church bright pink is a powerful statement of pride. And Gloria makes this serious point with as much silliness and joy as possible.



The 1990s

Sam always knew he wanted to be an artist. "I didn't enjoy school much because I wasn't able to make things all the time." He remembers his desk being filled with twigs, bark chips, rocks, feathers, flax. Sam squirrelled away any kind of material he could get his hands on; it all had potential. Making stuff was a form of escape for a lonely, anxious boy who felt different from his classmates. He found "the politics" of the playground stressful.

Sam went to school in the 1990s. There was a lot of homophobia, and kids who identified as LGBTQI+ didn't feel included. By the age of twelve, Sam knew he was gay but felt the need to disguise it. He was afraid he wouldn't be understood or accepted. But if making things was a refuge, it also helped him to connect. Sam used drawing as a way to find people who were going through the same things.



Safe haven

Sam found a safe haven in being creative. For him, it was an act of joy and discovery. “Art isn’t just for the arty kids. It’s for anyone who’s having a hard time,” he says. “Art is about not knowing, being surprised, working things out, brushing up against beauty – and there’s a lot of comfort in that.”

For Sam, art is a verb. It’s about the process of *creating* things, not the finished product. Sam believes it’s this compulsion that made him an artist. “I just want to make stuff. Make stories. Make drawings. Make sculptures. Just make – and it doesn’t always have to be good.”

In the art world, Sam is described as a multi-disciplinary artist. He likes to switch between forms – sculpture, drawing, and poetry – so he doesn’t get bored. Taking a break from one thing, such as sculpture, allows him to return refreshed. Sam says another benefit of working across multiple forms is that when he gets stuck on one project, he can always sink into another. “And artists always get stuck,” he adds.

Sculptures: Indoorsy types

As an artist, Sam is known for his sculptures. He likes to make larger-than-life men, often naked or in teeny shorts. Sam sculpts these men from clay or papier mâché and paints them in bright colours – pink, of course, but also purple, yellow, and gold. Some of his men are covered in multi-coloured dots. Sam is participating in a long artistic tradition that dates back to ancient Greece and Rome. Yet his men are nothing like the famous sculptures from antiquity – heroes in heroic poses, marble muscles flexed, proudly displaying their chiselled abs.

Sam's men are more indoorsy types: soft-bellied, long-fingered, and shy. Their heads tend to be too small for their bodies. They stand around awkwardly, staring at their hands as if unsure of the space they're taking up. "I like my sculptures to be a little bit vulnerable and also a little bit silly," Sam says. "Art is so serious, isn't it? It's nice to have a giggle." But Sam's skinny-armed men carry a serious message too, especially in a sports-mad country like New Zealand.

Poems: Loneliness and longing

Sam also writes poems and stories. He sees this as another kind of making, only with words instead of clay. Words allow Sam to create characters like his sculptures, although these characters can talk and be part of a story.

Sam has written two books of poetry. His debut collection is called *People from the Pit Stand Up*. One of the main characters in the book is a sculptor (the reader suspects it's Sam). The sculptor tells us about living alone in a small rural town – about loneliness and longing and never mowing the lawns. The poems describe the process of making men out of clay: "begin with the feet" and "wield a slab of clay the size of a short piece of two-by-four, hold it like the butcher with his fresh young cut firmly in two hands". Even Sam-the-poet can't resist writing about making things.

Another poem describes the night the sculptor's bike was stolen:

> *It's good to live in a house full of golems*
> *In the summer when my bike was nicked*
> *Me asleep down the hall*
> *Hot night*
> *All the doors flung open*
> *I hope those thieves poked their noses in*
> *& lit up the room with their phones*
> *Eyes peeled for iPads & laptops*
> *Illuminating instead the terrible faces of nudes who loom …*

The sculptor-narrator concludes that the thieves probably scrammed pretty quickly after that!

How Gloria of Greymouth rose again

Most people think of poetry as an art form that's quiet and contemplative. But it can also be a form of protest. One morning, Sam woke to find that Gloria had been covered in homophobic and anti-Semitic graffiti. A rainbow flag, left on the front lawn, had been burnt to ash. Sam would write about the vandalism, and the poem ("How Gloria of Greymouth rose again") would be published online.

Word spread then & folks showed
up in droves. With flowers & cards & hugs & tears & support & outrage
Gloria's pink icing flanks were restored by noon
We sat on her paint spattered floor. We ate sandwiches
We caught each other's eyes & crinkled a bit & looked away
We checked our phones & said so & so & so & so & so & so just heard …

Sam also talks about the drag-queen show due to be performed on Gloria's stage that night. He and his friends refused to be demoralised by the act of hate. Instead, Sam says, they put on their highest heels and "glitteriest" jackets and sang and laughed and twirled.

We did the same thing the next night & the night after that
We continued to be vividly outraged &
We continued to be queerly defiant &
We put on our silk robes & our big hats & our gumboots &
We watched the sun go down & the glorious coast was lit up as pink as a lullaby &
We twirled.

A pinker world

Sam’s poem – “How Gloria of Greymouth rose again” – was a protest against hatefulness and bigotry as much as it was about pride. It’s the same message you’ll find in all of his creations: from his tall sculptures of shy men to Gloria, who also stands tall in her small town.

Sam’s work asks us to imagine a pinker, joyful, more inclusive world – one where we’re all free to put on silk robes and big hats and be absolutely, unapologetically ourselves.

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