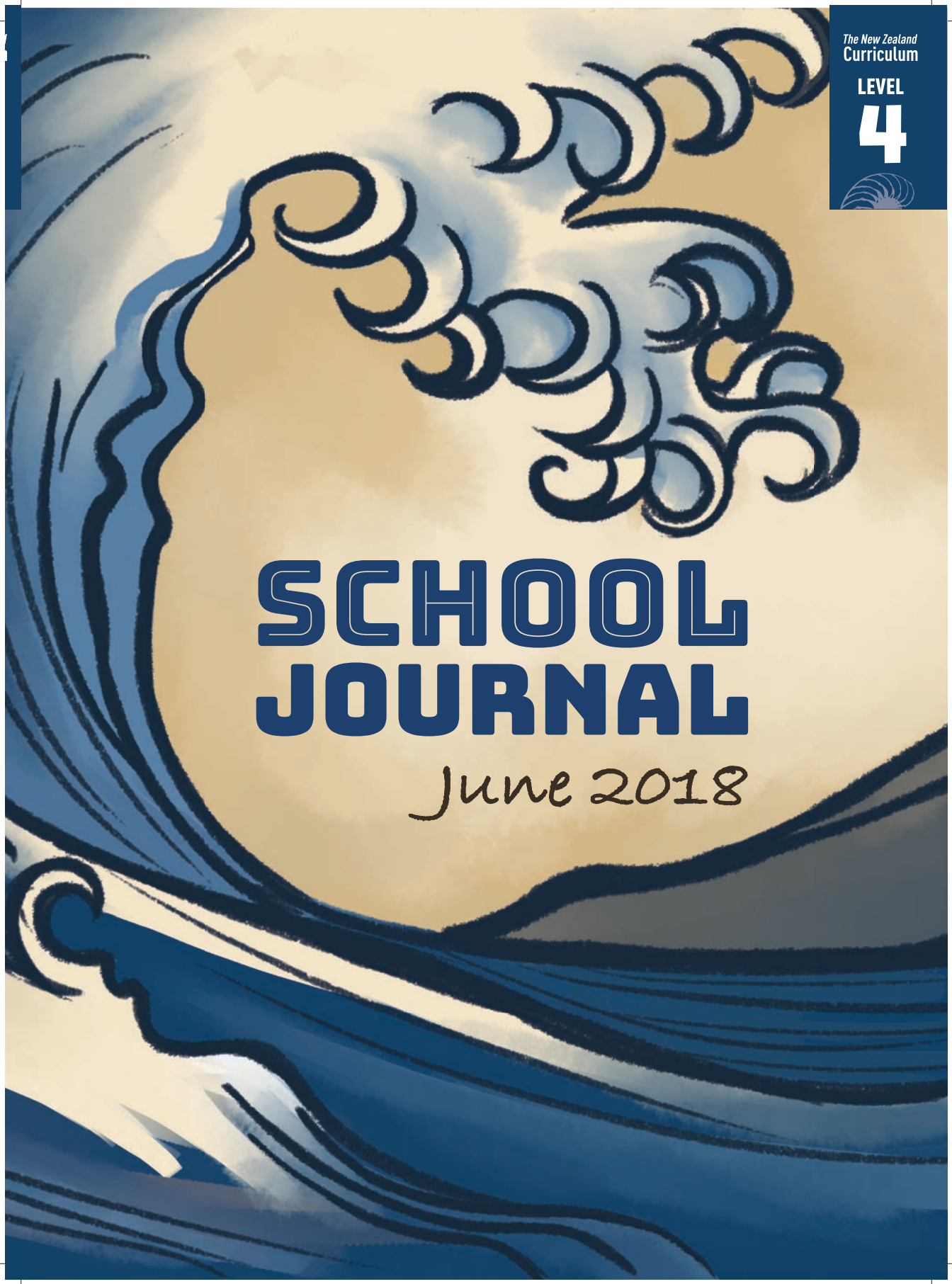
The New Zealand
Curriculum
LEVEL
4
SCHOOL
JOURNAL
June 2018

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This Journal supports learning across the New Zealand Curriculum at level 4. It supports literacy learning by providing opportunities for students to develop the knowledge and skills they need to meet the reading demands of the curriculum at this level. Each text has been carefully levelled in relation to these demands; its reading year level is indicated above.

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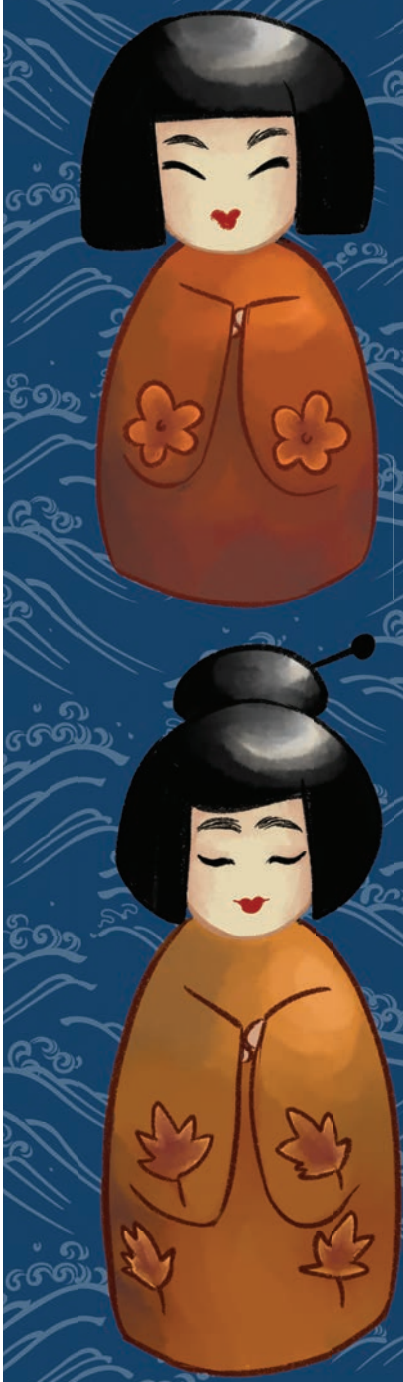
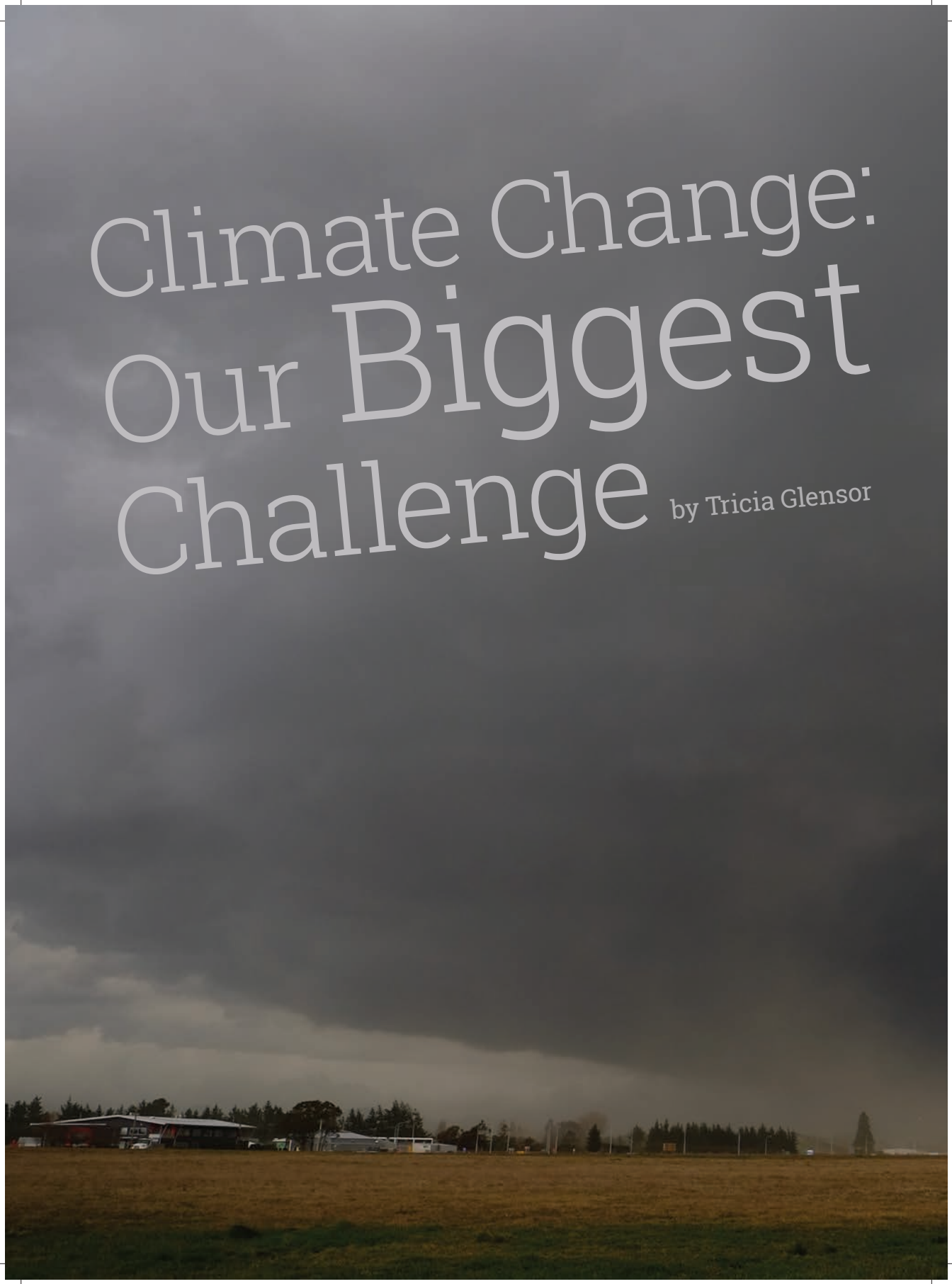
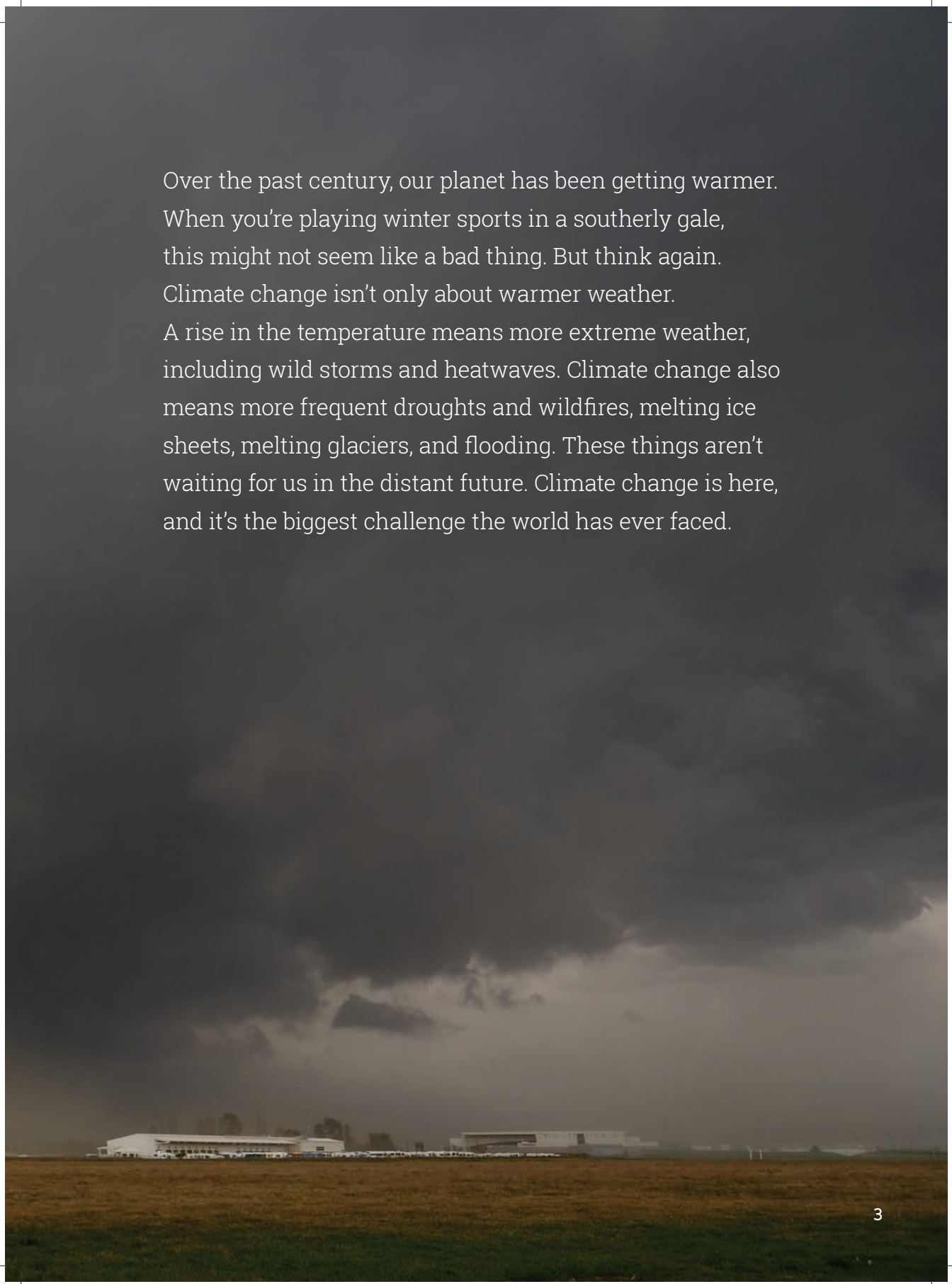


Ministry of Education

Climate Change: Our Biggest Challenge

by Tricia Glensor





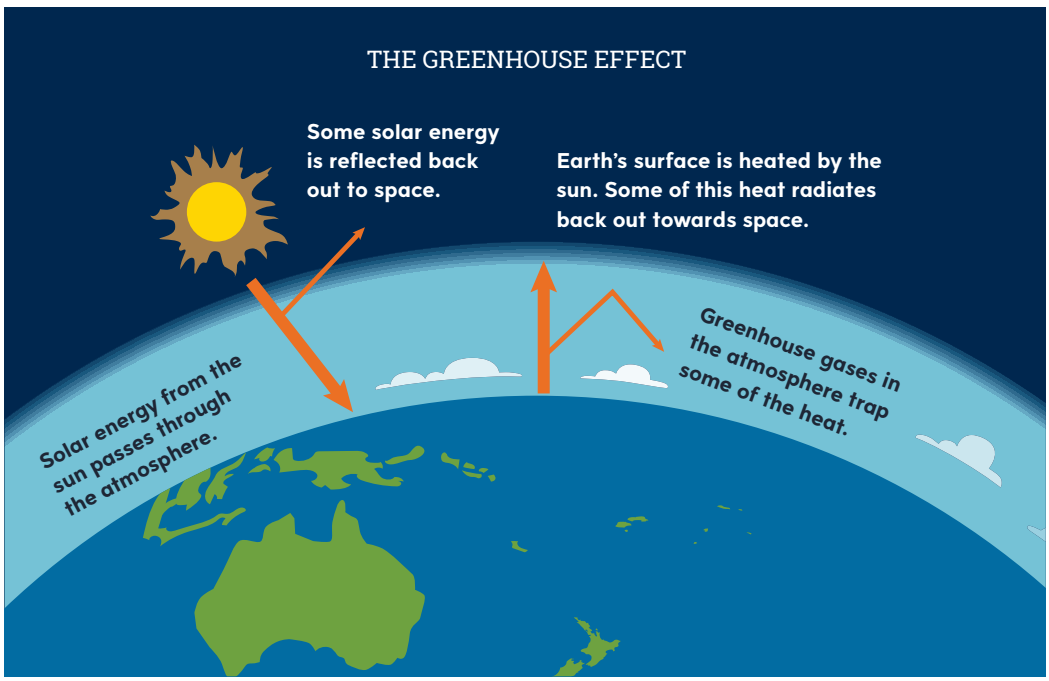
Over the past century, our planet has been getting warmer. When you're playing winter sports in a southerly gale, this might not seem like a bad thing. But think again. Climate change isn't only about warmer weather.

A rise in the temperature means more extreme weather, including wild storms and heatwaves. Climate change also means more frequent droughts and wildfires, melting ice sheets, melting glaciers, and flooding. These things aren't waiting for us in the distant future. Climate change is here, and it's the biggest challenge the world has ever faced.

Understanding Climate Change

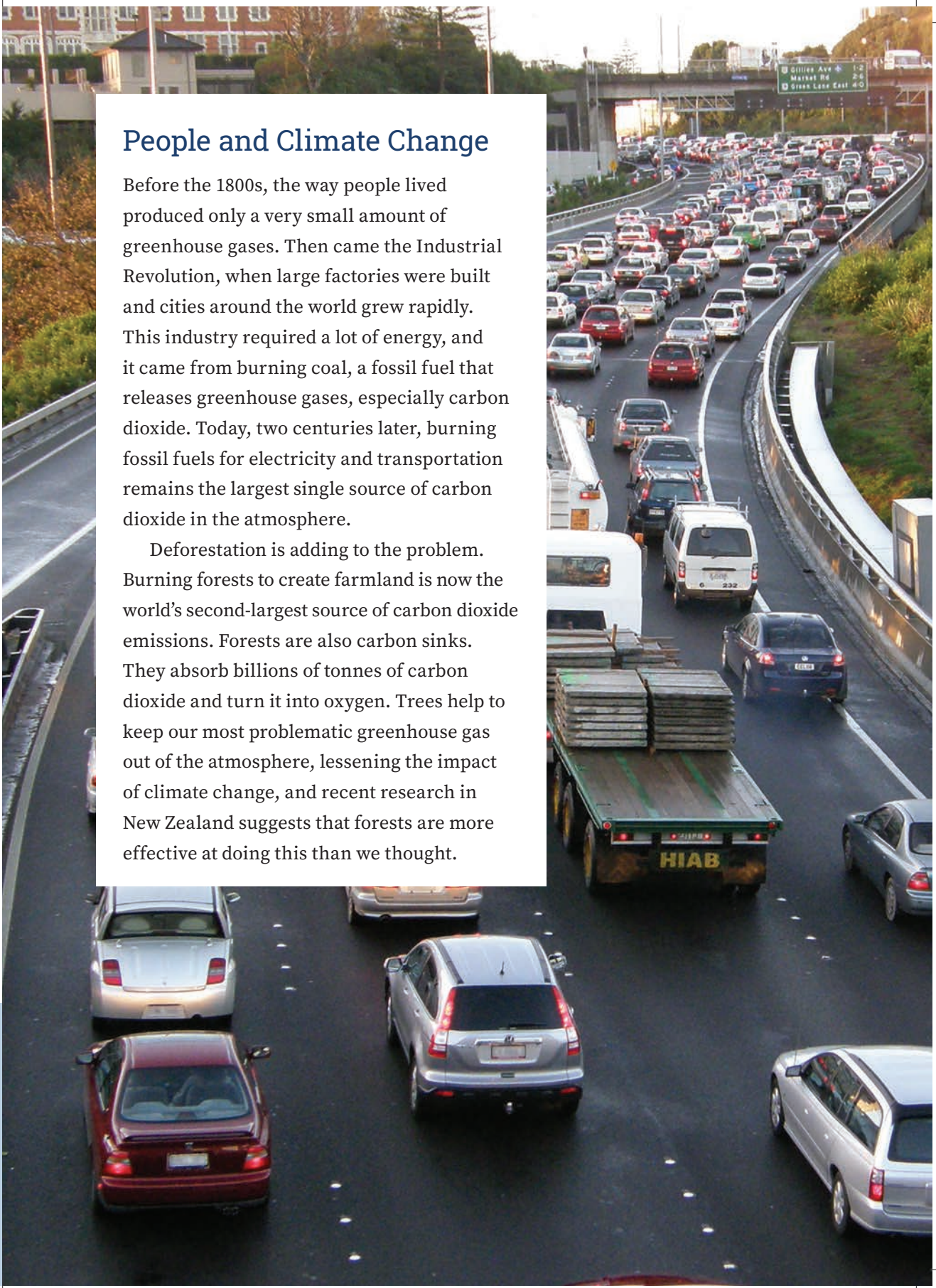
Understanding climate change means understanding the greenhouse effect – a natural process that keeps our planet warm using energy from the sun. Some of this energy is trapped by gases in the atmosphere called greenhouse gases (carbon dioxide, methane, and nitrous oxide are the most important). Without greenhouse gases, Earth wouldn't be warm enough to support life.

In recent years, however, the amount of greenhouse gases in the atmosphere has increased. Carbon dioxide levels are the highest they've been in hundreds of thousands of years. Now, more heat is being trapped, causing our planet to become warmer. This change is happening at an alarming rate – and it's caused by people.



EARTH'S CHANGING CLIMATE

Earth's climate has always varied. For millions of years, these changes were caused by natural processes, such as volcanic eruptions or small differences in our planet's orbit around the sun. Mostly Earth was a lot warmer than it is now; sometimes it was so cold there was an ice age. The last ice age on Earth ended around 12,000 years ago.

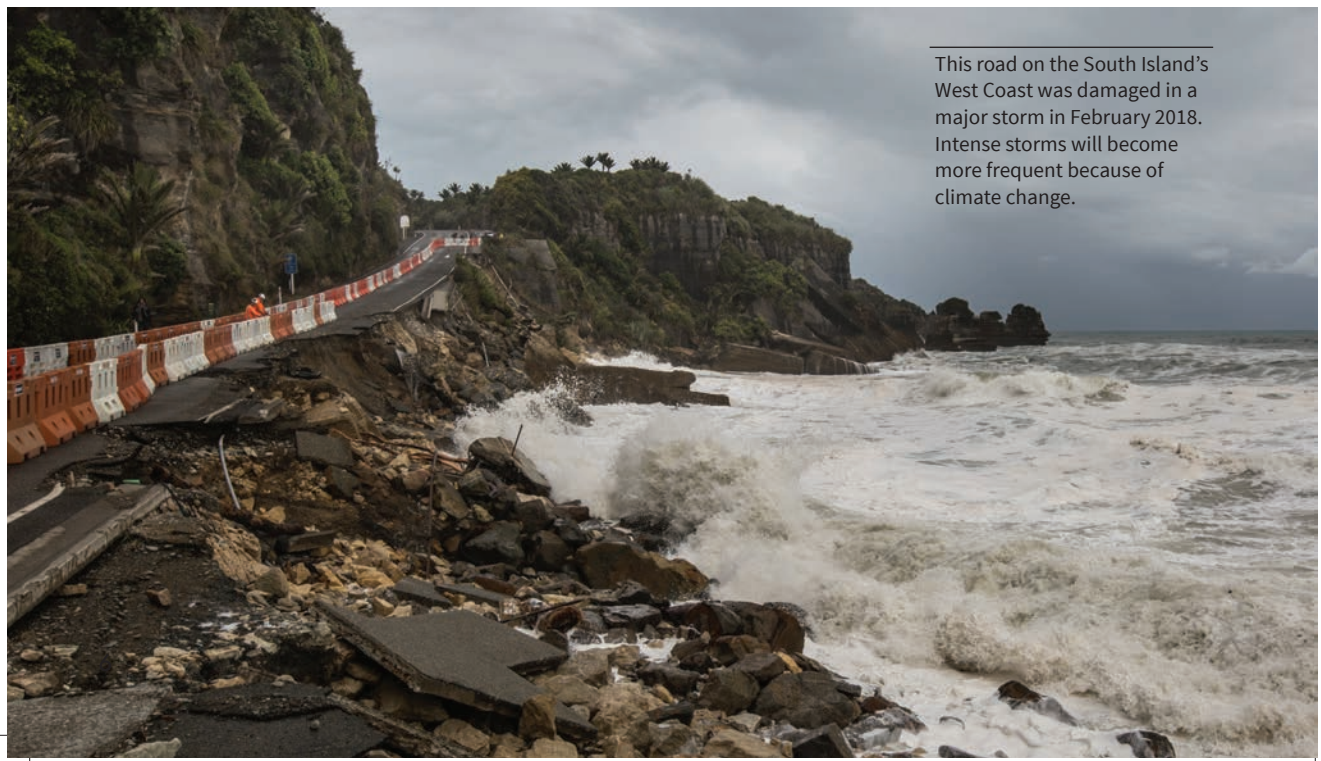


People and Climate Change

Before the 1800s, the way people lived produced only a very small amount of greenhouse gases. Then came the Industrial Revolution, when large factories were built and cities around the world grew rapidly. This industry required a lot of energy, and it came from burning coal, a fossil fuel that releases greenhouse gases, especially carbon dioxide. Today, two centuries later, burning fossil fuels for electricity and transportation remains the largest single source of carbon dioxide in the atmosphere.

Deforestation is adding to the problem. Burning forests to create farmland is now the world's second-largest source of carbon dioxide emissions. Forests are also carbon sinks. They absorb billions of tonnes of carbon dioxide and turn it into oxygen. Trees help to keep our most problematic greenhouse gas out of the atmosphere, lessening the impact of climate change, and recent research in New Zealand suggests that forests are more effective at doing this than we thought.

Agriculture is another major source of greenhouse gases, mostly methane and nitrous oxide. While these gases don't stay in the atmosphere as long as carbon dioxide, both are potent (each molecule of methane traps around twenty-six times more heat than a molecule of carbon dioxide, and one molecule of nitrous oxide traps around 219 times more heat than carbon dioxide). In New Zealand, most of our methane comes from sheep and cattle belching as they digest grass. Nitrous oxide is mainly produced when urine from farm animals reacts with living organisms, called microbes, in the soil.



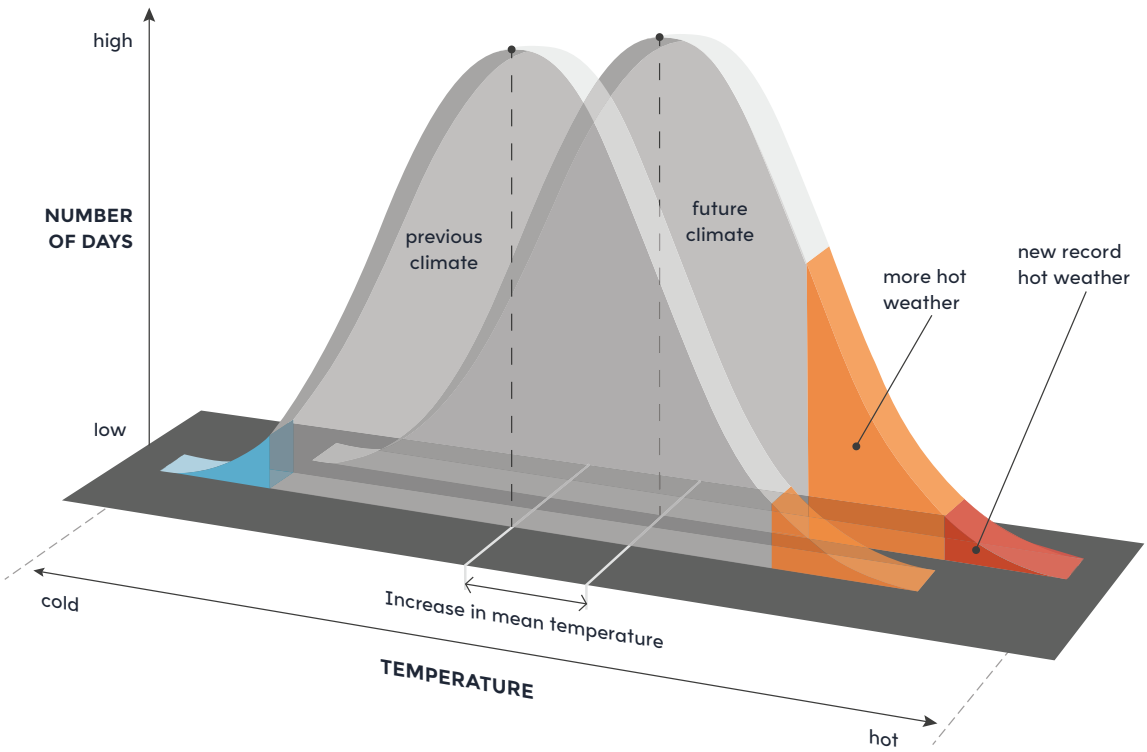
This road on the South Island's West Coast was damaged in a major storm in February 2018. Intense storms will become more frequent because of climate change.

Climate Change: Impact

Burning fossil fuels, deforestation, and agriculture – these activities mean our planet and oceans are now around 1 degree Celsius warmer than they were a century ago. This is a much bigger problem than it sounds. Even a small change in temperature affects Earth's weather and ecosystems. In turn, this affects our food sources and our health.

If the world's greenhouse gas emissions continue at the current rate, Earth's climate will change significantly. Generally speaking, wet places will become wetter and dry places will become dryer. There will be an increase in the mean temperature, with fewer cold days and more warm days. Hot days will be hotter than ever before (sixteen of the seventeen hottest years on record have happened since 2000). Heatwaves and droughts will become more common. Storms may occur less frequently, but they will be more intense. These changes will be seen around the world, including in New Zealand.

THE IMPACT OF CLIMATE CHANGE ON TEMPERATURE



Going, going, almost gone: New Zealand's Fox Glacier

One impact of climate change that can be seen right now is the rising level of the sea. As water gets warmer, it expands and takes up more space. This is one reason the sea is rising. Warmer air is also melting glaciers and ice sheets, adding huge amounts of meltwater to the sea. Scientists predict the increase in sea levels will be as much as a metre by the end of the century. Rising sea water is already a huge challenge in low-lying countries, such as Bangladesh, where there are now more floods at high tide and during storms. Around the world, coastal erosion has become another significant problem because of higher seas.

CLIMATE-CHANGE REFUGEES?

Kiribati (pronounced ki-ri-bas) is a group of tiny islands in the Pacific with a population of around 100,000. The islands are very low lying, and this makes them especially vulnerable to climate change. More intense storms and rising sea water are already having a devastating effect. Large waves are flooding homes and crops, and sea water has contaminated the freshwater supply with salt. The people of Kiribati fear they will be forced to leave their islands, becoming climate-change refugees. They wonder where they will go and how they will ever afford to get there.

An aerial view of Greenland's ice sheet, which is melting fast. If the ice sheet is lost, the world's oceans will rise by 7 metres.

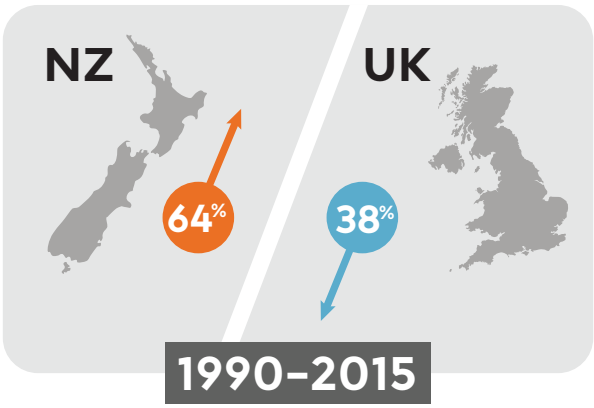
What We Can Do

We can't stop climate change completely. The high level of greenhouse gases already in the atmosphere will stay there for thousands of years. But if we reduce our emissions, we can limit how serious the effects of climate change will be.

In 2015, officials from around the world met in Paris to discuss climate change. Almost two hundred countries agreed to keep global warming to below 2 degrees Celsius, although the ideal, they said, would be 1.5 degrees. It's an ambitious goal. The world has already warmed 1 degree, and many people say the Paris agreement doesn't do enough. One British professor of climate change, Piers Forster, said achieving the 1.5 degree limit would take nothing less than a worldwide "revolution".

Riibeta Abeta worked for many years for Kiribati's Ministry for the Environment. He says education is the key to reducing the impact of climate change.

GREENHOUSE GAS EMISSIONS: A COMPARISON BETWEEN NEW ZEALAND AND THE UK



But people can change, and governments are responding. The New Zealand government has pledged to slash its greenhouse gas emissions by 11 percent from 1990 rates (the year the world properly acknowledged the problem of climate change) by 2030. Given New Zealand's recent record, keeping this pledge will be a challenge. Over the past three decades, our greenhouse gas emissions have increased by 64 percent. In contrast, over the same period, the United Kingdom has decreased its emissions by 38 percent.

Generation Zero is a group of young New Zealanders with a much higher aim. They're campaigning for zero carbon emissions by 2050. This would require a detailed plan from the government with radical policies that would change the way we live. But Generation Zero believes the future of our planet depends on radical change – and everyone needs to step up.

NEW ZEALAND: CLEAN AND GREEN?

As Parliamentary Commissioner for the Environment, Jan Wright has given advice on water quality, the plight of our native birds, the use of 1080 poison … but the most important issue of all, she says, is climate change. “It affects everything.”

Jan lives on Wellington’s south coast. She loves her view of the sea – although she warns that we take its health for granted. “Now that there’s more carbon dioxide in the atmosphere, there’s more carbon dioxide dissolving in the sea. Our oceans are becoming more acidic,” Jan says. “This means there will be more jellyfish and less kaimoana. Shellfish such as pāua and pipi will become harder to find.”

Jan believes that New Zealand’s biggest challenge comes from pastoral agriculture. “Reducing the greenhouse gas emissions that come from this kind of farming won’t be easy, and farming animals for meat and milk is such a big part of our economy.” So far, there are no obvious solutions, despite the fact our scientists are investigating all kinds of options, such as changing what dairy cows and cattle are fed.

What if you’re not a scientist? What can the average person do? “Owning an electric-powered car is great,” Jan says, “and I love seeing people on electric bikes.” Jan also thinks we should grow more trees. “We’ve got so much land in New Zealand that isn’t suitable for farming. We should fence it off to let the native forest grow back.”

Jan’s no longer the environment commissioner, but she hasn’t retired from the fight against climate change. She’s very encouraged by groups like Generation Zero and believes more people are waking up to the problems we face. “These days, I rarely meet anyone who says climate change isn’t real.” Jan thinks our government needs to set clear, ambitious goals if we want to reduce our greenhouse gas emissions. “New Zealand’s a small country, but we can still influence the world. We should be leading the way, showing that New Zealanders really are clean and green.”

The Village

BY PAUL MASON

The resort hid behind a fringe of palms that overlooked a curve of powder-white sand. The guests were busy: working on tans by the pool, booking kayaks and massages, snoozing. At night, they ate too much and drank too much and listened to bad music as if the rest of the world didn't exist. It was an adults' place, and Ava was bored.

On the third day, she noticed a sign at the far end of the bay. It pointed along a track that led through the rocks, then up over the headland. Ava told Mum about it.

"What ruins?"

"The sign just says ancient ruins. Want to come and look?"

Mum lowered her magazine. "Ask your dad," she said.

"He said to ask you."

Mum glared across the pool, to where Ava's dad was talking business with some man he knew from work. They both knew it would be impossible to drag him away.

"I can go by myself," Ava said.

"Good idea, love. Don't forget to take water."

★ ★ ★

The track climbed quickly, the dusty path hemmed in on both sides by sharp, volcanic rock. Rust-coloured dirt coated Ava's sandals and stuck to her skin. It was baking hot, and the landscape was dry and bleak, the scrappy bushes more thorns than leaves. The lushness of the resort seemed odd now – and so far away. Ava glanced back and saw that she was already on her own. No surprise that guests wouldn't come here. It was a lonely, unfriendly place of heat and sweat.

At the top of the next rise, Ava spotted shapes camouflaged against the red rock. The ruins. She left the track to take a closer look at the low, tumble-down walls and skeletons of buildings, fashioned from the lava itself. The houses were clustered round a well in a central courtyard. Once, people would have come here to collect water and talk – but something felt wrong about this place. Abandoned homes on a forgotten, dried-out hillside … what had happened here?

Ava stepped through a doorway and let her fingers brush against the brittle rock. She looked round the room and tried to imagine who had lived in this place.

★ ★ ★

Hanini hurriedly pushed himself upright. A girl with pale, pale skin and hair the colour of dried grass had emerged from nowhere.

"Who are you? What are you doing here? Go away!" he demanded. She was a trespasser. Why hadn't the dog barked?

The girl didn't move. She just stood there, her curious eyes searching every corner of the room. Hanini reached for his staff. "I'm warning you!" he called out.

"Who are you talking to?" grumbled his grandmother, stirring from her nap and sitting up. "And why are you waving that stick?"

Hanini stared at his grandmother and then at the girl. She stood no more than an arm's length from him. "Her!" he hissed. "That girl."

"Girl?" croaked the old woman. She looked round the hut. "You're having a dream. We're the only ones here, you know that. Go back to sleep."

Hanini swallowed. *Was* he dreaming? "You don't see her?" he asked.

"I see a hungry, thirsty boy haunted by ghosts."

Hanini rubbed his eyes, but the pale-skinned intruder hadn't moved. Fear coursed through his body. What kind of trickery was this?

The girl raised a strange-looking gourd and drank. Hanini watched her swallow, over and over. Her thirst sated, she turned and left. Grandmother was right. This was a spirit come to goad him.

He got to his feet, curious now, and followed at a distance. His dog was still fast asleep in the sparse shade of a bush. The pale skin was poking round in the house next door. What right did she have?

"You won't find anyone there," he shouted at her back. "There's no food. No water. They're all gone. There's no one to torment. You might as well go." Hanini heard his own words, and his heart dropped. It was true. The others had fled long ago.

He remembered standing on the rocks, watching them leave; the sun blazing, his mouth dry, the hard-hearted drone of insects in his ears. The villagers had pushed their canoes through the swell, calling back that they would return for them – the orphan boy and his crippled grandmother – but their words had felt empty. Once they were beyond the horizon, Hanini was sure he'd never see them again. Not that the pale skin cared. Now she was drifting through what was left of their village. She was taunting them. It was an insult.

"I said go!" he called again. "Can't you see we have nothing?" He gestured at his vegetable patch – the limp plants thirsty for water, always thirsty – at the dusty food bowls, the empty well.

Hanini stumbled towards her, swinging his staff. Once, twice, three times through the air. He hoped it would be enough to scare her away, but the spirit stood still. Now he was close enough to see the sweat on her skin, her white teeth that glared in the sunshine. He swung with all his strength, but as he finally struck the spirit, the staff passed through her body, and she disappeared.

★ ★ ★

Ava stumbled, her feet slipping on gravel, and she fell, her hand crashing into a sharp rock. She cried out, but there was no one to hear. Blood trickled from her palm and melted into the dust. Ava opened her bottle and rinsed the cut, gasping as the water hit her raw flesh.

She got to her feet. Apart from the cut, she was fine. She took a last look at the derelict village before finding her way back to the track. She needed to get away.

★ ★ ★

Ava drank a glass of cold water while Mum rubbed cream and patched her up with plasters. "No more wandering off," she said. "I don't know why you bother with ruins. We've got everything we need right here."

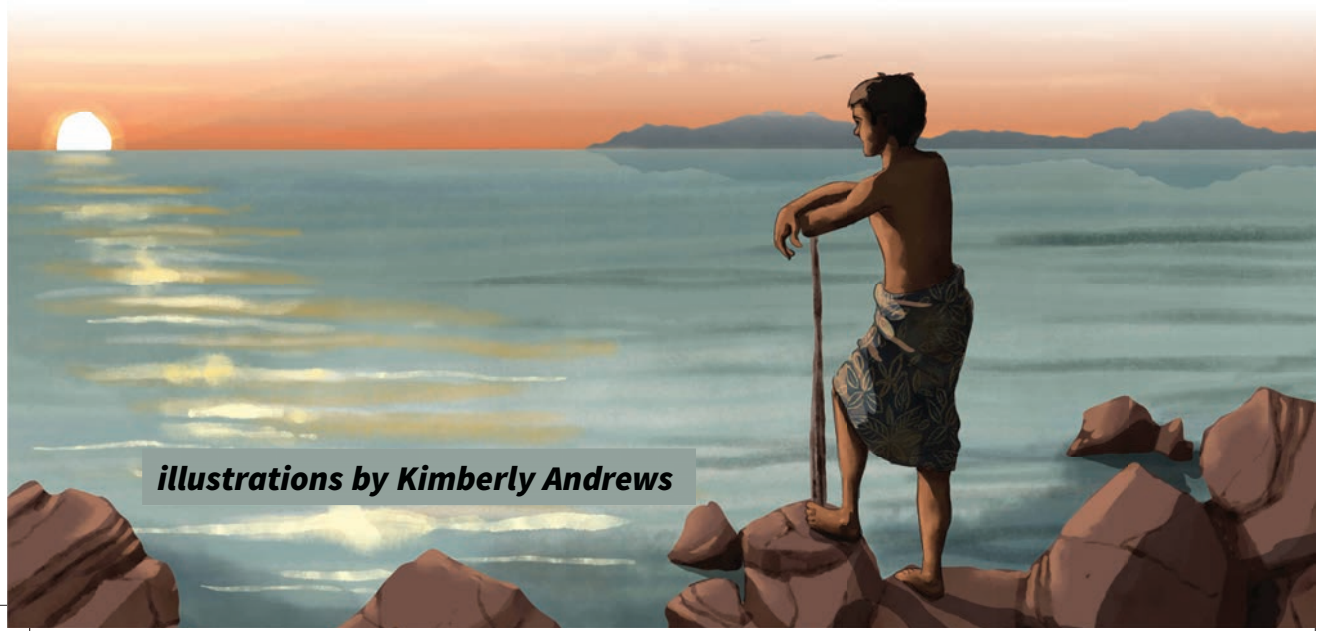
Ava looked round the resort. Sprinklers drenched carpets of grass. Waiters in crisp white shirts took orders for food. Guests at the swim-up bar clung to their glasses as if they were life preservers. She thought back to the dusty track, the hillside scorched dry, the crumbling remains of homes.

"More than we need, Mum," she said.

★ ★ ★

On the hillside, in the house with crumbling walls, Hanini settled himself on his mat. His grandmother lay silently next to him. He felt tired again. Hungry. Seeing the spirit had taken all the strength out of him. Later, when it was cooler, he would go and find some water. Perhaps catch a fish. Stare out at the horizon to see if the canoes were on their way back.

But for now, he would sleep.



illustrations by Kimberly Andrews

Kāhuipani

by Anahera Gildea

We'd been down the bush track heaps of times but never as far as the Tuakau bridge. Kui had said it would only take a day, but already Tahu was dawdling.

"Come on," I called back. "We're not there yet."

Far ahead, I imagined the great Waikato River and Kui's spirit waiting for us. Without thinking, I began to walk faster. I didn't realise Tahu's footsteps had stopped until I heard him cry out.

I found him crouched under a whekī ponga, arms wrapped round its trunk. The jar of soil was wedged between his knees.

"What are you doing?" I growled. "I thought you were in trouble!"

Tahu's face was pale. "The kēhua are following us," he whispered. He was terrified. "I can hear them."

"Tiakina tō tungāne," Kui had said to me. I was suddenly ashamed of my impatience and knelt beside my little brother.

"I heard ghosts," Tahu whimpered. "I really heard them. Shhh. Listen."

"Auē, Tahu. There aren't any ghosts."

"But I heard wailing. Like at home."

I knew the sounds he was talking about. "It's not ghosts," I said. "It's people who are sad."

Tahu started crying again. "How long until we get there? It's too far."

I was close to crying myself. "Kui said that if we make it to the river, Te Puea will find us."

Tahu picked up the jar and held it to his chest. Then he lay down. "What if she doesn't want us?" he said quietly.

The sun was high. It was getting hot. We had hours of walking to reach the river, and once we were there, I had no idea how to find a woman I'd only heard people talk about.

"Me haere tāua," I said.

Tahu didn't move. "I'm so tired. Can't we just stay here?"

I shook my head. "I'll carry the jar, eh? Must be heavy." He still didn't budge. "Put it in here then." I unrolled our whāriki and held it open. "I'll wrap it in our clothes to keep safe."

Slowly, Tahu sat up. I shook the whāriki once more and, reluctantly, he handed the jar over.

"Come on," I said. "Farmer Mason's place is near here."

We started walking. This time, I held Tahu's hand. "Will Farmer Mason help us?" he asked.

"Doubt it. He didn't help when our people were sick." Tahu looked confused, and I smiled as if a great idea had just dropped into my mind. "But people say he has a strong horse."

The bush track opened onto a grassy spur. We could see a farmhouse across the paddock, and in the paddock was a huge brown mare.

"I know how to catch a horse," Tahu said, realising my plan. "I saw Matua do it heaps of times." He started towards the fence. "You just make a clicking sound."

"Get back here," I hissed. "Stay low and keep quiet."

Tahu sat down, disappointed, and I crept forward. The horse snickered and side-stepped further away. I had my hands on the top rung of the gate, about to climb over, when I heard a biting whistle. I jumped down, getting a splinter in the heel of my hand as punishment.

"Who's there?" I said, grabbing Tahu and pushing him behind me.

A boy's voice came from my left. I whipped round to face it.

"You'll be in big trouble if old Mason catches you pinching his horse."

The boy was fifteen, maybe sixteen. He walked towards us, laughing, and whistled again, this time with respect. "You're pretty fearless for a little kōtiro."

"I'm eleven. And I wasn't stealing. I was borrowing."

"I'm Maheru," the boy said. He sat down in the grass, keeping his distance. "Nō whea kōrua?"

I relaxed my arms a little, and Tahu came out from behind me. "Our kui died," he said. "There're just ghosts in our village now." I nudged him with my foot to keep quiet.

"You tell us where you're from, first," I said to Maheru. "Are you following us?"

He laughed. "Kāo, girl. I'm from Mangatāwhiri. I'm sorry to hear about your kuia. The sickness?"

I nodded.

"You sick?" he asked.

"No," I replied. "You?"

Maheru shook his head. "Nope. But I have whānau who have left for Te Rēinga as well."

I nodded. "I'm Kirimahara, and this is my brother, Tahu. We're heading to the river. We're going to live with Te Puea."

Maheru smiled and stood up. “Good. I was sent to find you – and the others.”

“Others?” I was surprised.

“You’ll see. We’ve got a camp.”

I looked in the direction of the awa. Tahu kicked at the grass and leant into me. “I’m tired, Kiri,” he moaned.

Maheru strode over. He was skinny but had broad shoulders and looked strong. His woollen pants were oversized, and his greying undershirt had been mended many times – but it was his eyes that I really noticed. They were soft and warm.

“Don’t worry, little man,” he said, reaching down to pick Tahu up. “I’ll be your horse.”

We walked for two hours through the afternoon and another two into evening. Maheru explained that he had been helping Te Puea find orphans from all the kāinga and pā along the river.

“How many?” I asked.

“Sixty-eight so far, counting you two and me. Most are at Mangatāwhiri already, but there are some at the camp by the bridge with Te Puea. We’ll stay there tonight. Tomorrow we’ll go up river by barge to Mangatāwhiri.”

“Ono tekau mā waru! How will there be enough food?”

Maheru frowned. My voice was loud, and Tahu was asleep on his shoulder, but I was shocked. “Where will we all sleep?” I asked.

“There’s kai in the river. Te Puea says enough for whoever needs it. She’s going to look after all of us.”

My mouth started watering at the thought of proper food. We’d eaten stale bread and watercress for a week. I hoped Maheru was right.

We saw the light from the campfires before we got there. It was getting dark, but I could smell food being cooked and could hear people quietly singing. Maheru led us straight to Te Puea. She was organising a bed for some of the smaller children. Tahu was awake now, and she took him from Maheru and kissed his grubby cheek.

"Tēnā koe," she said to me. "Nau mai, haere mai, child." She held out her free arm. "I'm Te Puea."

"Tēnā koe, Whaea." I could feel tears but held them back. "I'm Kirimahara, and this is my brother, Tahu Manawanui."

On the ground behind Te Puea were jars and bottles, each one filled with soil. Tahu scrambled out of Te Puea's arms and fumbled inside our whāriki until he found the jar that Kui made us bring. He hesitated for a moment before handing it to Te Puea. She pulled the soil to her chest, closed her eyes, and spoke a low karakia. Then she placed the jar beside the others.

"Here we all are," Te Puea said, turning to include the other orphans.

I followed her gaze. Each jar of soil had been carried by these children from their hau kāinga, and I realised what we were going to do. We would mix the soil, turn it, make the whenua of the new home we would build together. I looked at Te Puea then and, for a moment, it was as if Kui herself was standing there.

"Not a single one will be forgotten," Te Puea whispered.

Author's note

Te Puea Hērangi was a great and important Tainui woman and the granddaughter of Tāwhiao, the second Māori king. During the influenza epidemic of 1918, she was living in Mangatāwhiri, in the northern Waikato, where a quarter of the Māori population died. Afterwards, Te Puea found and cared for more than a hundred orphans. She affectionately called them her kāhuipani – her flock of orphans. There are no accounts of jars of soil being brought by the orphans, but Te Puea's kāhuipani did help build a new community. Together, they cut gorse and flax and drained swamps to re-establish the Māori king's marae at Ngāruawāhia, on land that had been confiscated after the New Zealand Wars. This marae is known as Tūrangawaewae: "a place to stand".

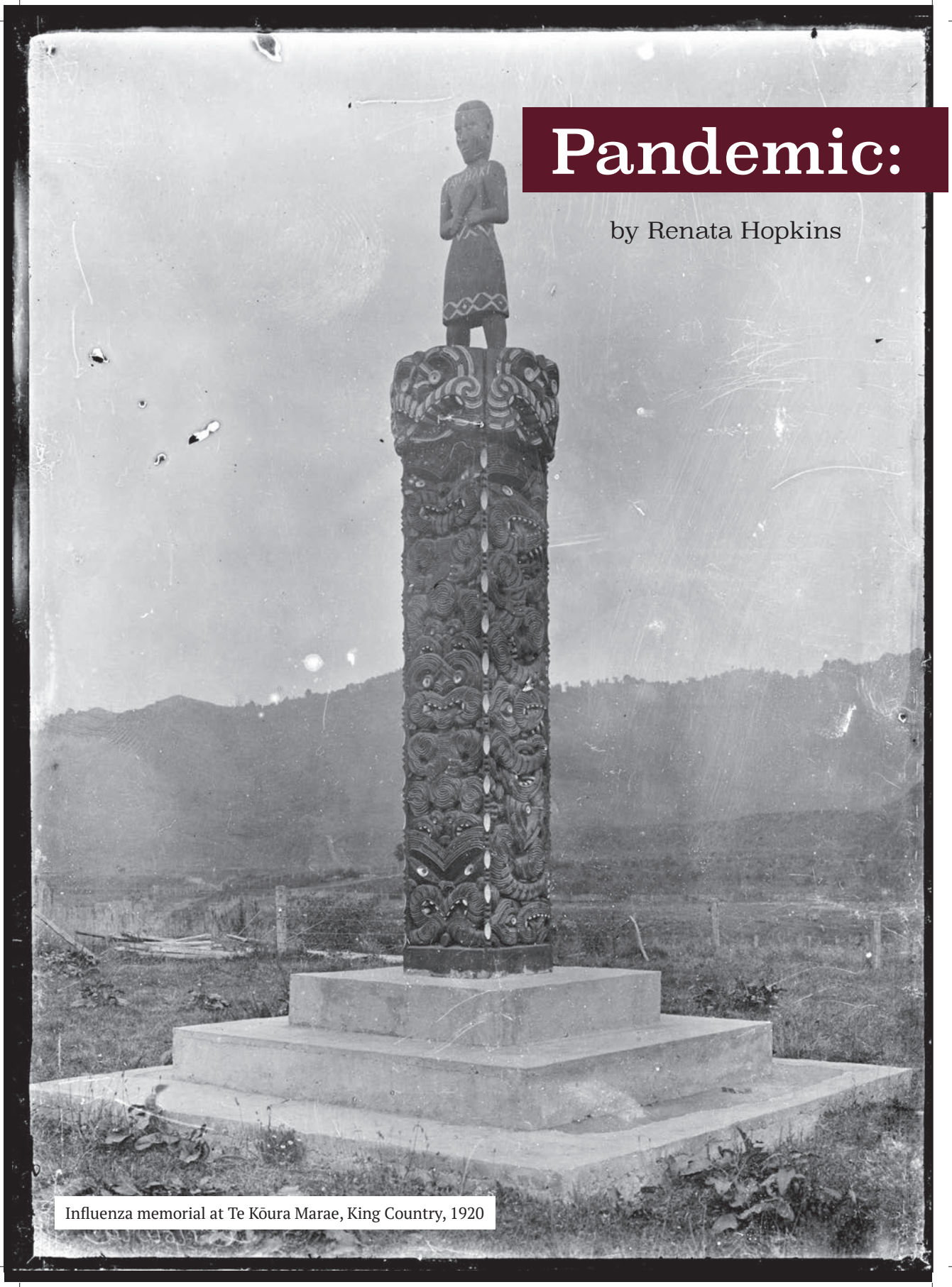
Glossary

Auē!	Oh, no!
hau kāinga	homeland/true home
kāinga	home/house
kāo	no
kēhua	ghost
kōtiro	girl
kui	an affectionate term for a grandmother or an older woman
Me haere tāua.	We should go.
Nau mai, haere mai.	Welcome.
Nō whea kōrua?	Where are you two from?
ono tekau mā waru	sixty-eight
pā	village, usually fortified
tēnā koe	hello (to one person)
Tiakina tō tungāne.	Take care of your brother.
whāriki	mat (when travelling, it was rolled up with possessions tucked safely inside)

illustrations by Andrew Burdan

Pandemic:

by Renata Hopkins



Influenza memorial at Te Kōura Marae, King Country, 1920

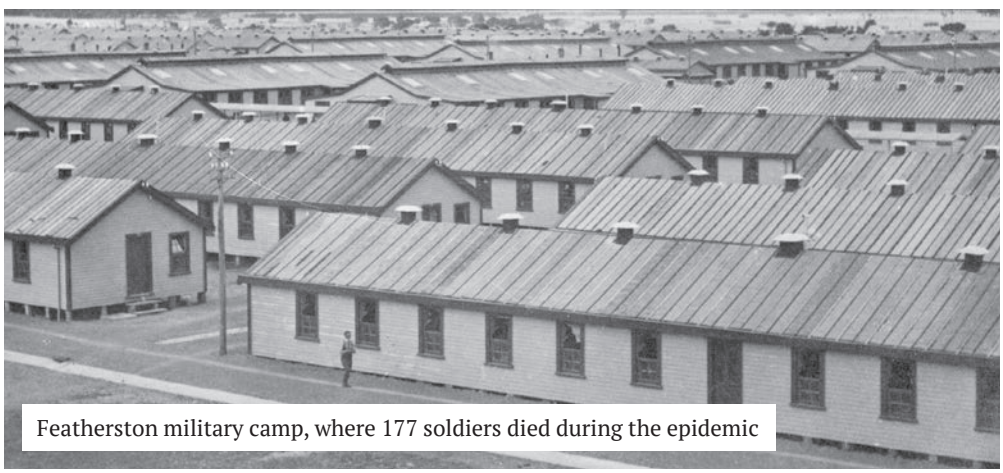
The Deadly Flu of 1918

Most people who get the flu recover, but in 1918, a previously unknown strain of the influenza virus caused a global pandemic. Worldwide, at least 50 million people died. Even in relatively isolated New Zealand, the death toll was shocking. No event had ever killed so many of us in such a short time.

Deadly Speed

The 1918 flu travelled with deadly speed. This was made worse by something else that was happening at the same time: the First World War. Soldiers had been brought together from all over the world, and they often lived in crowded, unsanitary conditions. Many also had weak **immune systems**, compromised by the stress of war. These two things, along with the constant movement of troops and supplies, allowed the killer virus to thrive.

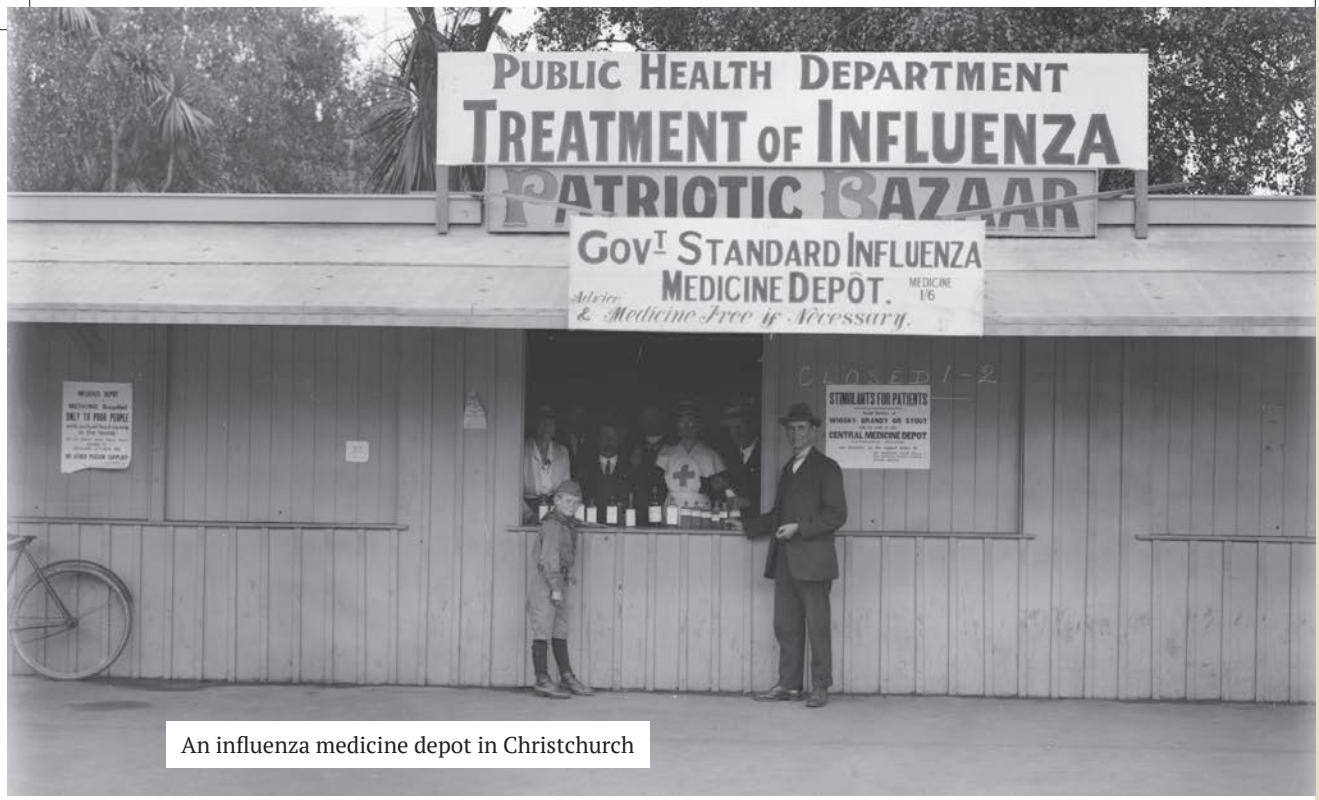
It's thought that the new strain of flu was first spread by soldiers travelling from North America to Europe in early 1918. By mid-year, the virus had reached the Southern Hemisphere. Most people affected by this first wave of the pandemic recovered. Then, in May or June, a second far deadlier form of the virus appeared, with a death rate that was much higher than was normal for influenza. Large numbers of soldiers fighting in the trenches in western Europe fell ill, and many developed serious complications that attacked their lungs. The flu reached the big cities of Europe and North America by August, and soon people were also dying in South Africa, Japan, China, Peru, Greece, and Italy.



Featherston military camp, where 177 soldiers died during the epidemic

pandemic: an outbreak of disease across a country, a continent, or the world

immune system: the organs and processes in the human body that fight disease and infection



An influenza medicine depot in Christchurch

Everyone Was Sick

By December 1918, the influenza virus had spread throughout New Zealand. Many people blamed a ship that docked in Auckland in early October – the RMS *Niagara* – for bringing the virus into the country. A rumour spread that the ship hadn't been **quarantined** because the Prime Minister, William Massey, and his deputy, Sir Joseph Ward, were on-board. The two politicians denied this, saying they had been treated the same as other passengers – and there is some evidence the deadly flu was already in Auckland before the *Niagara* arrived.

However it got here, once the disease had arrived, it left no part of the country unaffected. New Zealanders had been exposed to the flu before – the last serious outbreak was in 1907 – but the 1918 epidemic was something else. Māori suffered a particularly high death toll: five to seven times that of Pākehā. Because so many Māori died, some people blamed them for being the source of the outbreak, but this was wrong. The respected leader Whina Cooper remembers the tragedy experienced by her people at Panguru, in Hokianga: "Everyone was sick, no one to help, they were dying one after the other …" Her father was one of the first to die and was taken straight to the urupā, with no time for a tangi. There were too many sick people needing care.

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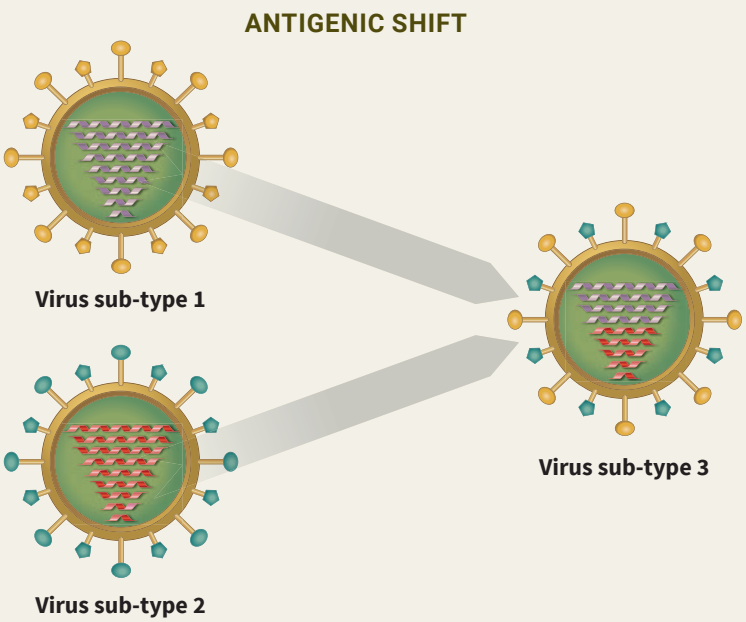
quarantine: when strict isolation is imposed to limit or contain the spread of disease

VIRAL MUTATIONS

Influenza is a virus, a very simple micro-organism that needs a **host** to survive. There are three types of influenza viruses that affect people: A, B, and C. The 1918 epidemic was caused by a type A virus. The type A virus is different from the others because it can infect species other than humans, including seals, whales, horses, pigs, and birds.

When a person is infected with an influenza virus, their immune system responds by creating **antibodies** so it can fight back. If that person catches the same (or a similar) flu at a later time, their immune system will recognise the virus and be better able to fight it. But there's a hitch: viruses are constantly changing. Usually these changes are small and happen gradually over time. The type A virus, however, is able to change suddenly and dramatically to form a new sub-type – a process known as antigenic shift. This kind of big change means a host has less chance of beating the virus. Dangerous new strains of type A viruses sometimes emerge when bird, pig, and human influenza sub-types combine. Some scientists believe this was the cause of the 1918 influenza pandemic.



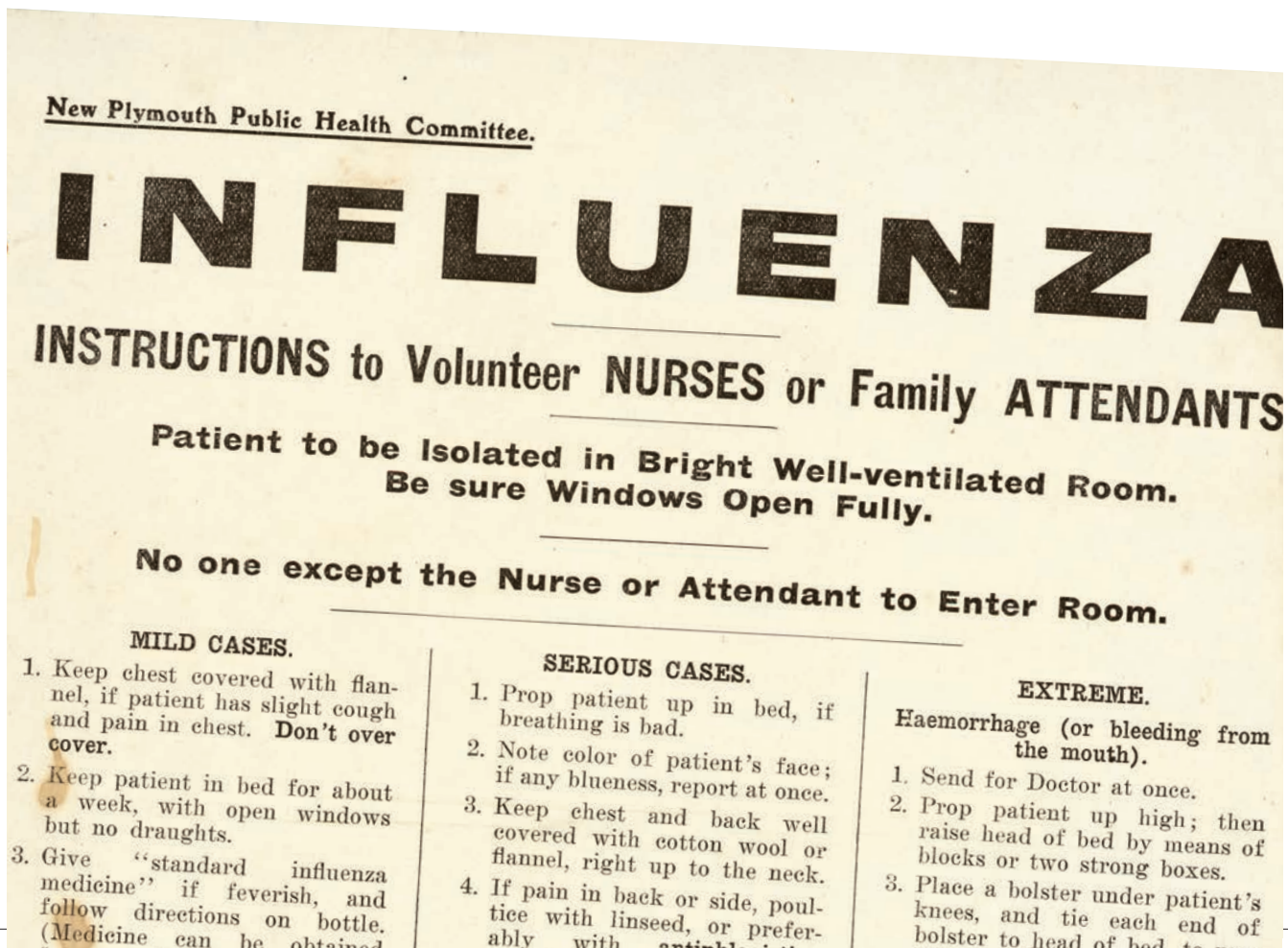
host: a living organism that another organism lives in or on

antibody: a protein the body makes to defend itself against foreign substances

Killer Strain

It became clear very quickly that the 1918 strain of the flu was not the common illness people were used to. Whereas most flu viruses hit young and older people hard, this one was claiming mostly twenty- to forty-year-olds. And some were dying within twenty-four hours, when the flu usually took a week or longer to cause death. The virus was also causing unusual – and severe –symptoms. People suffered terrible nosebleeds; others haemorrhaged (bled excessively) from their organs. In many cases, the flu quickly developed into pneumonia, a complication that caused the victim's lungs to fill with fluid, making breathing difficult.

Pneumonia also caused cyanosis, where the skin changes colour because of a lack of oxygen in the blood. Audrey Drummond, who was a child at the time, remembered helping to nurse residents in the Wellington guesthouse where she lived: "Some of our patients turned … a smoky sort of black. Some of them stayed that way for up to three weeks …" To Audrey, the virus seemed more like the plague than the flu.



New Plymouth Public Health Committee.

INFLUENZA

INSTRUCTIONS to Volunteer NURSES or Family ATTENDANTS

Patient to be Isolated in Bright Well-ventilated Room.
Be sure Windows Open Fully.

No one except the Nurse or Attendant to Enter Room.

MILD CASES.

1. Keep chest covered with flannel, if patient has slight cough and pain in chest. **Don't over cover.**
2. Keep patient in bed for about a week, with open windows but no draughts.
3. Give "standard influenza medicine" if feverish, and follow directions on bottle. (Medicine can be obtained

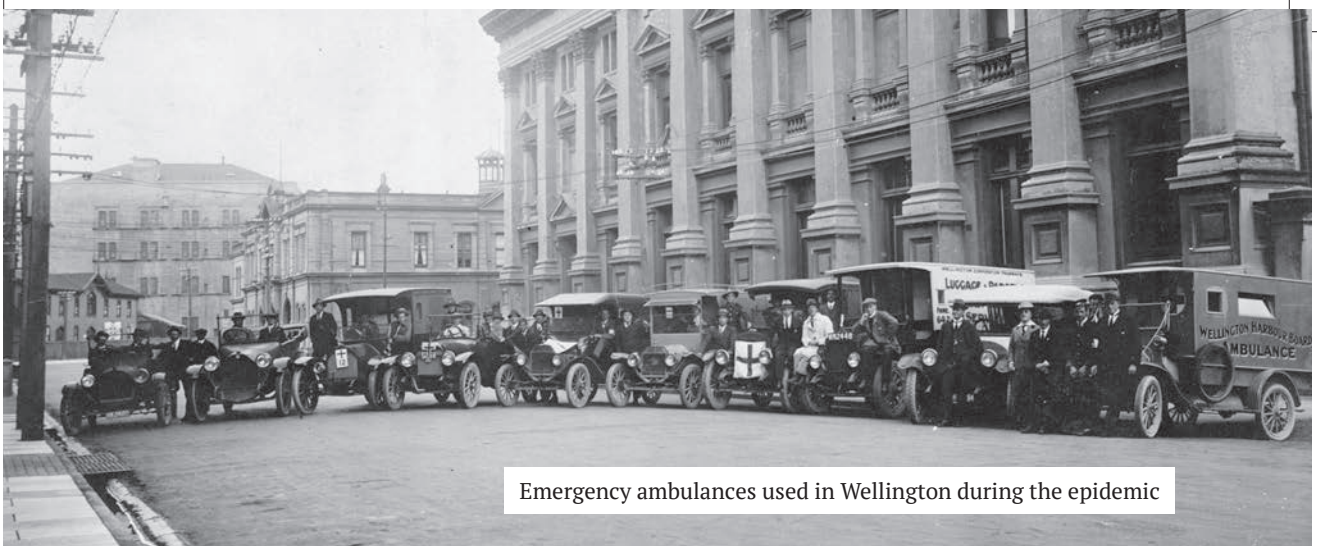
SERIOUS CASES.

1. Prop patient up in bed, if breathing is bad.
2. Note color of patient's face; if any blueness, report at once.
3. Keep chest and back well covered with cotton wool or flannel, right up to the neck.
4. If pain in back or side, poultice with linseed, or preferably with antiphlogistine

EXTREME.

Haemorrhage (or bleeding from the mouth).

1. Send for Doctor at once.
2. Prop patient up high; then raise head of bed by means of blocks or two strong boxes.
3. Place a bolster under patient's knees, and tie each end of bolster to head of bed to pre



Emergency ambulances used in Wellington during the epidemic

Untrained Volunteers

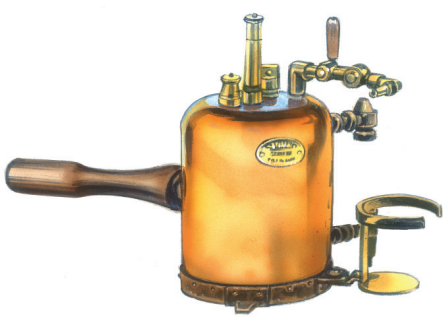
The flu hit New Zealand at the very end of the war, when a third of the country's doctors and almost a quarter of its nurses were still serving overseas. Those medical staff who were in New Zealand were often among the first to become ill. So untrained volunteers of all ages took on the risky, exhausting work of caring for the sick. Other people drove their cars as makeshift ambulances or built coffins for the dead.

It wasn't uncommon for children to help during the outbreak. Soup kitchens were set up, and children, including boy scouts, helped prepare and deliver food. Lilla Leach was the daughter of a clergyman in Christchurch. She worked throughout the epidemic. "A soup kitchen was set up at the school, and we took it in turns to go over and peel vegetables for the soup." Lilla remembered mourners coming to their house. "One of us had to be at home almost constantly, with people wanting to arrange burial services."

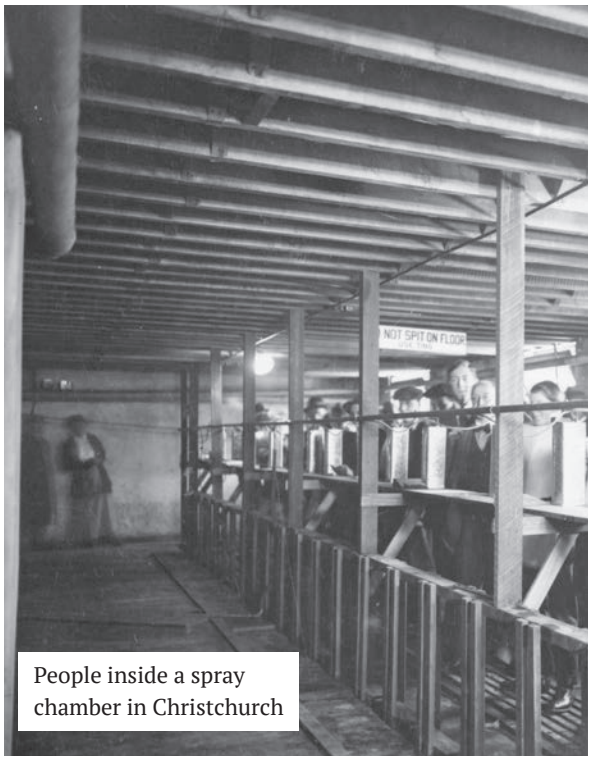
Fighting Back

In 1918, there were no flu vaccines, and there was no medicine that could treat complications from the flu. Viruses weren't understood to cause disease at the time, so the cause of the flu was unknown. People were offered one formally approved treatment: breathing in zinc sulphate gas, which was thought to prevent the spread of the disease. Special "spray chambers" were set up for this purpose, often in public buildings, where people breathed in the gas through spray inhalers. We now know the treatment had no medical benefits – and it may have done more harm than good. The chambers brought people into close contact, putting them at greater risk of spreading the virus.

Aside from the spray chambers, most public places in New Zealand were closed. However, not all gatherings could be stopped. When the war ended, on 11 November 1918, officials tried to ban street parties, but after four long years of fighting, people were desperate to celebrate peace. In many places, the ban was ignored. These joyful occasions undoubtedly resulted in more deaths from the flu.



Zinc sulphate spray inhaler



People inside a spray chamber in Christchurch

People in Cathedral Square, Christchurch, celebrating the end of the war

I had a little bird. Its name was Enza.
I opened up the window and in-flu-enza.

Children's skipping song, inspired by the 1918 influenza pandemic

The Aftermath

By the end of December 1918, the pandemic was largely over. It had added heavily to the losses of a nation already devastated by war. In just a few months, our death toll was at least nine thousand – half as many as the estimated eighteen thousand New Zealanders killed during the entire war.

Since 1918, there have been three influenza pandemics: in 1957, 1968, and 2009. Another outbreak on the scale of the 1918 pandemic remains a definite possibility. Improved living standards and better hygiene will limit the spread of any virus, but other aspects of our modern lifestyle may contribute to the likelihood of a future pandemic. Industrial farming, where large numbers of animals live together in close contact, is thought to increase the risk of viral mutations transferring to humans. And international air travel spreads a disease much faster than the ships and trains of 1918. Scientists and public health researchers are unable to predict where or when another pandemic might take place, but most agree it's only a matter of time.

All first-person accounts are taken from *Black November: The 1918 Influenza Pandemic in New Zealand* by Geoffrey Rice (CUP, 2005).

GIVING MY FATHER FRIGHTS

We discover no end of windows
of opportunity for giving my father frights.
        Our house is for hiding in.
We crouch in the porch, waiting for the bend of his shadow.
        The frightening of him
happens in slow, simultaneous motion: we leap
and my father's feet
explode from the floor
and like a man falling he roars –
        we nest in the pantry. He comes searching for tea
and finds us instead, flared eyes and limbs
springing at him, blowing chip packets and muesli into the air –
        we fold into chests
                we hang motionless in the long curtains
        we hide in his suits, in the wardrobe
and once in the ceiling –
        dropping like spiders onto the bed
beside him, as he is sleeping. There is no sound
like my father's roar, its fury and fear,
each time we burst out at him
like the living dead.
        It is the sound of wishing
        for a time when
        a doorway was a welcome
the pantry unforthcoming
the wardrobe hung only with clothes:
all the empty suits, waiting.

Ashleigh Young

DIVE

BY GINA COLE

It was hotter than the sauna at the Newmarket pool, and I stood on the bank, lost in a daze. My cousin Eddy waited on the opposite side, hands planted on hips. She was different from me, always joking round. Now she squinted in the sun and shook her head, amused. Rivulets of water dripped down her black-brown legs.

"Hurry up, cuz," she called. "We'll be late for the lovo – and I'm hungry. I want some kumala."

The turquoise water was so bright and perfect it looked like a cartoon. Sticks and debris floated on the current. I imagined it carrying me away, too, out into the Pacific. Instead, I took a breath, took my phone from my pocket, and lowered myself into the cool river. I kicked my legs in wide arcs like I did at squad training, but it was an awkward one-handed breaststroke so I could hold my phone up, and soon I was panting. Water sloshed into my mouth, and I turned my head. That's when I saw something moving below me – something long and black and white.

"What's that stripy thing?" I shouted at Eddy.

"Sea snake. It won't hurt you."

"What? No way!"

The snake came towards me, and I shrieked and swam hard for the other side. I hauled myself onto the hot sand and sat there, crying. "I dropped my phone!" I wailed to Eddy. "It's in the water."

"How will you hear it ring?" she joked.

I began to cry even harder. How would I talk to Dad? I could hardly borrow Mum's phone.

Eddy knew some of this stuff, and her expression changed. "I'll find it," she said. Before I could reply, she dived in. I shielded my eyes from the glare and scanned the water. Eddy's head popped up downstream. She took a deep breath and dived back down, legs kicking out behind her. When she reappeared, she'd drifted even further. "Can't see it," she shouted.

I ran along the bank, dodging coconut trees. We had to find it. I wasn't leaving here until we did. Then I spied something orange on the riverbed.

"Over there," I yelled, pointing.

Eddy dipped below the surface, but she was way off course. Sea snakes or not, I had no choice. I ran at the river and dived in, reminding myself to stay focused. It was something our swimming coach always said. I cut through the water, strong and quick, using a breathing technique I'd just learnt. I grabbed the orange rectangle as it rolled over the sandy bottom and launched myself back up to the surface, punching a handful of water and phone high in the air. There was no dropping it this time.

I dog-paddled with my free hand and kicked out like a demented frog, reaching the golden sand just before the river met the sea. When Eddy spotted me, I was back on the bank, shaking my phone, hoping it would dry out in the hot Fijian sun.

"Wow! Cool dive," Eddy said. She looked at my phone. "Is it working?"

"It's meant to be waterproof. It should be OK."

At that precise moment, the phone rang. We looked at each other, amazed. Eddy started laughing. "Answer it!"

It was Dad, and I felt a weird stab of nerves. We hadn't talked for a week, not since the night Mum and I left Auckland.

"Hey, Dad," I said.

"Hi, Shelly. How's it going? What are you up to?"

"Oh … nothing. You know, swimming."

"I'm glad you're still training. Have you got a decent-sized pool there?"

"No pool, but I've been in the sea a few times. It's kind of scary. There are sea snakes!"

Dad laughed. "Seriously! Don't worry, I'm sure you can out-swim them."

There was a pause. I could guess what he was going to say next.

"How's your mum?"

Good question. She'd seemed all right yesterday, but I remembered the way she'd been on the flight over. She'd stared out the window, then spent the rest of the time under a blanket. Now, in Fiji, she went for lots of walks and came back with red eyes. And she went to bed way too early, even though my aunties begged her to stay up. But should I tell Dad all this? Would Mum like that?

The silence grew while I stressed over what to say. I finally settled on a half-truth. "Mum's OK."

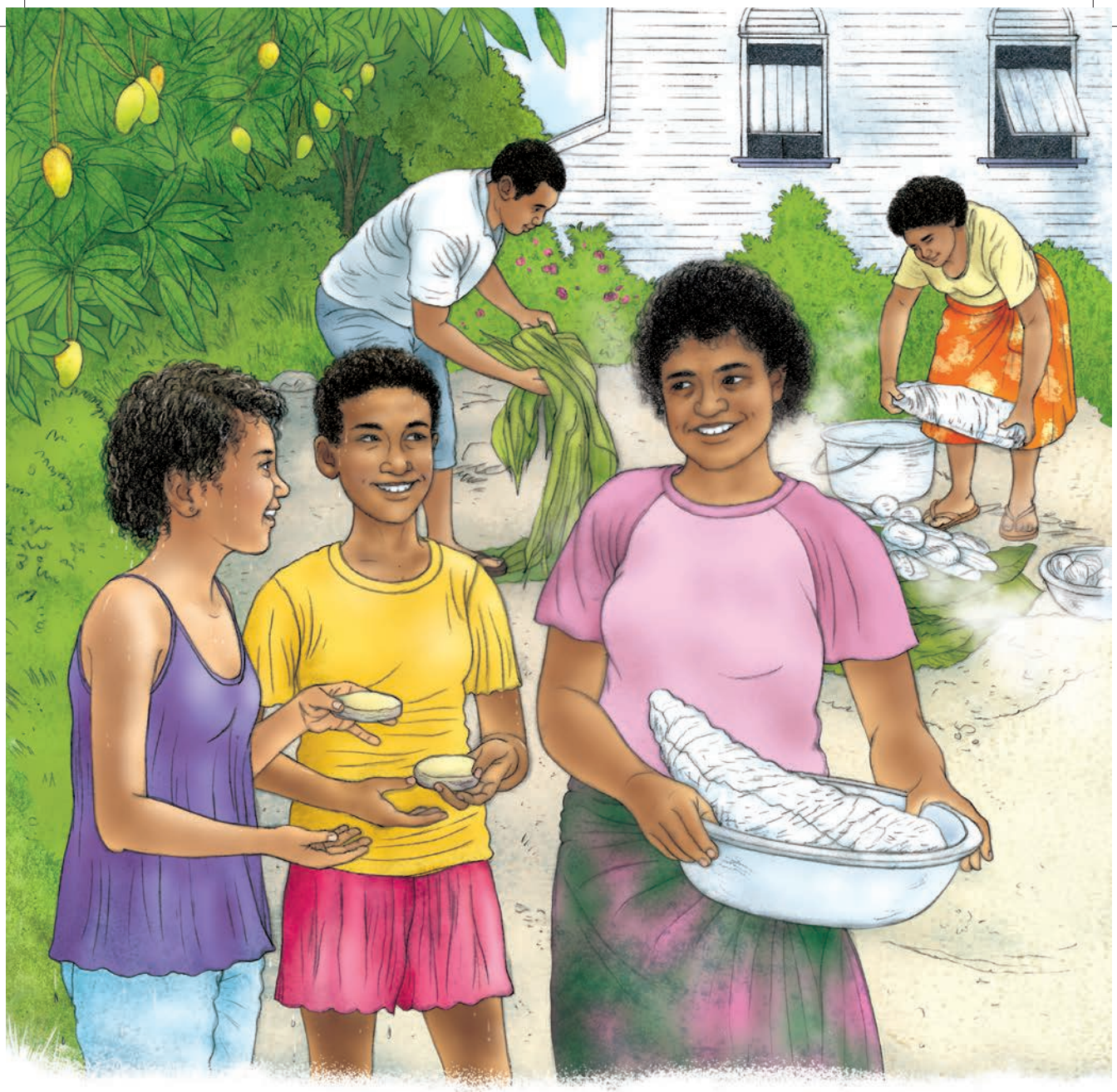
"That's good," said Dad. "I'd better get back to work. Bye, love. Talk soon."

Eddy was watching me carefully, her usual smirk gone. I could taste salty tears.

"Come on. We can't miss the lovo," she said, reaching down to haul me up. "They'll be digging it up soon."

We wandered through the cool shade of the trees. There were no schedules here, and I realised I'd begun to love this place: the oily smell of the kerosene lamps at night; trimming bele leaves with my aunties; sitting round on pandanus mats, laughing with my cousins. I missed Dad and our life in Auckland, but I didn't miss everything. Not the rush and stress and fighting. I wondered how to tell Mum about the call. She knew Dad and I chatted. I never hid it from her, although this time, I'd felt impatient to get off the phone – maybe because Mum had seemed a tiny bit happier the last few days. I didn't want to change that.

Eddy followed a track that led to a weatherboard church and a clearing. Underneath a mango tree, my uncles and aunties and Mum were hauling sacks from a smoking hole in the earth. Mum was smiling and speaking Fijian. When we'd first arrived, she'd stumbled over the language. I knew she struggled to remember the words; she hadn't visited her family for a long time.



"There you are!" Mum called. She'd changed out of her frilly church dress and had on a sulu and a pink T-shirt. Her face looked happy and relaxed, as though she'd finally caught up on some sleep. She came over, carrying a steaming barracuda wrapped in foil and some kumala. The sweet potato was hot, and Eddy and I juggled the pieces from hand to hand.

"Sorry I missed the church service," I said.

Mum gave me a knowing look. "You're soaked."

"Eddy and I went for a swim."

illustrations by Elspeth Alix Batt

BEN HAWKE,

MOSGIEL'S METEOROLOGIST

by Claire Finlayson

When thirteen-year-old Ben Hawke says things like "precipitation" and "atmospheric pressure", his friends groan and say, "Speak English!" Ben uses technical weather terms a lot. He finds them useful, which isn't surprising given he writes his own weather forecasts. He even has a column in the *Otago Daily Times*. You could say Ben's something of a meteorological star.

SNOWBALLING

Ben's committed to the weather. Each day, before heading off to school, he posts an online forecast, and on Saturdays, he gets up at 5.30 a.m. to study satellite images so he can write a weather report for the local radio station. Ben also has a social-media page, followed by over a thousand people. (*They* all want to hear what he has to say about precipitation and atmospheric pressure.)

Ben's hobby went to a new level in year 8, when his science teacher set some basic weather-forecasting tasks as homework. Ben found the homework too easy and decided to do some extra, using his weather station at home. Then he had a brainwave: he could share his forecasts on social media. "I got around two hundred followers in one day," he remembers.

It snowballed from there. "My page was mentioned by the Breeze radio station, and another two hundred people began to follow me," Ben says. "Then I was interviewed for Checkpoint on Radio New Zealand. That got me three hundred followers." There was also an article about Ben on the front page of the *Otago Daily Times*. The people kept coming!

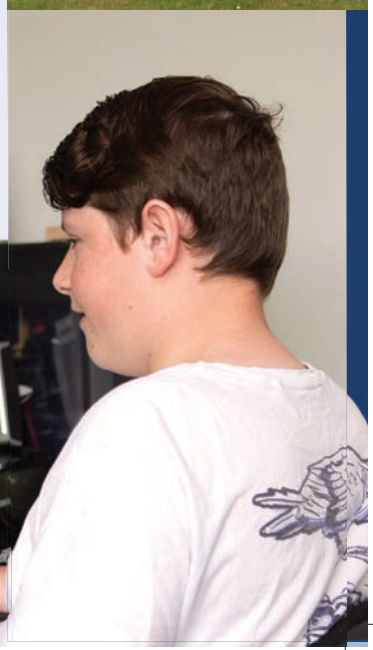
ON THE GROUND

That winter, Ben's reputation received an extra boost when he predicted that snow around Mosgiel would fall lower than the country's national weather forecaster, MetService, had initially forecast. He was right. Ben's proud of this achievement, although he keeps it in perspective. He acknowledges the advantage of being on the ground: he can see the way different weather systems interact with local landforms. This makes it easier to forecast the weather for his suburban patch.

Mosgiel has its own distinct weather patterns, which is called a microclimate. Ben says that sometimes, this can make it tricky to produce an accurate forecast. "In Mosgiel, the cold air in the hills flows down into town because it's the lowest point. That's why this place gets so cold and foggy, even more than Dunedin."

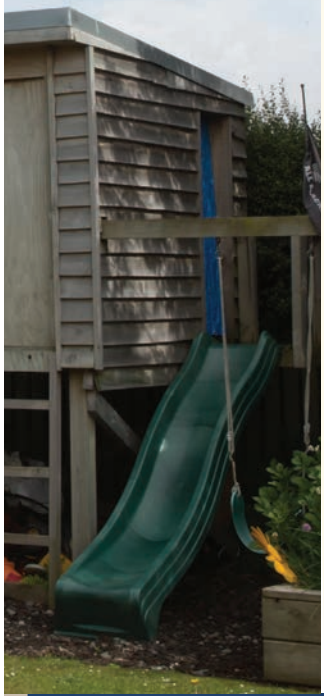
WEATHER OBSESSION

Ben's weather obsession began at a young age. By six, he was keeping a close eye on the weather station attached to his hut in the backyard. He used this to measure air temperature, wind direction, and chill factor – to predict when there was going to be a frost. On very cold nights, he'd leave a bucket of water outside. In the morning, he'd use a ruler to measure the ice that had formed. He also caught rainwater in a measuring jug and collected hailstones. When he was eight, Ben began to read about hurricanes. "I've always liked extreme weather, and hurricanes are the epitome of extreme weather!" Ben continued to study up on them, then he started tracking hurricanes for fun.



BEN'S BASE STATION

BEN'S BACKYARD WEATHER STATION



FORECASTING WITH BEN

Each day, Ben posts two weather forecasts: one for the next twenty-four hours and one for the next few days. If there are gales, floods, or any other dramatic meteorological events, Ben writes about them separately. He uses the following checklist before he writes a forecast.

- ☑ Consult the rain maps and surface pressure maps on the MetService website. Read the isobars. (These are the lines on a weather map that connect the places where the air pressure is the same. A high-pressure weather system means warmer weather; low pressure means cooler, more unsettled weather.)
- ☑ Look at the satellite imagery on the MetService website. (Weather satellites provide a bird's-eye view of the various weather systems around Earth at any one time.)
- ☑ Check the rain gauge to see how many millimetres of water have fallen overnight.
- ☑ Take readings from the backyard weather station. (Ben's is a nifty device with solar-powered sensors that transmit data to a base station, which interprets and displays the data. This covers air temperature, wind speed, **wind chill**, wind direction, **humidity**, **dew-point**, and **barometric pressure**.)
- ☑ Finally, examine the different readings and make predictions about the way they will interact.

barometric pressure: the weight of the air as it presses down on everything below it (also called atmospheric pressure)

dew-point: the temperature at which air becomes saturated with water vapour and the water becomes liquid

humidity: the moisture content of the air

wind chill: how cold the temperature actually feels on your skin once the wind has been factored in

THE RIGHT SKILLS

It's no suprise that Ben's considering a career in meteorology. This means he needs to focus on science, physics, and maths – all subjects that help with decoding information about the weather, although simple curiosity goes a long way, too. When Ben was first confronted with the mysteries of a weather map, he was intrigued. "At first, I had to use the key to decode the blobs and squiggles. I could tell they were important, so I taught myself what they all meant."

Ben reckons there's one other subject that comes in handy for a career in meteorology: English. "It teaches you to communicate effectively." He's keen on the idea of being a weather forecaster on TV, though sometimes wonders if the job might be too serious. "Meteorology is my passion, but I also enjoy entertaining people," he says. In the meantime, Ben has plenty of time to decide about his future.

A SIMPLE MYSTERY

Ben loves the way the weather is both incredibly simple and incredibly mysterious. "It's literally just water, the air, and the sun – that's it! Water causes humidity, rain, and snow; the air causes air pressure; and the sun causes temperature. These three things interact to give us our weather."

Occasionally, the weather outsmarts meteorologists and their computers. This makes it endlessly fascinating to Ben, especially when it misbehaves. "I look forward to bad weather. I track what's happening. Sometimes I even get up in the night to do this."

MetService is always looking for ways it can improve its data collection. It has plans for a new rain radar in Dunedin. What about Ben? "I'd like a more professional weather station," he says. "And I'd love to visit the MetService one day."

METSERVICE

Forecasting the local weather, as Ben does, is one thing – but what about forecasting for an entire country? How does that work? MetService is New Zealand's national weather forecaster. It provides information about the weather twenty-four hours a day, every day of the year. This includes mountain forecasts, marine forecasts, and severe weather warnings. People rely on these forecasts for all kinds of reasons, not just so they can decide whether to bring in the washing. Sometimes, an accurate forecast really does mean the difference between life and death.

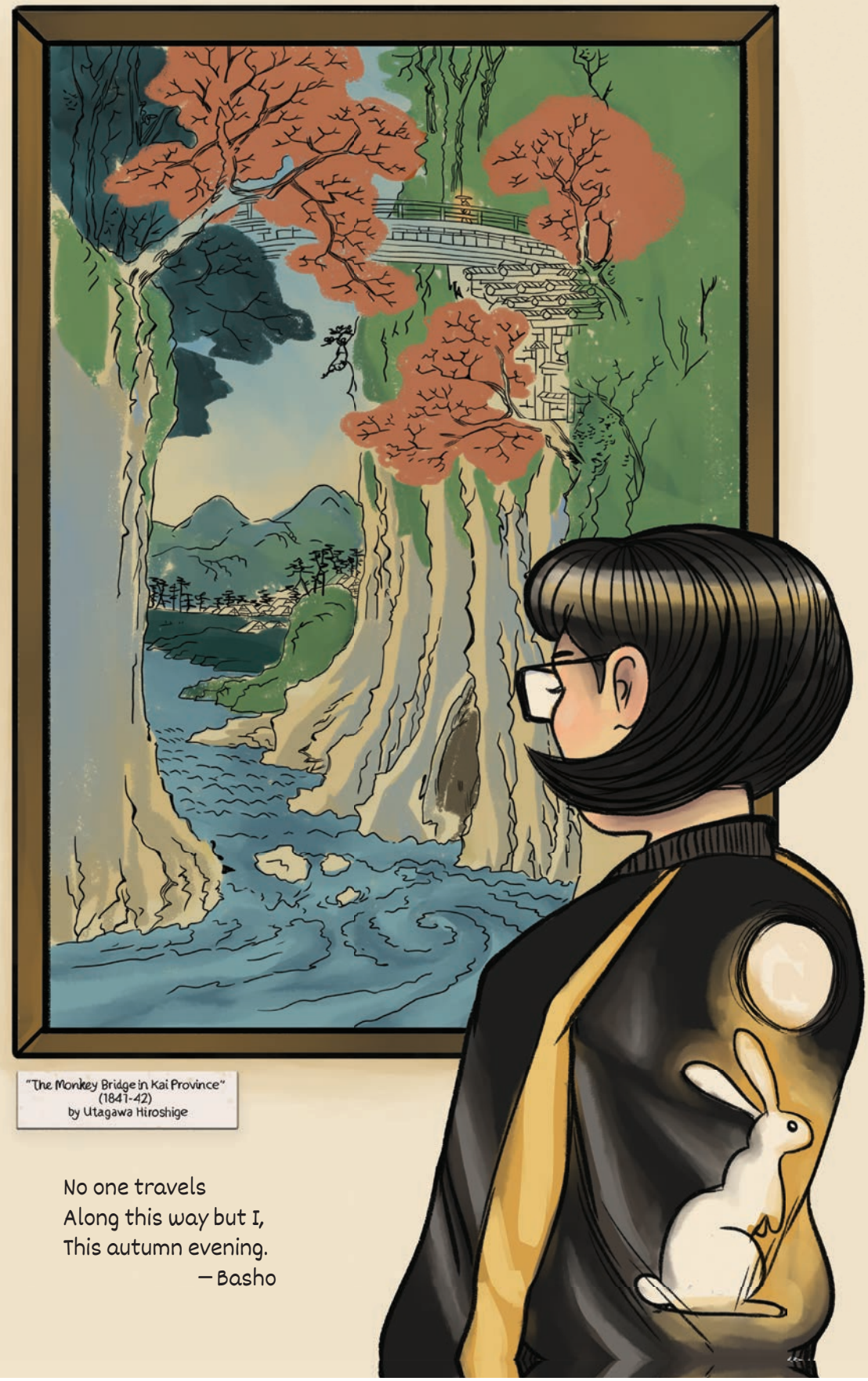
The meteorologists at MetService predict changes in the weather using a variety of tools. The first step is establishing the current state of the atmosphere – in other words, learning what's happening with the weather right now. This information is supplied from around the country via the weather network, which is made up of weather stations, aircraft, satellites, radar, ships, and buoys. Each of these sources specialises in a different kind of observation, for example, satellites observe cloud patterns, and radar measures rainfall. Weather buoys float in the ocean to collect data about the wind and the temperature of the sea.

Data from New Zealand's weather network is used in conjunction with information about global weather patterns that comes from supercomputers. Doing this allows MetService's meteorologists to refine their predictions about how weather systems will behave once they reach New Zealand. A big part of weather forecasting is about recognising patterns, something supercomputers can't do. This is why meteorologists are MetService's secret weapon!

Something Alive

by Jem Yoshioka

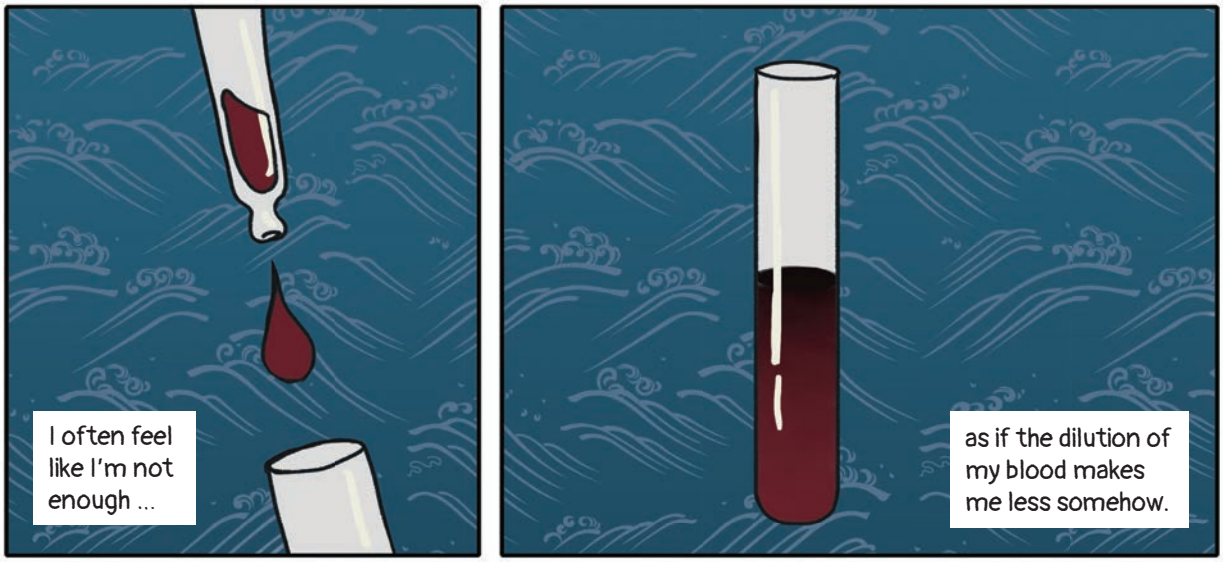

But still, there is this part of me that people misunderstand.
They want to dress me up in armour and swords and blood ...
or cast me in chrome as the product of some imaginary superfuture.
I feel like a badly translated haiku that doesn't mean the same in English.



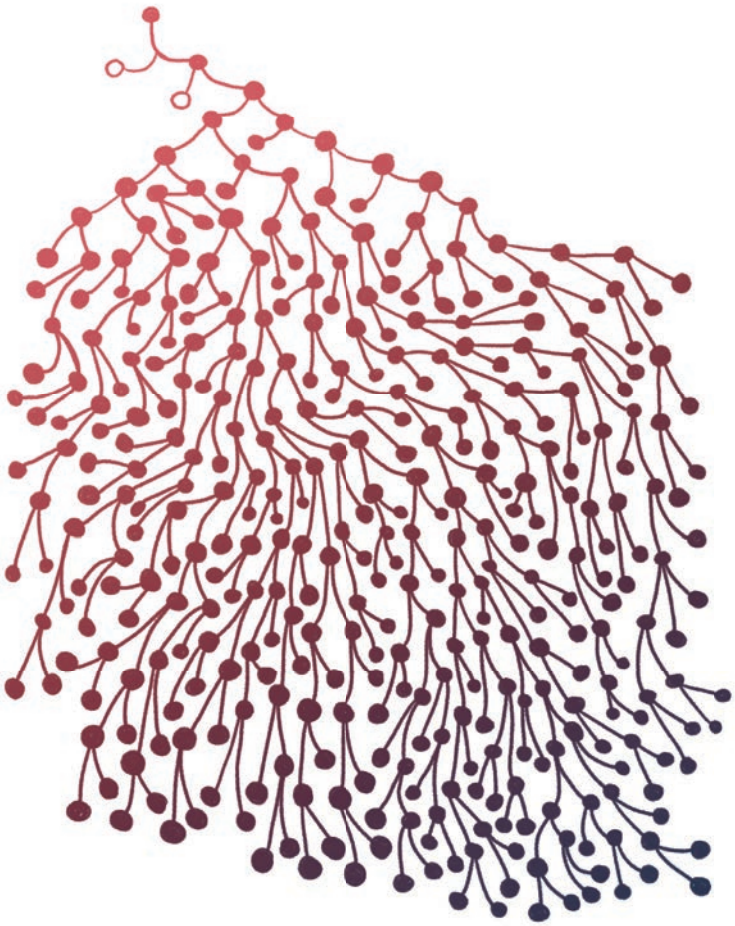
"The Monkey Bridge in Kai Province"
(1841-42)
by Utagawa Hiroshige

No one travels
Along this way but I,
This autumn evening.
— Basho

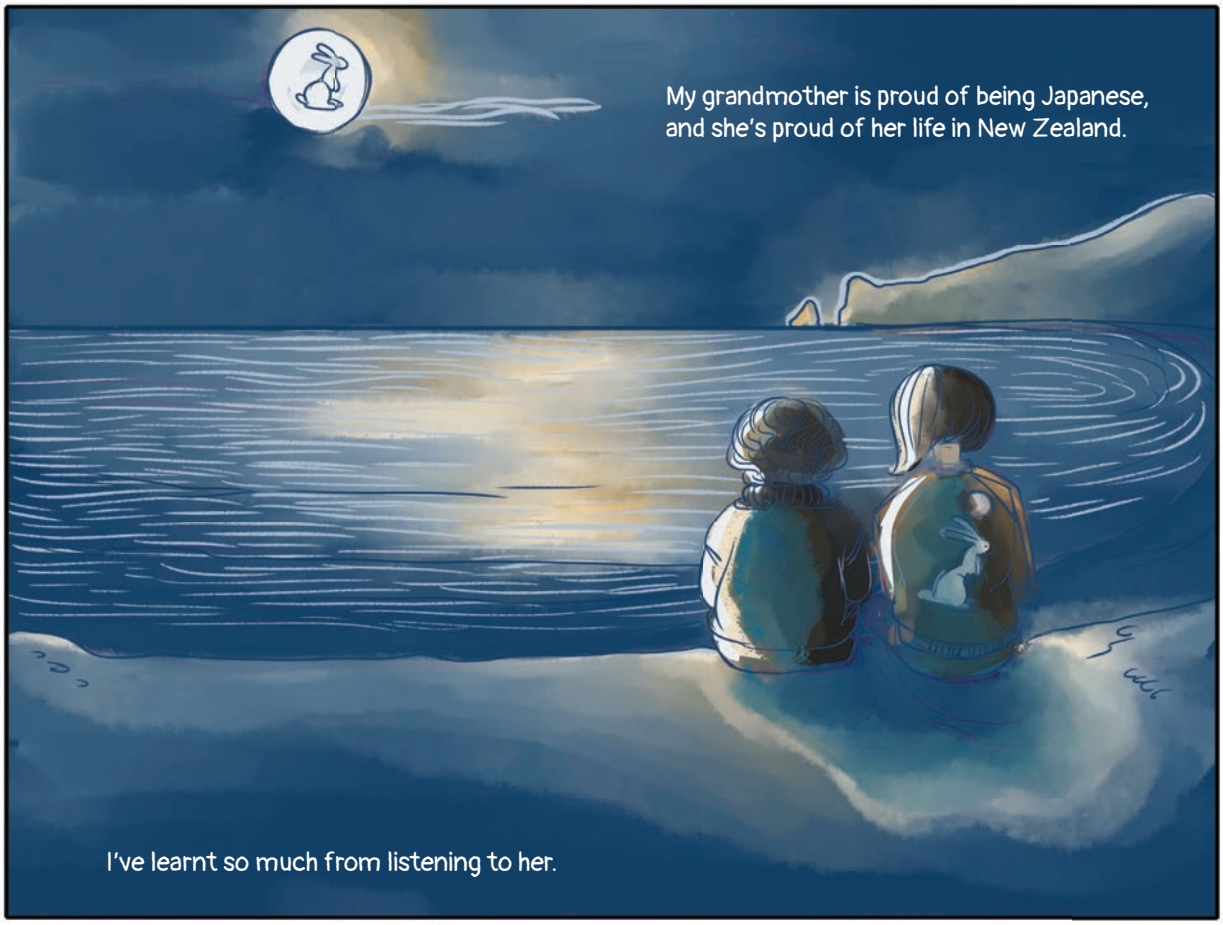

I've lived most of my life on these tiny southern islands, not their sisters in the north.
I feel lost in both places.
People love to tell me things about Japan.
?
Others expect me to answer their questions.
It's frustrating to hear things I've known my whole life.
And it hurts to be reminded that there's so much I don't know.



But that's not how heritage works. I can trace my lineage back over a thousand years ...

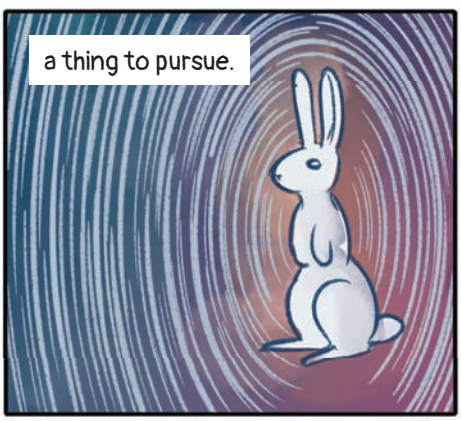



Now my grandmother calls New Zealand home.
It hasn't always been easy, but she's made a good life here.
I tell her about my efforts to learn about Japan.
She encourages me to read more Japanese.
うさぎと月
I'm learning.
日
日本
日本語
I'm trying.
When I'm feeling lost, I have my family.
And I have my grandmother.


My grandmother is proud of being Japanese, and she's proud of her life in New Zealand.
I've learnt so much from listening to her.


She's taught me that my heritage is a living part of me ...


something moving and alive ...


a thing to pursue.

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