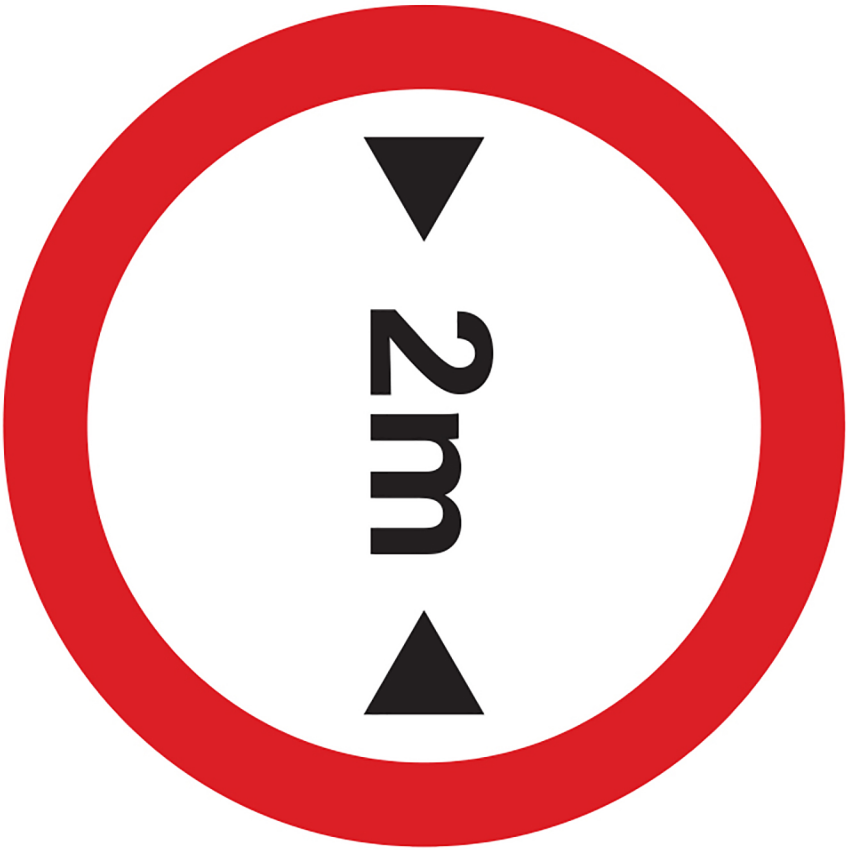
Life plus 2m



Volume 2

Edited by David Zetland

Life Plus 2 Meters

VOLUME 2

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Contents

Visions of our future

David Zetland

As a water economist, I am well aware of how climate change will intensify the water cycle and thus bring strong negative impacts to our lives. For many years, I ignored climate change because I thought that the Intergovernmental Panel on Climate Change (IPCC) represented a fair-to-pessemistic perspective on climate change. I dropped that assumption in 2016 when I read two papers[1] arguing that climate change impacts would arrive more quickly and do more damage than projected by the IPCC's cautious models.

In the first paper, Weitzman explains how economists have severely underestimated the magnitude and probability of damages from climate change — a nearly criminal omission when one considers that climate change could eliminate the human species. In the second paper, Hansen et al. explained how current levels of greenhouse gases (GHGs) in the atmosphere and oceans could speed glacial melting and

[1] The papers are at lifeplus2m.com/science.

thus raise sea levels by 2 meters in the next 50 years and as much as 6–9 meters within 150 years — estimates that are far more aggressive than the IPCC's. Hansen et al. also discussed how warming might slow or stop important currents that keep Northern Europe from freezing over in winter, the Caribbean from having year-round hurricanes, and so on. Those papers, rising GHG emissions, and weak mitigation pushed me to discuss climate change adaptation more aggressively.

But how do you get people to understand the magnitude of the forces coming their way? I'm not Al Gore or Leonardo DiCaprio, so I don't have a massive audience. As an economist, I could write more, but few people have the time for academic details.

Instead I started the Life plus 2 meters project, which would invite authors to write stories of how we might (not) adapt to life in a climate-changed world. In December 2016, we published the first book (*Life Plus 2 Meters, Volume 1*), whose 29 "visions" from 27 authors alternated between storyteller and practitioner perspectives as a means of providing readers with a variety of potential futures.

Volume 1 was neither a critical nor commercial success — we gave away the PDF and sold other versions at cost — but it was fun and invigorating, so I launched a more ambitious scheme to attract more authors from a greater diversity of backgrounds. In May 2017, I launched a Kickstarter project to attract donations that we could use to award prizes to the best visions in the categories of storyteller, practitioner, author under 26 years old, and author from an economically developing country.

The Kickstarter attracted over $600 of donations, and judges (drawn from Kickstarter backers, authors in Volume 1, and volunteers who had followed the project) choose the following winners:

Best story:

1. Daniel Gilbert for "A Marsh Arab's story" (Chapter 30)
2. Emma J. Myatt for Amplitude" (Chapter 25)
3. John Sayer for Data recovery unit" (Chapter 20)

Best perspective:

1. Kalila Eve Morsink for "Blue death" (Chapter 6)
2. Finbarr Swanton for "All empires fall" (Chapter 1)
3. Ed Dolan for "2100: Hot, crowded and wealthy" (Chapter 11)

Under 26 years old:

1. Joes de Natris for "Climate-charged democracy?" (Chapter 16)
2. Jack Cooper for "Seventy metres" and "September" (Chapters 23 and 27)
3. Celia Daniels for "We drown with history" (Chapter 19)

Economically developing country:

1. Ignacio Carlucho for "Dusk" (Chapter 34)
2. Anna Maria Wybraniec for "Browsing pages" (Chapter 8)

Although the prize-stories were popular with judges, let me assure you that *every* vision in volume 2 is worth your time. Although each author was limited to about 1,000 words, all of them found creative ways to explore our potential futures. (These chapters are grouped into sets of five chapters — with one"practitioner" chapter followed by four "story" chapters — due to the mix of submissions.)

We hope that you read this book for entertainment but also consider human behavior as an important factor in how climate change affects our lives. The

34 visions in this book do not represent a single, determined future, but a variety of possibilities that should make you think about the following questions:

- How will climate change affect your life, your community, your region and nation?
- Are your neighbors there for you when you need them? Is that their job or yours?
- Are your leaders protecting the community? Is that their job or yours?

Climate change is real, powerful and unpredictable. We hope this volume gives you lots to enjoy, and lots to think about.

David Zetland, editor
Amsterdam
January 2018

A big thank you to our backers: Anonymous, Arik Day, Christopher Gustafson, Cornelia Dinca, Drew Moxon, Graham Symmonds, Ignacio Urrutia, Jai Haissman, Judi Mesman, Mark Newcomb, Marcu Knoesen, Mariana Pereira Guimaraes, Nikolaos Zirogiannis, Sue Barrett, Ralph Pentland, Robert Morrow, and Yoram Bauman. An additional thank you to Hour of Writes (www.hourofwrites.com) for hosting a competition on the life plus 2 meters theme.

One

All empires fall

Finbarr Swanton

All empires fall, and all empires fall for the same reason. . . Arrogant Complacency.

They rise through hunger and innovation. The Egyptians invented the war chariot, and conquered North Africa and the Middle East. Then the Mesopotamians built a better chariot, and that was it for the Pharaohs. After them came the Persians, and after them the Romans and so on, each building newer and better machines of war.

If it is true that necessity is the mother of invention, then it must be doubly true that war is its father. After all, nothing says necessity quite like your neighbours attempting to part your head from your body.

"What has that got to do with climate change?" I hear you ask. (I have truly excellent hearing.)

Well everything. Empires grow fat the more successful they become. Their well-fed citizens become lazy, delegating work to slaves or immigrant labour. Their sense of inherent supremacy leads to complacency, and then one morning you find the Visigoths at

the gates, and they ain't no tourists neither.

Even when they recognise the danger, it's either too late or they're so blind — *We're number one, HoooWahh* (sound familiar?) — that they simply refuse to accept their loss. Ask Louis XVI or the Romanovs, they could tell you a thing or two about it. The British still can't believe their Empire is gone.

You're still wondering what all this has to do with Global warming. Jeez calm down, I'm getting to it.

It's a commonly held belief that man's interference in the workings of nature leading to his ultimate demise is unique to our time. Not so. Eleven hundred years ago an entire Peruvian civilisation disappeared because of irrigation. Yes, you read that right, irrigation proved to be their undoing.

What they didn't realise was that every time they irrigated the land, the water brought nutrients and minerals with it. One of those minerals was salt. Over the course of two hundred years they salinated the land so thoroughly that they rendered it incapable of growing anything.

And how do we know this? Because it's happening all over again, only this time in California.

We may be unique in the history of mankind, in the history of any species that has littered this planet for that matter. We can see our own demise heaving very slowly into focus, one degree at a time. But we suffer from the same paralysing sense of entitlement that bedevilled empires long gone.

We complain that it's too hard, that wind farms are ugly, that we can't make the sacrifices. We're too pampered, too fat, too full of ourselves. We live in a society that not only claims broadband as a necessity but as a human right (like clean water, only more important).

Are we capable of learning the lessons of all those fallen civilisations? Possibly.

The most heartening sign is that China and India, the fastest growing economies in the world, are ditch-

ing coal for solar faster than you can say "Fake News."

So there may be hope for us yet, though I won't hold my breath. Lucky for me I'm a good swimmer.

Finbarr Swanton: A welder, by trade, a writer by design, a fantasist by necessity, and luckily, Irish by birth. What else needs to be said really?

Just before she told him no 2

Michelle J. Fernandez

Di wasn't there when it happened; she didn't have to be. She could see it as clearly as when she was a girl and her grandparents had painted the picture for her, as their grandparents had for them. The waters would advance, overtaking the beaches, the resorts, the high rises and bungalows, until all that remained visible were the palm fronds of the last coconut tree, undulating like sea grass atop the waves. And so when it happened she was not surprised. She had carried the image of those last palm fronds in her mind for so long that she had already come to think of her homeland as submerged. Almost out of obligation, she had raised a mourning yowl to the empty universe, a pointless screech of rage, and then was done.

The news reports claimed that the archipelago was almost devoid of human life at that point. Anyone who could get out, did, of course. Few were as fortunate as Di, who had gotten out before it was necessary to obtain refugee status, before exceptions had to be made. But there was that word "almost," sometimes substituted with "virtually." Almost devoid of human life. Virtually unoccupied. Words that suggested that not everyone had escaped, that at least one person was still there. At least one person sank with the wreckage.

But she couldn't bear to think of that. One single life, or five, or ten, was inconceivable when every day brought news of deaths in the thousands. She could only think of the place, because its people had flung out in every imaginable direction, living and dead. The place, now, was lost.

Once, she'd had a professor who graduated from an academic program that later went bankrupt and lost its accreditation. He had done all the work, earned his degree, played the tenure-track game and won, and sud-

denly had no academic credentials whatsoever. The foundation on which he had built his entire professional life was instantly, and through no fault of his own, undone. This was like that, amplified ten thousand times.

Her grammar school. Her pediatrician's office. The minarets of the nearby mosque. Her neighborhood. Her mother's neighborhood, her father's neighborhood, and so on back for thousands of years. The house of the cute boy who sometimes rode his bike past after school and did tricks in her driveway, knowing she was watching from behind a corner of the drapes. The betel leaves and areca nuts. The airport hotel on Hulhule where she had her first job as a receptionist, smiling in the faces of eco-tourists. All the places that held the faint memories for everyone she had ever known. All of it gone. It was unthinkable, so huge the loss. She couldn't begin.

And yet, here on the other side of the world was not so much as a gust of wind to mark the change. Not even the beating wings of a single Karner blue. The loss was within her. It may well as been a dream.

What, then, could something as frivolous as another person's love mean to her?

Michelle J. Fernandez is a public librarian from New York who lives in Washington, DC. Having spent the majority of her life at sea level, she is fascinated and bothered by climate change's potential impacts on humanity. This chapter is an excerpt from her first full-length novel, Eminent Domain, for which she is currently seeking publication.

3 *The green turtles*

Cohl Warren-Howles

The time had come. She could feel a trickle of sand upon her nose as she broke through from the safety of her spherical home. Clambering on top of her discarded eggshell, she propelled herself into the warm night air and waited. Gradually hundreds of tiny heads emerged from their hidden cavity. They looked about nervously. The full moon's light reflected upon the indigo sea... The air was still and balmy.

'Let's go, follow me.' she said.

The sand was warm as they scrambled towards moonlit water. Gentle waves kissed the beach as they dove headlong into the open sea. The currents grew stronger as they approached deeper water.

'Wait for me,' a voice called from behind her. She turned to see one of her brothers, smaller than the rest, paddling as fast as he could against the tide.

'Keep up, I'm sure it won't be far.' She wasn't certain of where they were going, but instinct drove her on.

After several hours, a large bed of seaweed appeared ahead, swaying in the swell. The horizon stitched a line between rose-pink sea and sky.

'Come on, we can rest here,' she called to the little one beside her, and turning, she was surprised to see that the rest of the group had disappeared. Seaweed brushed against their bodies and they rested within its benevolent embrace, hidden from the eyes of predators.

After such a long swim and hunger gnawing at their bellies, they began to tear small pieces of tasty seaweed with their beaks. As they ate, they were unaware of a large slim shape that lurked below them, intent also on a meal. Suddenly she sensed the shark and signalled her brother still. Its flicking tail passed close enough to touch before it headed into the water's azure expanse.

‘That was close,’ she breathed.’ We’d better be more watchful unless we want to become someone’s dinner.’ He shivered.

Days passed into months and the two youngsters outgrew their floating home. They swam closer to the shore and spotted a kelp forest, stretching like underwater trees towards the surface. The water was shallower here, with algae covered rocks that jutted from the sea floor.

A jellyfish poked its glassy head out of its rocky hiding place. She caught sight of its diaphanous form and intrigued, sped towards it, thrusting herself through the ultramarine waters. Her sawlike beak pierced its underbelly but avoided the circling tentacles. Its rubbery body was unlike anything she had ever eaten. She gobbled the new dish, tendrils curling from her beak.

The sunlight-sprinkled waves crawled to the shore and lapped the gold sand. Gulls silhouetted against the cloudless sky, wheeling above on afternoon thermals. The lazy day idled. Summer languished. Time passed.

Some days they would climb on to a rock to bask in the sunshine. Here they felt relatively safe as they were too large to fear seabirds. Life was good.

One sunny day, they noticed the sea full of jellyfish. From their sun-warmed platform, they could see many an easy catch. They slipped into the water and ate quickly. The jellies didn’t put up much of a fight as they drifted like gossamer in the current. Their white tentacles were tough and somewhat bland, but food is food.

‘So many jellies,’ she said as they finished eating. Semi-transparent forms floated just below the surface in the rhythmic pulse of the sea. These gelatinous umbrellas pirouetted, caught in the water’s circling embrace.

The sky was cloudless, the sun breathed heat, and they returned to their lounge. Listening to the sound of the lapping waves, they watched as the sun changed its colour from orange to a muted gold that spread across the sea’s surface like an amber veneer.

As the temperature dipped, she turned to her brother and was startled at how strangely pale he seemed. He had a faraway look in his eyes. She wondered what had brought about this sudden change. Slipping into the apricot water, she turned and said. 'I'm going to eat, are you coming?

'I don't want to eat right now' he said quietly.

In fact, as he replied, she realised that she didn't feel like eating either. It was as though there were lots of tiny bubbles in her stomach and somewhat alarmed, she found it was becoming difficult to keep below the surface.

Neither of them were hungry, but occasionally they scraped a little algae from the rocks in their seaweed forest. Listlessly, she wedged herself between two small rocks to secure herself from floating upwards, she fell asleep.

When she finally awoke, her brother had disappeared. In desperation she looked around, as she wriggled herself free from the rocks. Once again the bubbles in her belly forced her to rise and before long she found herself drifting on the surface.

A boat's bow broke near her.

'Look' shouted an excited boy, his freckled face smiling as he peered over the side. 'It's a turtle!' he mumbled through a mouthful of sandwich, its empty plastic bag still in his hand. His sister appeared and leant over to watch the bloated green turtle flounder in the tide.

'It doesn't look very well, does it?' she said sadly, 'I wonder what's wrong.'

The boy moved to get a better look as a gust of wind blew the bag out of his hand. He watched it float away, another synthetic jellyfish in the plastic sea.

Cohl Warren-Howles writes in a variety of genres and has a special interest in Eco-fiction. She writes for a number of magazines worldwide, has published a book, and is now completing her second. She lives in Stratford-upon-Avon with her husband Saul.

Swimming over the future 4

Eric Douglas

Nathan Scott slid into his lightweight dive gear and prepared to explore a new site in the sunken city. His father was a photojournalist and his mother an archeologist, so this work came naturally to him. He had been diving and exploring ancient ruins since he was a boy. Now, he was the archeologist leading his own team.

For this dive, Nathan wanted to see how things had changed since the sea had taken over and an earthquake had further dropped the ground below. Their laser-mapping gear would make a 3-D model of the entire area as they swam.

With a nod, each diver backrolled into the warm saltwater and descended to the bottom. The site was relatively shallow — only 30 feet deep. Not far away the bottom dropped off miles deep, but that was a dead zone.

Swimming nearly unencumbered, Nathan thought back to his dad's gear and laughed to himself. That ancient stuff belonged to museums now. Nathan's dad had died a few years before, but his mom was still alive. At 100 years old, she loved to tell stories and relive their adventures like it was yesterday.

Nathan caught sight of the building he planned to survey. The architecture was considered "space-age" at the time. That brought another laugh. Now that space travel was common, he realized the science fiction writers and architectural dreamers had it pretty close. The buildings on Mars looked like this — minus the corals of course.

The main structure had four long legs that came down at angles and rose over the top in two massive bows. Underneath the legs, a pedestal rose and flared out, connecting to the legs. Storms had knocked the pedestal sideways down to the sea floor.

A few glass windows survived the fall, but most of the building was open to the sea. Nathan turned on his light to look inside.

The water had risen slowly, but inexorably, so the people who worked in the building had time to remove things. Only fixed furniture and the walls remained. With nothing of value to claim, the building had been ignored for years.

Sweeping his light to the side, Nathan saw a shadow move. There was something there. But what? There were no sharks left in this part of the ocean. Whatever it was, it was big. Bigger-than-him big.

Nathan moved inside. He needed to see what was there. Whatever it was, it kept moving ahead of his vision. He kicked further inside. The odd angles of the floor and the walls, with the structure lying on its side, were disorienting.

What is it? His imagination?

Moving into the cavernous room, Nathan stayed away from the walls. He didn't want to get backed into a corner. Swinging his light to his right to look around a partition, his heart almost stopped. He had heard stories, but he almost didn't believe what he saw. The flowing fins and spines radiating from the fish's body identified it immediately. A lionfish. But this one was as big as a lion. It had to weigh 400 pounds. When Nathan was a kid learning to dive, lionfish weighed a few pounds and the sting caused excruciating pain. This fish was surely deadly.

The fish advanced, stalking him like prey, and Nathan backpedaled quickly. The spines were as long as he was tall, with enough ichthyotoxic venom to paralyze him on the spot. Lionfish were fearless and aggressive hunters, masters of the ocean these days.

Lionfish hunt by moving close, darting forward, lowering their jaws, and sucking prey into their mouths. If this lionfish got too close, Nathan wasn't sure there was much he could do.

Swimming backward, Nathan crashed into something hard. He'd managed to run into one of the few remaining glass windows. His reflection showed the huge fish closing in.

Nathan raised his light and smashed the window, diving through the falling shards of glass. He felt a pull but grabbed the window frame and pulled himself through. He'd lost a fin to the lionfish, but it was too big to follow.

He was safe.

His return to the boat was slow with only one fin, but he wanted time to reflect. He knew the world had changed in his lifetime, but today's exploration of a landmark he'd visited many times as a boy brought the situation home.

He swam over a familiar sculpture. The *A* and the *X* nearly reached the surface, but the *L* had fallen. All three massive letters were covered in coral.

LAX.

When he was a kid, he used to come to this airport with his dad. They would fly away to have adventures. Now it seemed quite easy to have adventures right here.

Eric Douglas writes fiction and nonfiction. His Mike Scott novels are set in dive locations around the world. This story features Mike Scott's son Nathan, years in the future.

A challenge at Sabratha 5

Robert Alexander Hoekman

2192 / March 13 / 16:36
Libya / Zawiya District / Sabratha Port

The chaos was glorious. Harsh calls and barking dogs, shrieking children, and the staccato coughing of dying automobiles. Heat shimmered off stone and earthwork construction. Metal roofs mirrored the sun.

The man walked through a busy market towards the red-tinged sea just visible through the crowds. Airships glittered as they hovered. They swayed slowly against the anchor chains which stretched from dizzying heights to the coast creating metal latticework reminicent of a spider's web. The algae blooms reflected red light, colouring everything in a sickening hue. *The algae was not the only thing catalysed by the sun*, he thought, grimacing at the stench of shit.

It was packed. Thousands jostled on the street. Few stopped to browse the paltry offerings scattered across the decrepit stalls and reed mats. The drought had hit people hardest here. Food shortages were worse than in Eurasia. A few UN depos provided water, supplements and bandages, but they were overwhelmed by the masses arriving daily.

Desperate eyes clawed from sunken faces as listless bodies pushed towards the port. The man's obsidian eyes scanned across the crowd, never resting more than a few seconds. He was tall, his dark skin no longer exotic among the millions of Africans recently arrived from the drought-stricken south.

Most of them were already dead, he sighed. It was unthinkable that this many people faced extinction, unthinkable that only two decades ago the region had been in a process of economic and technological recovery at a scale not seen since the Renaissance. But then the

drought had surpassed even the most pessimistic prediction. Climate change had long since been accepted, mitigation was occurring worldwide. Things had been looking up for the first time in fifty years. Then two decades ago average temperatures soared globally, in the sub-Sahara above what even solar panels and batteries could tolerate. People retreated indoors, only coming out at night. Electrical appliances quit, cooled greenhouses died. Global food production dropped by forty six percent in three years. Population kept increasing for the first few years.

The man turned away. There was a silver lining of course. People were willing to give up everything to get somewhere — anywhere — with food. He offered them a good deal. Methane-filled airships could travel light and fast at low altitudes, avoiding radar and space surveillance. He and his rag-tag air force often delivered a satisfied payload.

He passed through the crowd, easing aside those in his path. He wore a typical black bedouin robe. It was his confident stride that attracted looks.

He turned into the shadows of a side street, walking past crumbling houses and open gutters. He arrived at a seedy bar that looked like any other house in the alley, save its faded plastic chairs and chipped tables. He sat and stretched his legs, waiting.

A woman emerged from the interior, the open door letting out the quiet hum of the cooling unit. The door swung shut, its clap cutting through the quiet. The woman approached from his blind side. “You’re late Akilian,” she said with some annoyance.

He didn’t turn. After a few seconds, she came around and sat down. Her blue eyes glared from behind the niqab. She was always dressed like this. Akilian’s attempts to profile her had failed, so he had resigned himself to operating in the dark. He didn’t mind.

Clearing her throat, she looked past his shoulder into the alleyway and asked: “Why the delay?”

Akilian leaned back, the chair creaking. “We’ve had

a lot of casualties, four of my airships took fire and were lost over the Aegean sea. No shipments were recovered" He looked back at the web of anchor chains and ships visible in the dusking sky, "I thought the new route was safe. You told me there were no patrols."

She shook her head slowly, tense with anger, "It was never a guarantee, there are food shortages even in the very north. They're watching."

She leaned forward, blue eyes capturing Akilian in a cold iron vice, "these shipments need to be made or we will have complete devastation here. We need to reroute. Why not South Africa?"

He paused in disbelief. South Africa had been shooting on sight for the past decade. *They must really be getting desperate*, he thought.

"If we attempt South Africa we will lose half our ships" he said slowly. "If we attempt a Mediterranean landing again we will lose half our ships." He stood up slowly, "come to me when you find a route that does not kill those we are trying to save and my business with it."

The woman said nothing as he walked away, but reached for her temple and tapped once, stopping the video recording. There would be much to discuss back home. Others in the movement had more ambitious plans to move two hundred million people. Others were far more dangerous.

Robert Hoekman is a Tanzanian-grown data journalist and weekend wildlife photographer of Italian and Dutch stock, currently living in the Netherlands. He works as a Data Journalist and Storyteller for the Red Cross and 510 Global and moonlights as a consultant.

Six

Blue death

Kalila Eve Morsink

Some say the world will end in fire

I like the idea of a nuclear apocalypse. So do you. We like the sound of it: "nuclear" clips and "apocalypse" pops. More than that, we like the suddenness. We'd like to go quickly, in the four-mile blast radius of a one-megaton bomb where winds reach speeds of 158 miles per hour. Of course, a four-mile blast radius is only 50 square miles of a 200-million-square-mile Earth, but the world is small when a bomb lands on top of you. That apocalypse is stentorian and scriptural and sudden. The world ends just as it should — in fire that falls from the sky. Red death is quick.

Blue death is slower. The seas are rising: a millimeter and a half every year in the 1990s, three millimeters a year by 2000. Three and a half millimeters in 2016. A slow creep as global temperature rises and the ocean expands. Scientists expect that hurricanes will get worse as the decades tick by — infinitesimally more intense from one season to the next.

But a slow apocalypse is so difficult to think about.

We don't like it. I don't like it; I hate playing the game of time. If I have children, will they have children, and will those grandchildren be born by 2100? (Climate scientists tend to make their predictions for the year 2100.) Will those grandchildren perhaps live in the Netherlands (where my own grandparents lived), somewhere that is currently only one meter above sea level? Because, if so, those hypothetical grandchildren would surely be subsumed by the sea.

But this game is tedious, and I've lost interest. It's much easier to panic about the nuclear apocalypse than an apocalypse that is wet and blue and slow.

The heat of a hurricane

The heat energy released by a fully developed hurricane is equivalent to that of a ten-megaton nuclear bomb exploding every 20 minutes. Not a one-megaton bomb, with its 158-mile-per-hour winds within a four-mile blast radius, but a ten-megaton bomb, and in another 20 minutes another ten-megaton bomb, and in another 20 minutes another ten-megaton bomb. In the most impressive hurricanes — Category 5 on the Saffir-Simpson hurricane scale — wind speeds may exceed 158 miles per hour. The amount of energy released by a hurricane is shattering. It's apocalyptic.

If a Category 5 hurricane churns over you, then the apocalypse is quick, although not red. If you favor a fiery end, then console yourself that at least there is heat in a hurricane — thousands of billions of watts of heat, many nuclear bombs' worth of heat. So much heat that it's almost strange that hurricanes bring blue death.

The hate of a hurricane

There's hate in the nuclear apocalypse. There has to be hate, because bombs are dropped by people.

(*Hate is indifference where there should be empathy.*)

There's no hate in a hurricane, except that hurricanes intensify as the climate warms, and the climate is warming. The most intense of hurricanes — the Category 5 storms as well as their cousins in Category 4 — are going to become more frequent. By 2100, when my hypothetical grandchildren are growing up, the number of Category 4 and 5 hurricanes will have doubled. Perhaps my grandchildren will not be living in the Netherlands, after all (because perhaps the Netherlands will be underwater) and will instead inhabit a more hurricane-prone location, like Japan or Bangladesh or the Gulf of Mexico coast. And while they are growing up on the Gulf of Mexico, they will have good reason to be afraid of Category 4 and 5 hurricanes, because Category 4 and 5 hurricanes are exceptionally destructive. During the last century, they accounted for 6 percent of the storms that hit the U.S. but 48 percent of the hurricane-induced damage.

So there is no hate in a hurricane, except that hurricanes intensify as the climate warms, and climate warms as carbon dioxide spills into the atmosphere, and carbon dioxide spills into the atmosphere because we burn coal and oil and gas, and we burn them freely. We think the apocalypse will be red and fast, so it can't be happening now. After all, it's hard to see speed as the sea rises, millimeter by millimeter, and it's hard to see pressure build as hurricanes get worse and worse, one at a time. And it is very tedious to spend time considering a hot, wet, blue death.

Perhaps it's just tedious enough that I am unmindful, and perhaps I am just unmindful enough that I am willing to be cruel to my bright-eyed hypothetical grandchildren. Perhaps, in 2100, there is hate in a hurricane after all — my aged indifference turned to hate. (*Hate is indifference where there should be empathy.*)

Death by water

When a hurricane hits it is certainly not the heat that kills, nor those galloping, screaming winds. Nearly seven hundred storms hit the U.S. over the past half-century. They killed two-and-a-half thousand people, ten percent by wind, the rest by water.

When a hurricane makes landfall, it pushes a wall of water before it, a storm surge that can be as low as four feet or high as forty. Storm surges in the U.S. over the past-half century accounted for half of the deaths by water. A hurricane also brings rain, and where it rains it may flood, or the ground may collapse into a mudslide — so rainfall accounted for about three-tenths of the deaths by water. And the rest drowned in riptides, and waves, and the open ocean. It can take more than four minutes for a person to drown, and death is slow, and death is blue.

When I dream of the end of the world, I dream of water.

Kalila Morsink is a student in New York City, where she studies earth science and creative writing and thinks blue thoughts about the future.

7 *The grass isn't greener*

Nishita Sinha

Krishna and his three siblings are playing in the sunlight outside their dilapidated mud hut. They have skipped lunch and don't want to be called inside for dinner. Devki, their mother, looks out of the cracked window and decides against calling them in. She smiles at her youngest daughter, Imly, playing in the shade of the giant Babul tree, but her smile gives way to tears of pain. Her husband Balraam hung himself from that tree a few months ago. Now Devki is managing on her own. Most days have only a single meal. It's easier to leave the children in the courtyard.

Balraam had owned a small farm in Vidarbha village in Maharashtra. Vidarbha had suffered from water shortage for several decades, but a local weather *guru*, Hirana, had predicted a heavy monsoon. The farmers paid for his promise of prosperity. Balraam borrowed to buy seeds and fertilizer. They had a small celebration.

The farm was plowed and seeds sown, but it barely rained. Balraam's crops failed. Drenched in debt, Balraam could not bear the pain of failure. Like many neighbors, he took his life.

A postman, meanwhile, hands a letter to little Imly, who brings it to her mother. Drying her tears, she takes the letter. It's from Sujata — Devki's sister — who says she is bringing her family to stay for several days. Sujata lives in Bihar, where the holy Ganges and its tributaries keep the land wet and fertile.

Devki has always found happiness in Sujata's prosperity, but now she feels jealousy. Devki begins her reply, explaining that she can barely feed her children, let alone honor them as guests. Devki nearly asks her sister for help but stops out of respect for her deceased husband. The children interrupt her. They are tired and thirsty

but sleep after they drink. Devki cries herself to sleep.

A knock wakes her. It is Sujata and her children. Devki invites them inside and offers water. Sujata looks at the brimming glass and starts crying. Confused, Devki sends the children outside to play.

She hugs Sujata as her sister tells of flooding in Bihar. Heavy rains enlarged the rivers. Her husband Ranjan was swept away when their farm was inundated. The only drinking water was stagnant. People were sick and children were dying of diarrhea. They were running out of food, so they escaped to Devki. Sujata starts to cry as she recalls a conversation with Ranjan. He wanted to leave after the last floods. She didn't, and now he is dead.

Sujata offers to work in Devki's farm and raise their children together, but Devki cannot accept. She sold the land to repay Balraam's debt and now works at the local government office. Devki will ask if Sujata can work.

The next morning, Devki sees a crowd outside the office. They are debating problems with simultaneous droughts and floods in different parts of the country. Their positions are familiar. Every year the same conversations, but nothing ever gets done. Sensing a wasted day, she goes home.

Later in the evening, the village *panchayat* announces a green light for the river-linking project that will bring surplus Ganges water to dry Maharashtra. Devki remembers this project from her childhood.

Filled with hope, she and her sister go to ask the local officer when the water will flow. He is tired and uninterested. After several minutes, he snaps, "Not in your lifetime!"

Sujata and Devki turn to each other, in tears.

Nishita Sinha is a doctoral student in the Department of Agricultural Economics at Texas A&M University where she studies water resource policy. She believes the "invisible hand" plays a crucial role in managing natural resources.

8 *Browsing pages*

Anna Maria Wybraniec

I still keep an old magazine that I found in my childhood. Nowadays, it is valuable. Not many newspapers are left; magazines with colourful photos are even more scarce. When people fled during The Dies Vagire, they kept solid mementos like books, not throw-away papers with trifles, advertisements and pretty pictures. They left behind the thing for which they had cut down our forests. Isn't that ironic?

I used to flip through the pages and imagine myself living in the past. I liked pictures most. After Vagire the new government, The Greenest Party, did not allow printing of such useless things. It was a reasonable decision. We did not have enough trees to sustain our basic needs. We did not have enough water or electricity to waste on pretty pictures. They banned many things that were bad for the environment. Today, most people do not mind. They don't even remember. They are too busy surviving.

When I tried to imagine living in the past, I would start with breakfast — a slice of bread covered with a cacao-hazelnut spread. I used to imagine the taste, but I have no idea if I was right.

We don't use white bread. Tortillas are easier to make. Chocolate spread disappeared when cocoa products were banned. It was easier than preventing planters from cutting down what was left of the rainforests, to stop them from overexploiting the soil. Palm oil was also banned, but it didn't save the orangutans.

The same paper had articles about the impact of growing cocoa and palm oil and pretty pictures promoting their use. Isn't that strange?

The spread also had sugar, now in very limited supply. Milk is a rare and expensive treat, eating animal

products is not encouraged for their heavy eco-footprints. The last ingredient, hazelnuts, disappeared with the plants and animals slowly moving towards poles, to escape the heat and unpredictable weather.

After breakfast, I proceed to imagine myself in pretty dresses, colourful but too delicate for heavy wind. The handbags looked uncomfortable to wear and too small for hauling. The shoes were puzzling, with thin straps and high heels that looked uncomfortable to walk in. Then I remembered. They didn't need to be practical. They could be looked at. We must look out.

My favourite pictures were of last-minute holiday destinations. Maybe they didn't mean it, but those destinations really didn't last. I looked at pictures of snow and skiing and skating on ice — water doesn't freeze on its own any longer. I have seen the ice, but only in school. It's too wasteful to freeze water for leisure. Other images showed beaches, sand, blue seas, and the sun on the horizon. All gone now. The beaches are covered in algae and poisonous jellyfish. The once azure sea is now dirty green. A suffocating layer of plankton and seaweed has killed the fish. Our seaside smells like death and rot. Only the sun is the same, too far away from us to contaminate it.

I always skipped articles on green energy. It saddened me, how hopeful they were and how badly they failed. The solar panels could not survive the hail and endless clouds of colder regions or the scorching sun in the hotter places. Hurricanes and tornadoes broke the wind turbines.

Now, when I browse the pages my attention is caught by one of the adverts that says 'The future is now'. It is wrong. We are past any future. The past is now, and all we have left of it is not enough.

Anna Maria Wybraniec is a student from Silesia with interests ranging from language and linguistics, to literature and history, to art and biology. She hopes her stories are entertaining enough to be educating.

The last mission 9

Xenia Artemiou

"Joe! Wake up!"

"What?"

"I saw another Mars bus in the sky."

"Go to sleep."

"But Joe, maybe we can get them to help us."

"Look Mark, we decided to stay here on Earth and deal with it. I don't understand why you would change your mind now, since it's probably impossible to get to Mars."

"Sorry Joe, but take a look at what's left: Nothing! We're 400 meters above sea level hiding in a cave to avoid skin cancer. We don't have medicine, the fish have been exported offplanet and food webs are collapsing."

"Can I just remind you that you were the one who said we should hide and wait for nature to heal?"

"And what are we going to do while we wait?"

"We'll do exactly what you said. Scavenge abandoned tech. Contact others. Keep going. Earth was a paradise, and it can be again."

"Ok, I know what I said, but I didn't understand the challenges — the radioactivity, the earthquakes, the flooding."

"One step at a time. We're post-carbon, cars and meat. We have lab food. We can wait. There's hope."

"That's going to take years... decades. We should go to Mars, like everybody else."

"Ok, fine, calm down. I'm staying here. You can take the pod. Its charge should make it to the port."

"You're sure you wanna stay?"

"Yes. You adapt your way, and I'll adapt mine. I'm staying here."

Xenia Artemiou moved from Nicosia, Cyprus, to study for an environmental science and sustainability BSc at the University of Glasgow. She worked as an intern on the Life plus 2 meters project in early 2017. She is due to graduate in 2018.

La anciana sabia 10

Jane Wagner-Tyack

I discovered a recording of my great grandmother and me when she was very old and I was young. She was describing the Central Valley of California before I was born. We were sitting on the porch of her old house on a shaded street in a Valley town, burning citronella candles to discourage mosquitoes. Even now, the scent of citronella reminds me of that porch.

She remembered when the great north-south highways, one on each side of the valley, lay mostly along the valley floor. That was before flooding became so frequent that it was cheaper to abandon those and rebuild them in the foothills. Off these main highways, you can still see occasional weathered signs showing the name of the town you were entering, the population, and the elevation above sea level. That was before rising seas changed the elevation, and the government stopped updating the signs.

In those days, the Sierra Nevada mountains were covered with trees north to south, and there was snow every winter but less heavy rain. That was in the century when one side of my family was carried north from Michoacán on a tide of workers to pick fruit and vegetables in the Central Valley. My Anglo and Latino ancestors ended up together near the Delta of the San Joaquin and Sacramento rivers.

Immigrants had reclaimed the Delta for farming a century before. Winter floodwaters filling the great flood bypasses were rare. But now you can see the remains of some of their roads only in a very dry year, when locals travel along them instead of using solar boats. Rising seas have returned much of the Delta to the birds and the fish. Now the salmon move most years through a great inland sea.

"When your grandmother was born, in Sacramento in the spring of 1986," said my great grandmother, "the Sacramento River a mile from our house almost topped its banks. Even then, I wondered why they allowed homes to be built in that flood plain." In those days, she said, hardly any dwellings were built on pilings — just a few along the Sacramento river north of the Capitol, where now walls hold the river back.

In those days, people farmed vast areas from one end of the valley to the other, over 400 miles long, to feed people in California and the rest of the country and the world. Some farmers irrigated fields to grow alfalfa to feed cattle, and the meat of cows was so cheap that everyone whose faith allowed it ate beef all the time.

"Once upon a time," said my great grandmother, "men thought they could move water to anyplace that people wanted to live and farm. They considered themselves visionary for reshaping the natural world." That was before farmers drew so much water from underground that the land sank, breaking their mighty north-south aqueducts into useless fragments. That was before changing weather patterns made the big dams for storing water unreliable.

And the southern Valley kept getting hotter, making it harder to farm in the traditional ways, all one crop stretching for miles in soil under the desert sun. As it became too hot to grow food in the ground, except under solar panels, people everywhere began to relearn how to grow their own food, in fields or on green walls, in greenhouses or agridomes, wherever they live, as our family has done, so that food doesn't have to be moved great distances.

When we travel in the hybridcopter to cities in the southern deserts, we see the new dwelling enclaves where artificial intelligence manages systems that control temperature, clean waste water, and capture water from the air. Near Tulare Lake, they grow agave for syrup and mezcal. Only on the east side of the valley do thirsty nut trees still grow, and only farthest north do farmers still

grow rice and grapes for wine.

My great grandmother, a wise old woman, saw this Valley begin to be transformed in her lifetime. “People used to accumulate more things,” she said, “before all the fires and floods and dislocations. Gradually, we lost the illusion of permanence.

“Hija, it doesn’t do much good to warn people about calamities. We live our lives up close,” she said, drawing so near to me that our noses almost touched. “The BIG picture” spreading her arms wide and then pulling me closer “we mostly miss, the pending events, the unforeseen consequences.”

“ArtIntel takes care of those things,” I said, repeating the mantra from school. “ArtIntel does an error-free job of reasoning everything through, anticipating every possible consequence of every possible choice.”

“Yes,” she agreed, “we programmed it to do that for us. But even without that, human beings would adapt to their own follies and innovate their way out of any problem their shortsightedness created for them.”

“Every few centuries,” she said, “people begin to tell each other that they, of all human beings ever, are living at the end of everything, as if they thought they deserved to suffer uniquely, to be punished by gods they do not even believe in.”

“They are always mistaken.”

Jane Wagner-Tyack is a writer and educator who studies history and policy related to water, local and beyond. She lives in California’s Central Valley, in a small city called Lodi.

Eleven

2100: Hot, crowded and wealthy

Ed Dolan

Climate scientists use standardized scenarios to help them peer into the future. Known as "representative concentration pathways" and "shared socioeconomic pathways," the scenarios help maintain comparability among the work of research groups by specifying assumed trends in population, economic growth, energy use, and other variables that produce different degrees of warming. But by putting everything in the form of tidy numbers, do they obscure the big picture?

Two of the most widely publicized visions of the future, RCP 8.5 and SSP5, assume that the global population increases to as many as 12 billion people, nearly twice as many as in 2017. They also assume heavy reliance on fossil fuels (especially coal), and a tripling of CO_2 emissions. That would be enough to produce as much as 5°C of warming by 2100 — far more than the 2°C beyond which lies climate catastrophe, according to many environmentalists.

Although it is less often mentioned, RCP 8.5 and SSP5 also assume a remarkable increase in economic prosperity. They project that GDP per capita in 2100, adjusted for inflation, will be five times higher in countries that are already developed today, and up to 30 times higher in those that are now less developed. That economic growth surprises some people, but it should not. After all, economic production and consumption are the source of the emissions that drive the warming. In other scenarios, where GDP doesn't grow as fast, emissions are assumed to be lower and the future climate correspondingly cooler.

Numbers alone are not enough to grasp this paradoxical future, which combines environmental devastation with great economic prosperity. To get a better idea of what it might look like, let's switch to sci-fi mode and take a quick trip through time to visit some representative countries of the hot, crowded, and wealthy world of 2100.

Iceland. We start with a visit in Iceland, the richest country in the world of 2100, with a per capita GDP of $1.5 million. (All incomes in this account are stated in US dollars with 2010 purchasing power. The estimates come from a recent study by Marshall Burke and colleagues posted on Nature.com.) Yes, there is still actual ice in Iceland, if you look in the right place at the right time of year. As a tourist attraction, ice is one source of the country's wealth. Tourism aside, Iceland has maintained strict immigration controls, as have most European countries. The small population of Icelanders leaves plenty of room for crops in the country's fertile fields, so food exports are another source of income. Iceland continues to get most of its energy from geothermal sources, so it bears little of the blame for the climate woes that affect many other parts of the world.

Mongolia. Mongolia was poor and chilly back in 2010, but in 2100, it is one of thirty-eight countries that are better off with climate change. Its per capita GDP

of $390,000 makes it the seventh richest country in the world. Unlike Iceland, Mongolia has opted for an open immigration policy. Its population has increased 40-fold since 2010 and now stands at 120 million. Descendants of refugees who fled the rising sea levels of Pacific Islands and the Bengal Delta outnumber people of native Mongolian stock. Most people live in cities. The country's highly mechanized agriculture, which makes Mongolia the breadbasket of Asia, requires few workers. Abundant coal, copper and gold, plus a young, skilled, and rapidly growing urban population, have made Mongolia an industrial powerhouse. In that respect, some people compare it to Japan of the late twentieth century. As we take a tour by high-speed train through verdant fields of corn and soya beans, we can't help but wonder what Genghis Khan would think of his once-austere homeland.

Australia. Australia, unlike Iceland and Mongolia, has been a relative loser from climate change. Per capita income has more than doubled since 2010, but it would have risen five-fold without global warming. The Australian environment is in terrible shape. There is little open-air agriculture. Kangaroos and koalas survive only in zoos. Nearly everyone lives in cities, which have compacted in response to heat. Streets and cars are gone. People and freight move around in pneumatic tubes. Energy is abundant, with plenty of desertified space for solar farms and continued exploitation of the country's vast coal reserves. Mineral exports pay for food from Mongolia, Kazakhstan, and Siberia. The population is stable. Australia limits immigration, although it is generous with foreign aid.

India. India is the world's poorest country in 2100. Although per capita GDP is three times higher than in 2010, it is still only $1,657. Much income is spent on air conditioning, so personal consumption is meagre. Much of India, one of the world's hottest countries, is simply uninhabitable. There are fewer days each year when it is safe to go outside, even briefly, but

with few countries willing to accept climate refugees, more than a billion people continue to live here. Sydney and Melbourne, which we visited on our stop in Australia, are still recognizable as cities. Not so with the more compact habitats where Indians now live. They look like ships inside, with narrow corridors, crowded bunkrooms for the poor, and luxury decks for the rich. India is also self-sufficient in energy, thanks to abundant solar power and coal. Cultural life is vibrant, but exports of music, films, and services like software development do not earn enough to pay for food imports. The country is heavily dependent on foreign aid from the hyper-wealthy, guilty-but-unwelcoming countries of the North.

Back to 2017. Can we really believe what we have seen? Did humans really spurn even modest climate mitigation policies that would have left them a little less wealthy, but cooler? Did we really avoid the famines and wars that might decimate populations and wreck economies, leaving the planet battered but less crowded and not quite as hot? Climate models can't answer these questions.

Edwin G. Dolan holds a PhD in economics from Yale University. He has taught in the United States at Dartmouth College, the University of Chicago, George Mason University and Gettysburg College. From 1990 to 2001, he taught in Moscow, Russia. After 2001, he taught economics in Budapest, Prague, and Riga. He is currently a Senior Fellow at the Niskanen Center and lives in Northwest Lower Michigan.

New Atlantis

12

Catherine Jones

Lost at sea—
Tides hit and run,
Slow waves maroon and hide,
Cities, coastal, sink into sand—
Disappear before our eyes,
Drown in depths of hunger and drought.

Four metres a year — two rooms high—
Lost earth: the sea is already taking savage bites.

New Atlantis. . . lost, half drunk with drowning,
Power of skyscraper floats over Hong Kong,
The hustle and thrust of Shanghai,
Pastel exoticism of fondant Miami villas,
The glory of Sydney's bay,
And swathes of London. . .
Who so-called ruled the waves, is ruled again,
St Pauls, a dome floats, an island meringue
In an ocean of brown vanilla sauce,
Manhattan mythed of epic stature,
Chocolate slabs and gelatine sheets
As weak and nothing,
A global powerhouse caved in,
Encroached by white fighting crests.

Islands, pinpricks on maps, invisible once again,
Low lying places — Bangladesh to Netherlands
Mown down,

dislocation, relocation — easy-thrown words,
A Neverland of blight.

Meanwhile emperor penguins huddle watch,
Birdbrains curious at melting ice,
Their land, their home, dissolves and crumbles
Before their black bead eyes.

And humans, our very small birdbrains, our shoulders shrugged,
Pump out a geyser of Mount St Helen's each day,
Twelve times a day, emissions vomit putrid gas
Flatten, suffocate, melt and disintegrate.

Canute understood — no-one can control the sea,
It takes no orders,
Admire it.
Respect it.
Cosset it.
Treat it right and it might take care of you.

Disregard the sea—
Care not for the swallowing of ice sheets,
a gulp of raspberry ripple ice-cream—
Blood of futures folded through it,
Sickness and sweet sticky cloy,
And we dream in futility.

Catherine Jones is a writer, musician and artist. A Londoner who loves the city, she is based in Gloucestershire, UK. With dual German and UK citizenship, she endeavours to reflect her passion for Europe in her work.

13 *Castrillo Matajudios*

Peter Lynch

This chapter is on hold until the author approves the final version.

Last known recording of Argi Mikolas Munoz (and an Unknown Male), Beit Jamal Salesian Monastery, Beit Shemesh, Israel. Translated from the Basque (Upper Navarrese) by Fr. Ibon Garcia.

UM: What have you done with the life I have given you?
AMM: I have served.
UM: No, you are serving now — and it is too late.
AMM: I have always kept the faith; I have fought and bled for my country.
UM: Stone and earth are ambivalent my son — what faith?
AMM: That the Lord is my saviour and that...
UM: Come now Argi. Even now you would try to lie — and I am here watching you. Can you see the softening of the walls and the opening of the ceiling?
AMM: God help me, I am afraid.
UM: That's what Maria Dolores would have said — had she had time. You knew her too didn't you Argi?
AMM: I knew her.
UM: Did you know her little child?
AMM: I never met the child, I am sorry, I never wanted any of it to happen, I...
UM: But you didn't do anything to stop it, did you?
AMM: It was not my decision, I could do nothing.
UM: And if I was to say the same to you now my son; how would that be?

AMM: I will do anything, anything!

UM: Oh! They say I will, I would, I wish, I pray. They never say I have, I made, I tried, I hoped. They seek benevolence when all they have offered is ruthlessness; they plead for mercy though they have never bestowed it.

AMM: Surely it is never too late?

UM: Ah, surely it is never too early? You know that place your wife came from? Did you know that they've twinned it with Kfar Vradim? I had a chuckle at that one. It's yet another example of irony. You were supposed to learn from irony Argi. All of you are supposed to learn from it. Still, it doesn't matter much now.

AMM: Is there anything I can do?

UM: Once — there was a lot you could have done, but you played with fire didn't you? You knew that you shouldn't have — but you still did. What can I do when I'm faced with that?

AMM: I thought that if I did certain... things... then my people would gain their freedom and...

UM: Those are the thought processes of a child; besides they are not your people — they are mine. Freedom does not exist. There is only responsibility: to yourself; to others; to me. Those duties are the essence of self-emancipation. Have you ever seen those dogs in the country? You know — the ones that chase your motor vehicles. They wait, and wait, in anticipation — and then they charge out like lions protecting the pride — for naught. It always amuses me, and it always makes me a little sad; but bravery and intelligence have seldom been bedfellows.

AMM: So it is over then?

UM: Well, it is — and it isn't. Answers are never neat. Answers only beget further questions.

So I ask you again — what have you done with the life I have given you?

AMM: I do not know what you want me to say.

UM: That is correct; but also incorrect. Do you know what these men do?

AMM: What men?

UM: These men here. The men who took you in, who fed you, gave you a bed, treated you with kindness through the worst of your illness. These men.

AMM: They are monks.

UM: They try to take care of children. They try to help the homeless ones — the little unfortunates.

AMM: And I have heard the horror stories.

UM: I'll just bet you have. I'll say this for you Argi — you've got balls. My point is that you are a little child, even though you must be seventy now. Your mind is infantile. These men looked after you like a child. And yet here you are Argi: an old man in the dark eh?

AMM: Why have you come?

UM: I have come to show compassion; to practice what I have preached. I have come before Fr. Kendrick returns. What do you see now?

AMM: The dawn, I think.

UM: Yes, well — that will suffice. I want you to walk out over this meadow. I want you to move towards the rising sun. But you must not falter, this light is not as forgiving as I. You must adapt to it.

AMM: But it is so very far — so very far. I see Castrillo on the plain and Miriam's house. I loved her you know. We wed in, oh — I can't remember it now. They had that old dog, the one with the torn ear...

UM: Zirta.

AMM: Yes — that was him, Zirta. So long ago. So long. Wait, oh Lord — I can smell the... the what-do-you-call 'em...?

UM: The red carnations?

AMM: Yes, yes, oh yes...

UM: Do not weep. Keep walking. Nice and steady; that's it.

AMM: I am so very sorry for all of it. I am so sorry. I put a frog in the milk pail and made Ines cry.

UM: Take my hand now Argi. Do not be afraid.

AMM: What is it all? What is it?

UM: Adaptation Argi; little more than that.

NB: As per instructions, translation of final tape recording. Cassette withheld from authorities and in my possession. Pick-up at your convenience.

Regards,

I. Garcia.

Peter Lynch is from Co. Derry but has lived in Newcastle-upon-Tyne for over twenty years. His trade is demolition. He's 46, married with four children. He enjoys the outdoors, natural history, swimming and boxing. He reads anything and everything, and has done for as long as he remembers. Music, writing, and drawing have always been his favourite ways to express himself.

Climate night 14

Jorie Knook

John slowly starts speaking: 'It not only happened sooner than expected, but the consequences were larger than imagined. At 02:00, we finally managed to reach the first street. The water was above the ground floor, so we started knocking on the windows of the first floor. It was difficult to see where we were; the power was down and darkness had taken over. I heard men shouting, women screaming, children crying.'

Maya can't stop turning. The whistling wind and drunken students are keeping her awake. From experience, Maya knows that students pass her house every Saturday. Usually they ring the bell once or twice and move on, bored. Tonight, they weren't leaving, and there was knocking instead of ringing and shouting instead of singing.

Suddenly Maya sits up in bed, adrenaline coursing through her body. It's not Saturday, it's Wednesday! Where is the noise coming from? She vaguely remembers a storm in the news, but as an exchange student from Argentina she doesn't really pay attention. Besides, she knows that these storms usually only mean train delays.

When she enters the hallway she is startled to see flashlights shining through the windows. For the first time Maya realises the knocking isn't coming from the ground floor, but from the windows on the first. She walks to the window and opens the curtains. Fear takes hold as she sees a soldier outside, standing in a boat, gesturing at her to open the window. She pushes hard, twice, before it blows open and shatters. Terrified, Maya looks outside. The ground has disappeared, the porch, the communal garden. There is only darkness, and water, and the small boat.

'In the third house a girl opened the window. Her

eyes were full of fear. She didn't speak the language and obviously wasn't aware of the severity of the storm. I avoided the broken glass from the window blowing out and shouted to her. She had to leave because the dikes had broken and water was coming.' John stops and sips his water, collecting his thoughts. He needs to sort through that night's memories, chaos and terror.

Maya is shocked. How could this be happening? Why hadn't she noticed the storm?

'She was frozen. I told her to come with me, there was simply no time. The water level had gone up 3 meters in an hour and we had no idea of what was yet to come.'

Maya looks at the boat, nearly full. The old lady from next door and her two grandchildren are already seated. She slowly realises the whole street is being evacuated.

He looks around the conference room. Hundreds of people are silently listening to him. 'Thirty years ago, no one had any idea this would be the first of the 'Big Five' — disastrous storms that led to the death of billions. Coastal cities submerged. Diseases spread and harvests failed. Many died in famine and war.'

Years later Maya finds herself listening to John, the soldier who rescued her that day. After the storm she was able to move to Southern Germany; one of the few safe places in Europe that hadn't been swallowed by water and had adequate food. Returning to Argentina was not an option. Infrastructure had been destroyed; famine had caused a civil war.

John looks at Maya, the girl he saved years ago. He knows she was surprised by the Big Five — like so many others ignorant of climate change.

Maya sighs. She had heard of climate change but didn't feel it was a big issue. She was enjoying her studies abroad and didn't really pay attention. She looks down. She would give anything to travel back in time and change her choices. It might not have prevented the disasters, but it could have helped.

'Although the Big Five destroyed our modern society, they have given us the chance to find a new balance. To-

day I am filled with feelings of hope and I am confident that we, if we hold on to our new way of living, will never have to face such a disaster again. I say this because today, I have an important announcement: South America has been declared a safe destination. The civil war has ended and the past two harvests have been successful. We will soon re-open transport routes to Buenos Aires, allowing people to return to their home countries.'

Maya feels a lump in her throat. Her exchange semester might finally be coming to an end.

Jorie Knook was born in the Netherlands and after studying in Argentina, France and Germany, she is now a doctoral researcher at the University of Edinburgh, Scotland's Rural College and AgResearch. She combines her passion for travelling and nature in her research, which focuses on the evaluation of agri-environmental advisory programs in both Scotland and New Zealand.

The turtle 15

Annie Percik

Danielle travelled the waterways of Manhattan. In the years since the waters rose, it had become a new Venice. Danielle loved the new face of the city. Negotiating the flooded streets was a tranquil experience, in comparison to before.

The majority of the faces were female. The gender revolution had been and gone, after World War Three wiped out 80 percent of the male population and only 20 percent of the women. It had always been tough for a single girl in the city; now even more so. Danielle felt like a green turtle, endlessly searching the deep blue for a mate.

She had other things to worry about today, though. Real estate was booming as remaining industries sought space to expand. With many prestigious Manhattan addresses underwater, it took a creative sales team to meet that demand.

The self-driving skimmer moored at her destination's short dock. Danielle climbed out and walked down the wooden platform to the building's main entrance, on what used to be its second floor.

The receptionist looked up with a bright smile.

"Can I help you?"

Danielle was distracted by the floor-to-ceiling aquarium behind the receptionist. Brightly coloured fish darted among coral fronds and tropical plants. A pair of turtles swam slowly together, flippers almost touching.

"Yes, sorry," Danielle said. "My name is Danielle Saracen. I have a meeting with Sam Deveraux."

The receptionist checked her computer, then looked up with another dazzling smile.

"Fifth floor. Room 502."

Danielle made her way to the elevators and pushed the button. Her attention was drawn back to the turtles. They looked content in their enclosed world. Danielle envied their simple routine, safe from danger or years of lonely solitude. They might not be free, but they were looked after. It was an appealing existence.

The elevator beeped and doors opened. She stepped inside, trying to focus on the meeting. She had corresponded with Sam Deveraux by email and knew the basic requirements. Small new law firm, seeking a business office that would lend credibility without breaking the bank. It was the kind of request Danielle specialised in, and she had a portfolio of options prepared.

The elevator stopped, and Danielle checked her teeth in the back-wall mirror before exiting. A plaque on the wall pointed to Room 502. Danielle knocked.

A deep, male voice called out, "Come in."

Danielle was completely thrown. At one in five globally, it wasn't as if men were completely unheard of, but she had assumed Sam Deveraux was a woman. She shrugged off her surprise, took a breath and opened the door.

A man stood up and extended his hand. His professional air made it easier for Danielle to focus.

She stepped forwards and took his hand.

"Mr Deveraux."

"Sam, please. And may I call you Danielle?"

"Yes, of course."

"Coffee?" He gestured at a sideboard set out with refreshments.

"Lovely, thank you," Danielle said. "May I freshen your cup?"

There were papers scattered over the conference table, a plate sporting a few crumbs and a cup containing coffee dregs.

"Yes, thank you," he replied, handing her the cup.

Once the coffee-making was completed and they were both seated at the table, Danielle laid her leather portfolio between them.

"I've read the specification you sent through, and I think I have a few properties that might interest you."

Sam leant forwards. "One of my friends recommended your agency and said your team came up with some really creative ideas for her company."

"Well," Danielle said, turning the portfolio slightly to give him a better view, "this is a good time to be looking. There are some real gems out there, reasonably priced and likely to increase in value. Let me show you."

After Danielle finished, Sam looked up with a smile.

"My friend was right. Impressive work."

Danielle felt a rush of professional pride, and smiled back. "Thank you. Do you see something you might want to move forwards with?"

"Absolutely," Sam said, "but I'll need to take a couple of days to think it over. May I keep this?" He gestured at the portfolio.

"Of course," Danielle said. "Would you like to meet back here later in the week to work out the details?"

Sam paused, calculating. "I was wondering if our next meeting could be at your offices. My new firm will be specialising in property law, and I thought I could pitch my services to your agency."

Danielle smiled at his opportunism. "I'll see if I can set something up and let you know."

"Excellent. Thank you." Sam extended his hand again, and Danielle shook it. "I hope this develops into a mutually beneficial relationship."

Clearly he was talking about a business relationship, but Danielle thought the glint in his eye suggested more. She couldn't help thinking of the turtles downstairs. Had the endless empty ocean shrunk into this conference room and brought her lonely turtle days to an end?

Annie Percik lives in London, where she is revising her first novel while working as a University Complaints Officer. She writes a blog about writing and posts short fiction on her website. She likes to run away from zombies in her spare time.

Sixteen

Climate-charged democracy?

Joes de Natris

Introduction

In many advanced democracies, politicians provide public goods (in the economic sense of the word, I'll come back to this soon) such as health care, education and property rights. Moreover, they provide those goods impersonally (if you meet certain characteristics, you can get those goods regardless of who you are or vote for). In these countries, voters choose politicians for their platforms and policies.

In the rest of the world (and especially in autocracies), politicians buy support with cash or special treatment. In these countries, the powerful and connected benefit from government expenditure while the rest suffer from taxation and neglect.

One of the major questions in political science and economics is how countries get from the latter situation of corrupt, personalized politics to the former situ-

ation of voter-friendly, impersonal governance. Many have argued that this transition depends on whether the political elite prefers more public goods.

Climate change will increase the demand for public goods such as dikes that protect against flooding or reservoirs that balance shortage and surplus. Could this demand spark democratization?

Linking public goods and democracy

Before trying to predict the future, let's have a look at the past, namely at the United Kingdom during its industrial revolution, when it strengthened its parliamentary democracy. Let's zoom in on London (at that time the most populous city in the world) with its crowded housing, polluting factories, cholera outbreaks and killer smogs. These conditions were miserable for both rich and poor.

Politicians did little to address these problems. Why? The UK's government was constitutional but far from democratic. A large majority of the population did not have voting rights. Those who could vote often supported specific political parties based on their ideological preferences. In this system, it was the swing votes of those indifferent to ideology that attracted political attention. Politicians competed to attract swing voters with favourable regulation, unearned sinecures or cold hard cash. Ideological voters were mostly ignored.

For most of history, elites have been quite pleased with systems in which they enjoy rewards in exchange for political support while the majority suffers, but the industrial revolution changed elite opinion. On the one hand, it made them wealthier. On the other, it exposed them to deadly infections and miserable diseases.

Some elites began to support the provision of public goods that would reduce or eliminate the threats,

e.g., improved sewerage, public health programs, regulations on drinking water quality, and so on. Their support did not directly lead to action, however, because politicians were still loyal to ideological factions rather than competing to provide the best mix of public goods. To break this impasse, some elites supported voting rights reform as a means of pushing politicians to supply more public goods.

The extension of the franchise would make it harder for politicians to buy votes by reducing the political value of private goods relative to that of public goods. Private goods are rival, so if one voter consumes a private good supplied to him by a politician, other voters cannot consume that private good. This fact means that each vote might cost one Pound Sterling. Public goods, in contrast, are not rival, which means that one Pound Sterling can benefit multiple voters.

With a few voters (say 100), it is cheaper to pay each voter one Pound than spend 500 Pounds on a sewer system that provides the same total benefits. This logic reverses when there are many voters (say 1,000), as it's now cheaper to "earn" 1,000 votes by providing the sewer system. Elite support for an extension of the franchise meant that politicians would provide more public goods, regardless of their ideology, which would allow elites to remain in their political club while enjoying non-ideological public goods.

Climate change and public goods

Climate change will create crises in vulnerable countries similar to those of the United Kingdom in the nineteenth-century. To protect valuable farming land, factories and offices, and even their own lives, the elite will want their government to supply public goods that protect them (and everyone else) from floods, contagious diseases, droughts, and so on.

Climate change could increase elite support for

public goods (and thus democracy), depending on their vulnerability and mobility. The more mobile the elite or their assets, the less invested they will be in their community or its security. Although I am no expert on climate science, it does not seem far fetched to claim that in many countries elites will demand their government to protect them and their assets from rising climate threats.

My prediction in one long sentence

Elites threatened by climate change will support democratic rights for average citizens as those rights will translate into greater demand for the public goods that will protect everyone.

Joes de Natris, BSc, MSc, wrote his bachelors thesis at Leiden University College The Hague on how Mubarak's economic reforms alienated the Egyptian Army and led to his downfall. He recently graduated from the University of Amsterdam with a masters thesis on the economic roots of democracy and good governance.

17 *A day in the life*

Aurélien Puiseux

Joseph ducked under the Wild Bandits Leader's blow. He rolled, grabbed his fallen gun and turned to face the Leader, whose axe had stuck in the dead tree. "It's over, scumbag," he yelled. The Leader, eyes shining with hate, reached for his gun, but Joseph was faster. A shot echoed, and the Leader fell. The Cemetery was silent once more. Slowly, Joseph limped to Neema's corpse. He snatched his gourd from the cold dead hand of the woman who led him in this ungodly place. "So long, sweetheart," he said. He turned from her, mounted his bike and rode into the sunset, leaving the desecrated Cemetery behind.

Joseph put down his pencil and stretched. He loved writing stories, but it always left him with a sore hand. He put his notebook away. It was starting to get hot in the tent. It was time to get water.

He stepped out, and his eyes watered in the harsh light. Joseph grabbed their two jerrycans and walked through the camp. After fifteen minutes, he arrived at the queue, and sighed. It was going to be a long wait if they queue reached this far back. He knew the woman ahead of him. He greeted her and asked if she could watch his jerrycans while he checked the length of the queue. She nodded and he left.

The line was long but straight. There was no water truck at its beginning, which explained its length. The HCR guards were watching the front, armed, to make sure that nobody jumped the queue or took more than their allowed water. He walked back along the line, thinking of how he could integrate the guards into one of his stories. A militia protecting a city with an underground reserve of water, maybe?

He arrived back at his place. "The truck is not there yet, mama". The woman nodded. He hoped the truck

would show up soon. Since his arrival in the camp, there had only been two days when the truck had not showed up. Those had not been good days. He sat on his jerrycans while the line grew. He remembered when there was no need for trucks. When they had arrived, there was a well supplying water. He had been told the camp had been built there precisely because of the well. And then it ran out.

He often thought God had a strange sense of humor. They had left their village by the sea because of the floods, because of too much water. And now they didn't have enough water. Yes, a strange sense of humor.

Joseph didn't remember the village well. He was too young when they left. He remembered the sea, but it seemed mythical now. So much water. Joseph tried to return to The Land By The Sea in his stories, his mind escaping the barbed-wire fences and Barren Lands.

There was a clamor. The truck had finally arrived. The line moved slowly. An hour passed. At last it was his turn. A guard checked his ID card and his mother's and let him pass. Joseph first took a few sips from the tap. His mother had told him to drink and the guards tolerated it, so he did. He brought the water to his mother's small shop where she waited, ready to start cooking. Now he could play.

Maybe this time Neema would let him join her band. It wasn't very nice to kill her in his story. Should he could change the ending? Maybe they could ride into the sunset, to The Land By The Sea?

Aurélien Puiseux is a French ecologist working on climate change, biodiversity, urban forestry and water resources. He writes fiction and explores abandoned places in his free time.

18 *Deep water*

Tanja Rohini Bisgaard

"Ruined!" Peter shouted as he threw up his arms. The screen in front of him showed a drone's-eye view of their fields.

"No, Dad. I'm sure they'll be fine," John insisted. "They just need some water."

Peter turned to his son while he scratched the back of his neck, stirring up his grey, neatly combed hair. John was the only person on the farm who dared argue with him. Maybe it was because he had inherited his mother's snub nose and stubborn determination.

"But why isn't *his* crop looking like that?" Peter steered the drone towards the neighbouring field where long, neat rows of organic cotton plants stretched their fluffy heads towards the cloudless sky.

John shrugged.

"Are the sensors working?" Peter asked.

"Everything's fine. I just checked. The irrigation system was initiated last night when moisture levels dropped to three." John pointed at the screen in front of him. "Don't worry, Dad."

Peter took a deep breath to calm his voice. "Let's check the well to see if the pump's working." He pointed to another screen in the corner. He couldn't remember the last time they'd switched it on.

John walked over to the small monitor fixed on the turquoise wall and pressed a button. It powered up instantly, showing the inside of the borehole that supplied water to the entire farm. "See — everything's fine."

Peter stepped closer. "But it doesn't look like anything's coming up." He walked back to the main control system and requested a new report. Peter raised his eyebrows and tapped the screen once, his heart beating faster. "Where's the water? Nothing's coming out of the

ground." He showed John the numbers on the screen. "Come on, let's check it out."

On their way to the borehole, Peter picked up a half-grown cabbage from their field. Its outer leaves were wilted and they folded over his hand as he held it up for inspection. Dust from the dry earth swirled up, making him sneeze. He wiped his sticky face with his free hand, trying not to touch his sore mouth. Slowly he licked his lips in a futile effort to prevent them from cracking. The taste of earth and blood mixed on his tongue. "They need water very soon. Otherwise we won't be able to sell them," he muttered.

"It'll probably rain soon," John suggested.

Peter knew he was trying to cheer him up, so he answered in a milder voice. "I don't think there's a chance of that happening, son. You know there hasn't been any rain in this region for more than a decade." Peter touched John's back and felt his son's sweat-drenched shirt cling to his hand. "The only water around here is the sea that keeps getting closer to us every year. Who'd have thought: it's risen two meters in your lifetime alone."

The borehole's light-blue aluminium lid had lost its shiny gloss, but the scorching sun had not yet faded its colour.

"Right. Let's see if we can figure out what's going on down there." Peter took out a tiny sentinel drone and opened the narrow shaft next to the borehole before slipping it in. The drone made a low buzzing sound and disappeared into the ground. They followed its flight on Peter's wrist-pad.

Numbers appeared at the bottom of the video transmission as the drone reached the level of the pump. Peter looked up at his son and shook his head. "It's his fault," he sighed, and nodded towards their neighbour. "If he only grew something that didn't need so much water.

"What do you mean? What's happened?" John asked.

"His pumping has dropped the water table. Our borehole isn't deep enough. Why do people need to wear

organic cotton, anyway?" Peter sighed, turned off the screen, and instructed the tiny drone to return.

"Can't we drill deeper to get water, Dad?"

"It'll be expensive."

John shifted his feet and stuck his hands in his pockets. For the first time in a while, he felt unsure. "What else can we do?" he asked.

Peter looked towards the coast where the horizon was covered in a dark blue hazy mist. He could see the cluster of silver tanks. "We'll have to get connected to the desalination plant."

"But that'll take months!"

Peter nodded slowly as he closed the lid to the borehole. A drop of sweat fell from the tip of his nose and onto the blue lid. It evaporated instantly.

"All the crops will be dead by then. . . "

"Yes, son. They will." Peter turned and walked back towards the farmhouse.

Tanja is Norwegian and writes short fiction about a future world where the environment has changed as a result of pollution, climate change, and extensive use of natural resources. When she isn't writing, she runs her own company as a sustainability consultant for the public and private sector.

We drown with history 19

Celia Daniels

The Caribbean water is piss warm despite the cooling units in their skin suits. Hope floats next to Envy floats next to Saul, their heads colorful specks on the black water. Their tour guide hovers behind them, adjusting their oxygen tanks for the transition between the marshes they know and the ocean's deeper waters. He waits while they adjust to the warmth.

When he dives, the party follows.

Of the three, Hope is the first to adjust to the dust and blue. Stray methane bubbles rise up from the sand, collecting against her collarbone. The further she swims, the more intimately the sweat sticks the suit to her back. She ignores its cling as she sees the women below her, scattered across the ocean floor.

They lie on their backs, faces worn away but breasts preserved, pert and tattooed with the skeletons of dead coral. The guide points out the strays that have slipped away from the crowd. The stone of their skin is white and cracking.

Hope grimaces at the faceless caricatures.

"We don't know if they ever served a purpose," the guide signs, fingers flying through an amalgamation of esperanto-sign language, "but they migrate with the tide. My colleagues think this was some sort of mausoleum."

Hope can't see his eyes behind his goggles, can't guess whether or not he agrees. Below them, the women are piled like resting crabs.

The guide leads the party on.

The water warms past hazy piss to dirty jacuzzi. Hope watches as Envy swims ahead of her, fleeing Saul's outstretched hands.

"We're nearing the edge of the Grenadian reef, which leaves us close to the floating islands," the guide signs.

"We can't board them — the plastic pieces are too unstable — but you can see their prisms."

Hope follows his flipping feet, past the drowned remains of a bicycle.

The statue that marks the edge of the Grenadian reef wears a broad, stone hat. The guide points it out as they draw nearer, though Hope's gaze is hampered by muck and her companions' play.

She spots the floating islands before the statue itself. Sun light has turned their refractive plastic into skylights, pouring a mosaic of colors over the statue's hat and bowed head.

"We call her Mary. . . " the tour guide's sign language fumbles, and Hope catches ". . . María."

She paddles closer while Envy and Saul drift further away, among Grenada's submerged hills. She meets the statue's empty eyes. The bleached hat has spared the bulk of María's face, but her mouth is stuffed with a plastic bag.

Hope removes the bag, leaving a stream of bubbles in her wake.

Above her, the light shifts. María's face melts from white to gray, purple, and green.

"How'd she get here?" The muddied water makes it difficult for Hope to sign.

"Like the rest of them did," the tour guide signs, several moments later. "When the world is drowning, the wise learn to drown with it."

Celia Daniels is pursuing a Masters in Literature at the University of Toledo. She's fascinated by a burgeoning science fiction subgenre known as solarpunk. Her creative work has been published in Road Maps and Life Rafts, Magic Jar, Entropy, The Molotov Cocktail, Retreat West, and other magazines.

20 *Data recovery unit*

John Sayer

I have no tattoos. Life does not resemble a post-apocalypse, Hollywood movie. We do not have marauding, tech-savvy gangsters with body piercings and cannibalized vehicles.

Nor do I milk goats. I don't live in some back-to-the-land Arcadian community of smiling, simple folk making yogurt and tending organic gardens.

I live in a monochrome world of sadness and resignation, filled with too many moments of reflection.

We accept the indefinite suspension of democracy. The authoritarian government is tough, but who can blame them? Human rights don't seem like such a priority so soon after billions perished in The Extremes. Our tired leaders aren't overly corrupt or privileged. They are ruthless in "not letting us make the same mistakes again."

We do what we're told without complaint, like a defeated nation rebuilding after a war it deserved to lose. But we're not a nation, we are the world. The authorities rule all the scarred and fragmented lands still above water.

Funny really, but the proportion of people who follow God (or gods) remains about the same as before The Extremes. Believers say it's obvious that our hubris has been punished by a God who wants us to respect His creation. I don't know, but perhaps believers are comforted by the thought that God has received the billions of souls lost in our epic catastrophe. The Extremes certainly brought plagues and floods of "biblical proportions."

The religious and the non-religious alike blame people for the mess. Non-believers may not turn to gods, but they don't mind if others seek comfort in a divine image or confessions of their climate sins.

Some wily (or zealous) cult leaders try to explain the past, claiming that The Extremes were punishment for violating *their* rituals or strictures. But they remain few and predictable. Those of us who lived through The Extremes might be docile, but we're not stupid.

Traumatized and chastened, we all more or less get along. The authorities squash any group that tries to stir things up. We all learned too late that pointing fingers at others, fanning fears and attributing blame for a worsening situation can distract humanity from the "central task." Right now, our central task is to tread a long slow road to a sustainable civilization. There is little point in disagreeing. There's not much left to squabble over.

I often wish I worked for the Flora and Fauna Recovery Department. Those people have interesting and heartening work. They scratch around for surviving beasts which could possibly mate, matching up unlikely animals from across the planet. On their travels they grab DNA samples from nearly extinct and recently-dead animals in case we remember how to clone animals in labs. They also visit seed banks to see what might still germinate in a post-Extreme world.

The least happy cohort works at the Steady State Population Group. Their job is to coerce the rest of us to breed at a Goldilocks pace of not too fast, not too slow. Their population target of two billion explains why they're called the "more-sex police."

I work in the Data Recovery Unit. Most of us focus on technology for essentials like agriculture, transport and communications. We've lost a great deal, but we know what was possible before The Extremes. The job is as much about finding knowledgeable people as it is about finding data and equipment. It will be quite a while before we restore the systems — the clean rooms, the refineries — that will allow us to restart production of microchips and chemicals. The electronics that we now run use circuitry from before The Extremes: repaired, reused, and recycled. Mass consumption gadgets are

patched and pimped. Software is hacked and adapted.

I belong to a small sub-section: Cultural Recovery. After the technical people breathe new life into old server farms and extract the productive information, we look for non-essential data: music, films, pictures, stories.

We are allocated enough storage space to ensure some social and cultural collections are saved, but we also need to vet the material, which means we decide whose art and culture goes extinct.

Late at night, we sometimes watch movies from before The Extremes. People bring home-made wine and snacks so we can make an evening of it.

The movies often start in vast, traffic-clogged cities. The heroes always seems so carefree as they jet to the rescue in exotic locations. Pleasure boats and jet skis skim over sunny seas. There are car races and strange events where vehicles deliberately crash for howling audiences. Car chases usually end in explosions, orange balls of fire rolling skywards.

Sometimes we watch earlier stuff. There are Hollywood epics in which Roman gladiators kill wild beasts, and wild beasts kill innocent Christians in amphitheaters of stone. We wonder to ourselves, "how did ordinary people feel at the time? Did they look forward to the spectacle?"

Recovered documentaries show people cutting off mountain tops to get ore, damming valleys to send electricity through long powerlines. Rainforests are cut and burned. Fields stretch to the horizon, one crop replacing wild diversity. Vast garbage tips flap with plastic drifts, scavenging birds and dirty children. Experts issue warnings, holding endangered baby animals to the camera or pointing at dying coral. They were right, but they're all dead. You can see the audience believes, but their confused faces explain their paralysis. They looked for leadership.

These sights diminish the beauty of the art we have also recovered. All the flowing music, vivid pictures and clever writing seems distorted somehow, because we

were cutting the natural inspiration for all this creativity from under right our feet. Like noble utopian philosophies built on the shoulders of a slave society, all that blinkered artistic inspiration seems somehow tainted or escapist.

Sometimes one of us starts to cry at the beauty of the forests and seas. We encourage them to drink a bit more.

We survivors sit in this austere and shabby room, knowing our lives will never, should never, achieve the strange excitement of the heroes racing through cities and exploring tropical islands. That's okay. We have the record. We can watch the past and wonder. What times those must have been. What thrills they must have felt. What palaces they built. What heights they scaled. What thoughts... What were they thinking?

John Sayer is a Director of Carbon Care Asia, a company that works to reduce carbon emissions and increase preparedness for climate change impacts in Asia. He lives, walks and writes in Hong Kong.

Twenty-one

Visualizing earthly vulnerability

Fani Cettl

How do we visualize environmental destruction? What images do we see on our screens or hold in our minds? While the ways to narrate the story of humans in the age of the Anthropocene may be numerous, we use only a few iconic images to represent environmental destruction. Two examples are the view of the Earth from outer space and the post-apocalyptic Earth's surface. These images appear in science fiction films such as *Wall-E* (2008), *Age of Stupid* (2009) and *Oblivion* (2013), but they also pervade our popular culture and political discourses.

Science fiction places our species within historical, geological and cosmic timeframes that can help us understand our contemporary situation as well as imagine different futures. In *Trillion Year Spree: The History of Science Fiction* (1988), Brian Aldiss argues that science fiction explores our relationship to different

environments and technologies. From this perspective, we can see the narrative of climate change as a futuristic, speculative, science-fiction narrative. How does this narrative deploy those two iconic images as a means of exploring our anxieties and hopes? Let us consider these images in more detail.

The "Blue Marble" image of the Earth's face was taken in 1972 by the orbiting crew of Apollo 17. It shows the planet as a mesh of blue ocean, white cloud and brown earth suspended in an infinite, black cosmos. The Earth looks frail and isolated. The timing of the photo — at the height of the Cold War, only a few years after the first Earth Day — was significant. The Blue Marble became a symbol for global environmentalism, the unity of humanity, and the need to save our earthly home from nuclear and environmental destruction.

The Blue Marble condenses an enormous evolution into two dimensions. It takes us fast from one-celled organisms to plants, animals and finally humans, who occupy a split second in history but wield enough power to destroy themselves and much more. The image stands for the wonder of life as well as its utter vulnerability. In *Philosophy after the Apollo Missions* (2015), Kelly Oliver suggests the Blue Marble captures the tension between humans as the centre of the universe and humans as insignificant. Copernicus challenged human narcissism and dogmatic presumption by displacing Earth from the centre of the universe. The Blue Marble pushes us further by ilustrating our potential for self-obliteration and the futility of that act.

Suddenly viewers find themselves in the middle of a desert. An ominous threat has pulled the plug on our technology and civilization. Evolution has advanced a split second into the future and dropped us among the ruins. The post-apocalyptic Earth's surface shows a barren land, interspersed with scattered remains. A few human survivors struggle in the windy and erratic climate. Vultures feed on carcasses. Apocalyptic

imagery is older than the Bible, but contemporary depictions of Judgement Day show the catastrophic aftermath of industrial exploitation, of man's need to master nature. This uncanny world is haunted yet mesmerizing. The symbols of human civilisation lie in ruins: the London Eye rises from a flooded metropolis; Las Vegas casinos crumble into dust; the Sydney Opera burns. Human layers and structures disappear into Earth's surface, leaving traces for future geologists (of whatever species) to ponder.

The particular power of the post-apocalyptic image, as with the Blue Marble, lies in channelling the ambiguity between human importance on the one hand and insignificance on the other. As Clare Colebrook argues in *Death of the PostHuman: Essays on Extinction, Vol. 1* (2014), the post-apocalyptic geological image focuses on human survival at the same time as it presents the viewer with an Earth in which other life forms not only continue, but flourish. These post-human environments evoke elegy, mourning and loss. They come from the future, warning us to change course while we still can.

Fani Cettl is a scholar working at the intersection of science fiction, environmental humanities, animal studies and biopolitics. She holds a PhD from the Central European University, Budapest.

22

Message in a bottle

Karen Rollason

After saying farewell to our chief, my tribe left the pyre, heads bowed. I remained, alone. Chief Tyson was more than a chief to me. Chief Tyson was my grandfather.

Standing on the headland, I looked across the expanse of a sea dotted with islands much like our own. The islands are inhabited by enemies, who, legend has it, had once been our kith and kin. That story was just one of the many my grandfather had told our people, but it was hard to believe. Our tribes had fought many battles over those seas.

I could barely grasp my grandfather's death, but the stench of burning flesh and curl of rising smoke proved I was not dreaming. I worried for the future. Would I earn the respect of the people, as he had? He'd been as wise as the spirits that protected us. His knowledge of our people and our past, had, he assured us, been passed down from his grandfather, his grandfather before that, and so on. Some must have doubted his knowledge when they heard his fantastical tales, but respect probably kept them silent.

The sun was beginning to set behind the island of Skiddaw — a full orange sun, burnishing the sea. Not for the first time, I wondered what was beyond. Once, thousands of years ago, our island of Helvellyn had been a mountain and Skiddaw the same. And where the sea was now, had been beautiful fresh-water lakes. It had been a place of peace and beauty, an escape from that other place they'd known as 'tar and cement.'

According to legend, our ancestors had conjured up a storm so otherworldly that it had ended life as they'd known it. Their hunger had turned to greed, their desire to destruction. They'd robbed the land and drained the waters, ever-thirsty, never-quenched. They didn't serve

as caretakers, they did not care. They had lost sight.

Other stories said people spoke across the seas and watched each other through mountains and forests. They'd climbed to the moon to find the man and flown like birds around the stars. Those same stars were just becoming visible now.

Apparently, they had been a blasé people. Despite the warnings written across the skies and in the rising of the seas, they had been persuaded by the money Gods that they could have it all, so they took it. And they kept taking. The more they had, the more they wanted. A given, a right, a truth. They guzzled and consumed until it was too late.

My grandfather described storms that had rumbled until the skies had cracked, crimson with fire. The air grew hotter, until our ancestors choked for breath. Even the wildlife suffered. Winged life fell limp, plummeting to earth. Flies swarmed — flesh eating. Rank, putrid smells invaded nostrils. Great tidal surges had thundered towards the land, dumping the finned and swollen on the beaches, where they were left to perish and rot. Corals, once orange, green and red, lime and grape, were smothered, choked and bleached as their light faded. There had been no breakers — no protection to hold back the tide. Great civilisations were destroyed and drowned.

The world had imploded. Its people grew weak and disillusioned as their bodies failed. Only the fittest survived, taking refuge on the peaks while the rising troughs swallowed others. The land had little to give. Life was tentative, perilous.

Of course, these were just stories, tales of witchcraft and daemons. They couldn't possibly be true, could they? I once asked my grandfather this very question. He took me to the water's edge and told me to pick up one of the clear, battered containers from the sea. 'Where do these come from?' He asked, holding it up to the light.

We knew them as bottles. We collected and drank from them, buried them to collect bugs to eat, and built

totems with them. Where they came from, I hadn't ever cared. I shrugged my shoulders, 'they're a gift from the sea.'

'A gift you say.' My grandfather looked thoughtful as he combed his greying beard with his fingers. 'Well they are a gift of sorts. Look at them, littering the beaches,' he motioned with his arms. 'Their gift is not their usefulness, but the message they bring from our forebears.'

'The message?' I looked at him, dumbfounded. The bottle was empty, save a mouthful of dirty water and sand. 'But there is no message', I said, 'and how could something so old last so long?'

'Well that my son, I can't tell you, but I do know you must guard its message, always. Guard it and pass it on to your children and grandchildren.'

Bending down now, I fish a similar bottle from the beach, remembering how he'd leaned over that day and warned: 'Our ancestors reaped what they had sown, so learn from it. Be neither blind nor deaf. Never get complacent. Do not chase riches or convenience. Above all, never forget that we are mere caretakers of this land. Those who forget, sow the seeds of their own destruction.'

I looked at the bottle now, bemused, searching for these hidden messages. I bring it to my ear, listening, but hear nothing. The bottle is as mute to me now as it was then.

I kick the dust over the last burning embers of my grandfather and dismiss his warnings as the ramblings of an old man. Times are different now. We must adapt and change to survive, whatever the cost. As I turn to re-join my tribe, I throw the bottle back into the sea. The next tide will bring more.

Karen Rollason is a qualified Solution Focused Hypnotherapist, published writer and mother of two boys. She is a Lakeland lass and lover of the countryside, but lives in the South of England where the pace of life is much faster. She chairs a writers' circle, runs writing workshops, and believes in the healing power of writing.

23

Seventy metres

Jack Cooper

A honeybee's sting
smells of banana,
a sweet call
to swarm.
Fear made us gather
in those slowing years, hordes
that fled to high places
'til they turned to coast,
'til hills plunged to oceans
and grass became
sand.

The Moon under Water 24

Jacquie Wyatt

'Our parents didn't work all their lives to leave us with a shrinking landmass, rampant inflation, no job prospects and utter inequality!' George slams his china jug down on the table, spilling beer. 'We need change, and I can't do it from here.'

I frown. It had taken me days to source strawberry-pink china beer mugs, and George's revolutionary zeal has already put them at risk. He's spouting nonsense anyway. 'Our parents didn't work all their lives. They had nice long retirements. We're the ones who have to work until we're seventy-five.'

George tuts at me. 'At least your folks left you something.' He gestures at the Victorian bar. 'You've got a pub on a hill with a large garden. You've got a job for life now, with so few pubs and no more licences. You're sitting pretty, you are.'

'Look around you, George. I've got an empty pub it took a small fortune to rehabilitate. I'm only three miles from the sea and it's getting closer by the hour. The Moon under Water's not the only water-logged thing. The village where my customers used to live is submerged. There's no one left round here. The whole thing is doomed.'

He bends his head to one side and his huge brown eyes remind me of my childhood Labrador, who used to sit exactly where George was now. 'So why do you do it Elaine? Why did you give up a city career for the back of beyond? What's all this fantasy George Orwell pub stuff? No music, no live sports, liver-sausage sandwiches for god's sake.'

'It's not the back of beyond. We're only thirty-five miles from London. We're in the London area.'

'I know that was one of Orwell's bizarre criteria but

you've stretched it a bit too far. We're not in the London area. We're not even in the Southend area now it's gone under. It may have escaped your notice but there's no large town here now Leigh's drowned too.'

The expression on George's face when he knows he's right is just so unattractive. He must know I'm worried I've made a terrible choice. Why is he rubbing it in? I want him gone. I had imagined us getting stuck in, making a little utopia on the end of the earth, building something solid together. Sadly George is better at picking holes in what's been done than doing anything himself. He trashes me to make himself feel better.

'Fine.' I pick up his jug and empty it in the sink. It's a waste but not in comparison with a desolated country or planet with a precarious future. 'I think you should go back to London.'

'Fine.' He slides off the bar stool so quickly I know that was what he hoped I'd say. He's been prodding me to push him away. Five minutes later he's back downstairs with his bags. 'Could you give me a lift to the station?'

I hesitate. It's lunch-time — there could be customers. A guy came through yesterday. He seemed to like it here. I can't really leave the pub but I know it isn't safe to be out there on your own. Certainly not on foot when you can't get away from whatever's roaming nearby. Can I really care so little for someone I've spent five years with? 'OK but let's be quick.' I find an old chalkboard and write *back in twenty minutes* before propping it against the door.

George looks relieved. We start in silence but he's watching me as I drive. 'Tell me why you really came here, Elaine.'

It can't hurt now. I don't have to protect myself against his scorn anymore. 'I thought I could save a bit of the old world — you know, the one where people look out for each other. I mean, I know any property near water is a nightmare now, but I feel better looking at water.'

He snorts and shakes his head. 'And the Moon under Water was your childhood home.'

I nod. 'Yes but I don't have a romantic notion of it. I know only too well how hard it was running a pub even when they were profitable. You had to put up with other people's vices as much as their warmth. Mum and Dad ran it like a club, they had their rules and it didn't matter what you did or who you were outside. If you stuck to the rules, you were part of the place.'

'Vices yes. Remember the smoking? But why all this George Orwell stuff?'

'The Moon under Water was his vision of the perfect pub. Old-fashioned, yes, but something about his rules made me feel I could create that kind of place. I had this silly idea that people would come on daytrips for the charm of it.'

'But we only get five litres of petrol a week. It's not like the blokes could come on their own, now it's one car for two families.'

That rule is very precious to George. His job is coordinating car shares. So many people had to be rehoused that he was forever recalculating who could be matched. He's right though, I hadn't factored that in. I'm running at a breath-taking loss forever coming up with silly promotions that are as much good as Canute raving at the tide. The freezer is packed with unsold meals.

I stop in the station car park. It's almost empty. 'Bye then. I guess you won't be coming down for the weekend again.' I get out of the car as he does and hold out my hand. He clutches me to him, his bag swinging into my leg. We stand there, stuck in each other's arms. I'm tempted to hold on, to undo the last hour, maybe even the last six months. He kisses the top of my head and lets me go.

'Good luck to you Elaine. You're an idiot but I admire you, I really do. I just can't make myself believe it's going to be OK.'

It isn't going to be OK. I know that. I drive back to the pub trying to accept that nothing I do — wasting

beer or trying to make a sanctuary — will make the slightest difference. There's something bigger than us we've tormented too long. Now it wants rid of us irritants, it wants its world back.

I'm going to keep on fighting, plant vegetables and get chickens. I can't go back to my old lifestyle, head buried in the sand (especially now that the beaches are submerged).

I pull into the stupidly large car park, scattering a group huddled around the door. I tense until I recognise my only customer from yesterday.

'Are you open? Are you doing food? I brought my friends.'

Jacquie Wyatt left marketing to write novels in deepest, darkest Kent, UK. Her poems have been published in Poetry South, Sentinel and Clear and nominated for the Forward Prize by Structo. She is an enthusiastic contributor to Hour of Writes, always grateful for a prompt.

Amplitude 25

Emma J. Myatt

It's hard to stay mad at Suze. When she comes splashing through the small waves carrying shopping bags to the bottom of the steps — late, as ever — I can't help but smile. It's more than her beauty that draws me in; it's her way of being, the light she seems to carry with her and her constant, sometimes infuriating, optimism.

I'm sitting at the top of the sea-stained steps, and we fall into a hug that makes me feel whole again. Suze and I were best friends long before we became lovers. We were born within weeks of each other, to two equally unlucky families who ended up on low-lying land.

'You almost didn't make it,' I say into her hair.

'I'll always make it. Even when I have to swim,' she says, pulling back.

I don't remind her of the time she almost drowned, almost sucked into the strange currents that swirl below Gowan Estuaries' grey, concrete stilts. I've never swum it. If I miss the tides, I stay on land, in the damp swampy hut placed by the low-cost housing developers. They call it a Stayover, which makes us laugh. They make it sound like a place you'd choose, not a rotting hut for emergencies.

'So what did you get?' I peer into Suze's bags.

'Not a lot,' she grins back. 'But don't worry; I've already a recipe in mind. I'm cooking you macaroni and cheese, without the cheese. Or proper macaroni. And using dried milk. . . '

'Sounds great,' I say, pulling a face. 'I've asked the families over for the Lotto results.'

'I had some tokens left over so I bought an extra ticket,' Suze says.

I nod. 'Good. Because I gave ours to the Robinsons again.'

Suze mock punches me. 'Seriously, Lou? You're impossible. But funnily enough, I was going to do the same when I bought this one. . . '

I kiss her. 'That's why I love you. We're as crazy as each other.'

We sit and share some stale biscuits, watching the water climb the steps below us — greedy, surging water that wants to drink us in.

'If you could go back, what would you do first?' she asks me.

This game always puts me in a bad mood. I sigh.

'Go on,' she says. 'Humour me.'

'I'd give our grandparents a bollocking for doing nothing to stop all this,' I say, as I always do, gesturing at the water. 'But then I think I'd take you for a drive, just because I could, to one of the old beaches somewhere, and we'd sit and watch the sunset. When we got back we'd surf the internet and order stuff that would magically arrive in the post the next day, bought with real money, not tokens. And then I'd think how lucky I was to be alive in such an easy world.'

'I'd buy you a proper ring and propose under a rainbow flag on a mountain, one that wasn't off-limits to us, lower echelons of society, and—'

I cut her off. 'Can we stop? I'm not in the mood for this game today.' I never am, but the If game is her favourite. As an optimist, she's a total dreamer; still believes there's a happy ending to the crappy life we're forced to live. I don't. All of those dreams belonged to a different generation, the ones who sit, staring at the water, still in shock at the fact that the warnings were right, all along. Unless they're wealthy enough to live in the Hill Communities.

'Come on,' Suze says, pulling me up. 'Let's go and cook and get ready for the Lotto.'

At eight, our families arrive. We sit around the Screen and watch the presenters dangle dreams in front of us, tempting us to buy into their façade. This week

two houses are up for grabs, two beautiful, enormous dry houses in Beacon Hill Community, worth who knows what.

'I hope the Robinsons get it,' I say, letting my bad mood out. It's been growing for the last couple of hours as the sea has risen; the sound of the waves constant and annoying.

Suze's mother, Anne, groans. 'You didn't give your ticket away again?' she says.

'Fiona Robinson isn't going to survive much longer, here. You know that as well as me,' I snap.

'We've got an extra, this week,' Suze says, giving me a Look.

'Sorry, Anne,' I mutter, staring back at the screen, at the hyper-happy presenters showing off the houses. 'Just get on with it,' I say, and they do.

There's a silence as we all check our numbers.

'Oh well,' Suze says eventually. 'There's always next week. And remember, when we win we take you all with us — those houses are big enough. . . '

'Of course,' I say. 'Next week it'll all change. We can leave this swamp and move to a place we won't ever fit in because we'll always be Lotto Residents, everyone knowing where we came from. . . ' I stomp to our bedroom.

Much later, Suze climbs in next to me. We hold each other and listen to the sea below, the sound echoing up through the stairwells.

There's a knock at our door. Suze gets up and I follow. She opens the door.

On our landing are the Robinsons. Fiona is in tears, shaking as she hands Suze a Lotto ticket. Her husband nods at us. 'She wants you to have it back,' he says. 'She told me to say it's your future, not ours. It never was ours.'

For a second, there is silence while we read the numbers. And then we are yelling, jumping up and down, hugging. Our noise drowns out everything — even the roaring water below.

Emma J. Myatt lives in northeast Scotland, close to the sea. She writes fiction of all kinds. She lives with her young family and their various cats, chickens and fish. After spending time with her family, writing is her favourite thing to do and her stories are often about the sea, which provides the soundtrack to her everyday life. She hopes this story is not a prediction.

Twenty-six

Uninsured risk

David Zetland

Nobody can take credit for inventing insurance. All cultures have found ways to protect individuals from the full cost of bad luck.

- Farmers diversify their crops in type, location and timing to reduce their risks, but storage, trade and mutual assistance help the unlucky.
- Families diversify their work, assets and friendships to reduce their risks, but savings, neighbors and migration protect the unlucky.
- Investors diversify among liquid and illiquid assets with short-term or long-term maturities, but laws, family ties and social welfare rescue the unlucky.

Humans evolved these structures — and the rich social bonds and norms that hold them together — over millennia, with each post-trauma refinement bringing a little more stability to the system and prosperity to the group.

For most of the 200,000-year history of our species, Nature delivered accidents and harm, but those risks became predictable over time and thus amenable to insurance, hedging, and other methods of investing a little in good times to avoid rare, catastrophic losses.

Among those who study climate, "stationarity" implies that patterns vary within clear boundaries over time. For the past 5,000 years, climate has been stationary in terms of temperatures, precipitation and storms. That pattern has been disrupted by acute forces — hurricanes, earthquakes and volcanic eruptions — and has evolved under the influence of solar radiation and other geological processes, but those changes (small and local or large and slow, respectively) have not been strong enough to overwhelm our species. Insurance and other coping methods have helped us survive and thrive.

Welcome to non-stationarity

Climate change will bring unprecedented risks that will strain and occasionally break our formal and informal insurance mechanisms. In October 2017, the World Meteorological Association noted that:

> Concentrations of carbon dioxide in the atmosphere surged at a record-breaking speed in 2016 to the highest level in 800,000 years. . . The last time the Earth experienced a comparable concentration of CO_2 was 3-5 million years ago, the temperature was 2-3°C warmer and sea level was 10-20 meters higher than now. . . The rate of increase of atmospheric CO_2 over the past 70 years is nearly 100 times larger than that at the end of the last ice age. As far as direct and proxy observations can tell, such abrupt changes in the atmospheric levels of CO_2 have never before been seen.

Unprecedented levels of CO_2 and other greenhouse gases (GHGs) and their unnatural rate of accumulation mean that our species is about to experience dramatic changes in temperatures, precipitation and storms.

As a water economist, I am well aware of climate change's impacts on the water cycle and thus on the various categories of water-related phenomena through which climate change will arrive. Given this experience, I would order categories of climate-change impacts as follows, starting with the change representing the greatest threat to humans:

1. Temperatures too high or too low, forcing humans and other species to flee or die
2. Droughts or precipitation too long to be buffered by storage or drainage
3. Changes or crashes in biodiversity that destroy entire food webs
4. Wind-driven storms stronger than natural or man-made defenses
5. Rising sea levels and changing currents that alter continental ecosystems

Note that sea-level rise — the change evoked by the name of this project — is the least threatening change on this list.

There are many ways to die

Our formal and informal means of insuring ourselves against risk and disaster are going to fail many people in the decades ahead. Poor people with incompetent or corrupt governments will try to help each other, but their resources can only go so far. Rich people will be partially insulated by financial and political coping mechanisms, but additional costs will undermine

markets, overwhelm bureaucracies and break taxpayers. People all over the world will face the reality of uninsured losses and the uncertainty of emerging, unprecedented risks.

In *2052: A Global Forecast for the Next 40 Years*, Jorgen Randers (one of the original authors of *The Limits to Growth*) suggested that climate change would slow as humans diverted resources from consumption (and thus GHGs) to investments designed to offset climate change impacts. Although his logic is sound, I see few signs of that switch.

The bottom line is that the damages from climate-change driven alterations to the water cycle will overwhelm our coping mechanisms, leading to unprecedented death, destruction and misery.

What does this prediction mean to you? Perhaps it's time to invest in securing yourself and your community against those risks. How do you do that? The old cliché of "a friend in need is a friend in deed" applies here, in both its meanings. Friends are indeed welcome when we need them, just as their deeds are the kind of help we will need when we are in trouble. Maybe it's time to invite the neighbors over for dinner?

David Zetland is an assistant professor of economics at Leiden University College and founder of the Life plus 2 meters project.

September 27

Jack Cooper

a september schoolroom.
new year, new class, new chance
to fill my empty holidays
and take a bet
on sitting in back rows
with big boys, tough boys, real boys.

leave front rows
to smart boys, small boys, queer boys,
not my boys
this september.

teacher shows us his hostages,
plants detained
for a slow summer
adaptation.

noonwraiths are pulled from cupboards,
spider plants with light-starved leaves,
all wisp and pomp,
curving like the strokes
of pale script.

out of practice, I offer twisted cheeks
to boys sitting either side,
forced, efficient smiles
that get me nothing.

we see ferns hugging windows,
fronds rubbing in their frenzy,
the limbs of parlor palms
knotting inch-by-inch

crawling to the sun.

lesson ignored, back row boys
talk tough, play rough
like acorns comparing height.

strange, to see friendship by instinct.

the teacher brings us holly leaves
that wear wax like cheap lipgloss, a shine
to hold their water in.

their spikes do not escape me.

lesson ignored, front row boys
shuffle left, duck heads,
under attack from spitballs,
no reaction but tightened mouths
and tightened shoulders.

I make the point to laugh.
eyes meet, challenge accepted.

I hit last year's friend behind the ear,
hide borrowed straw,
and grin at new ones.

28 *Joy in the Sundarbans*

Keya Dutt

The sea was playing with Joy, gently lifting him, picking him up, and dropping him. Drops of water fell into his mouth, so sweet... the water trickled into his parched throat, and Joy leapt like the endangered Ganges river dolphin, nose in the air, arms spread.

A sudden loud crashing sound woke him with a start. His little eight-year-old body trembled as he cried 'Ma!'

His mother awoke, 'It must be part of the embankment that breached. It's been raining so hard for the last week, it's a wonder the embankment didn't break earlier.' Below, the waters noisily gurgled, throwing fierce small waves against the bamboo ladder that led up to their home.

Joy heard the rustle of the plastic sheets that made his mother's bed on the floor. Joy shouted in the dark 'Ma, I'm scared.'

His mother made some comforting sounds. The rains raged overhead and their fragile shelter shook. Looking at the empty bed, he asked his mother when his father would return. Her silence told him she did not know or could not guess.

Joy jumped to his feet as lightning struck, revealing the rising waters below. He crossed the floor to his mother, jumping over the two rotten planks in the floor. His father had brought them from the wreck of their old home, swearing that they would not last a week. They were still there, three years later.

His mother pulled him close. The rain above sounded louder than the waters below.

Joy's dry throat hurt. He tried to swallow, but he didn't have enough spit. Reluctantly, he asked his mother for water. She tightened her hold, rocked him and whispered, 'as soon as the rain stops I will get you water.'

Neither of them admitted that the rain did not look like letting up. Ever. He knew his mother could not go through the knee-high, dark, dangerous waters to get him a drink.

Theirs was the only shelter by the embankment. The rest of the village had fled to the new Flood House built on pillars. Joy had once sneaked in there and was surprised to see a water pump on the first floor.

Joy couldn't understand why his father had built a rickety, precarious shelter at the very edge of the village. No one had helped him build. He remembered his mother weeping. And then one morning, his father was gone.

Joy's eyes grew heavy, but every time he tried to sleep, his dry throat hurt.

Joy must have drifted off when he heard the clatter of pans downstairs. His mother softly called up 'I am getting water for you.' Joy tried to protest but his thick tongue stuck to the roof of his mouth. He lay flat near the crack and watched his mother below. The waters had risen to her waist. He saw her struggle against the wind, lit by zigzagging lightning. Then the darkness and the earsplitting sounds of the roaring sea enveloped her.

And for a long time the darkness remained. He was frightened for his mother. If only he was big enough to bring the water himself.

Joy did not know how much time passed, but just as he gave up hope, he saw his mother in a lightning flash, bucket in hand.

She cupped water into his mouth. Bliss!

Joy swallowed and hoarsely asked 'Ma, why don't we go and stay on the Roy house porch? Their house is so high the water won't reach, ever.'

His mother pulled her wet sari around her to stay warm but the raging winds pushed cold through the gaps and plastic sheets. She softly muttered, 'we can't go to the Roys. Your father... he stole from them...'

Fear gripped Joy's stomach. In a fit of bravado, he said, 'They will let us stay in a corner... We can't stay here.'

As if on cue, a gust of wind carried away the plastic roof. The shelter creaked and shook. Joy shouted, and they fled, climbing down the ladder, nearly toppled by the waves below.

When they reached the Roys, they turned and saw their home floating away. The sea had been distant, but now it seemed to be chasing them, its wet cold fingers grasping at the ankles of the newest climate refugees.

Keya Dutt has written crime stories (with one novel and many short stories), translated Bengali to English, and has several publications of literary criticism. She is drawn to the issues of climate change and environmental devastations through the work of her husband, Ronodeb Paul, who has made a documentary on climate change in the Sundarbans.

29 *The fallen staircase*

David Murray

When my family moved into this house, the previous owner jokingly said that 'this is where the coast used to be'. She waited for my face to register surprise, then led me through to the living room and pointed to a map of the area as it had been at the end of the last Ice Age. She left it for me when she moved out, and I stuck it on my bedroom wall with blu-tack, despite my mum's plea not to risk tearing the wallpaper. I never liked that wallpaper.

The house was a beautiful stone construction, at least a hundred years old and built to withstand the bitterly cold winds of East Yorkshire for at least another five hundred. I chose the bedroom at the top of the house with the view eastwards towards the North Sea, the cold stone steps from the hall an escape route to my own world. In the winter the inside of the window would develop a thin film of ice.

As a studious sixteen year old, I immediately searched for local information. I discovered that the entire plain to the east was formed from the glacial deposits of ice that had retreated ten thousand years ago, leaving behind flat, fertile farmland. I imagined pale blue ice towering above our house, perhaps a kilometer thick.

That melting ice brought the coast 12 miles closer in the past ten thousand years. In another ten thousand years it would reach our house. That seemed a huge safety margin.

I made a friend, Ollie, and we would cycle to the coast and wander along the beaches. Month by month we witnessed the road slipping down the fragile cliffs onto the beach, then slowly disappearing into the sea. Four hundred metres inland stood a house that was more perfect than our family's, a large bay-windowed Victorian

structure, with colourful roses in the front garden and a perfect lawn to the rear. We would climb onto the garden wall and make plans as to how we would lay out the formal garden were it ours, which flowers we would grow.

I was twenty five when I returned from university. Ollie and I went every day to stare as the Victorian was consumed, room by room, by the incoming tide. A violent storm came and stayed two days, with lashing rain and wind that whipped away anything that wasn't tied down. Two weeks later, the last garden wall on which we had sat tumbled into the sea. A house built to last several lifetimes was now rubble strewn across the beach.

I realised the magnitude of change when the power station became an island. Always heavily fortified against coastal erosion, I was surprised to see one winter that the sea had broken around the back of the structure, just as it did to our sandcastles on the beach.

The sea chipped away at the base, small chunks falling from the sides. Not even a causeway could prevent the inevitable. Now the remains of the power station sit eleven miles out to sea, a lit beacon the only sign that it ever existed.

Each summer the smell of the salt became stronger. Each time the wind blew from the east, the breaking waves became louder. We often heard of farmers losing fields and pastures to the sea. A complete village wiped off the map in two years. The ruins of a thousand year old abbey swallowed in months. As a schoolboy I would have relished the dramatic fall of the huge facade, but now it seemed something terrible.

I am thirty seven. The coastline has been torn by sea fingers insatiably seeking the softest substrate. A lagoon stands at the base of the low cliff that ends a few feet from our front door. In many ways the lagoon is beautiful, its shape constantly changing as the autumn tide rises. My heirloom waits for the collapse that will combine two beauties into an ugly mess.

It's now completely worthless, of course — uninsur-

able for over a decade. Everything that could be salvaged has been moved, leaving a shell with vibrant wallpapers, thick oak floors, and dreamy curtains. (Why take the curtains? This is the only home I have ever known.)

I haven't even asked where we're going. There's a large removal van parked behind the house. The packers will only use the back door.

We're lucky that the road approaches from the west, as if we had planned our own escape route. I turn back for the last time as the car pulls away. I can just see the mighty stone staircase to my old room tumble over silently, adding to the moraine of hand-cut, rectangular stones.

Dave Murray writes plays, poetry and short stories. He is based in Manchester.

30

A Marsh Arab's story

Daniel Gilbert

My name is Faris and I am of the Ferayghāt people, one of the tribal groupings of the Ma'dān. In English, you call us "Marsh Arabs," a label that carries no weight. Sadly, Ma'dān is often used in Iraq as a slight, aimed to inflict hurt and belittle. But I am proud of who I am, where I come from, and I will keep my memories of those former marshlands.

The Ma'dān is now largely burnt to a crisp. The relentlessly rising heat of this decade, the 2030s, is to blame, and so also is the construction of canals and outfalls diverting the Tigris and Euphrates rivers and draining the great lakes of Hammar Hammar and Umm Al-Binni. These waters kept the Ma'dān alive, and now it is dead. Only the most stubborn of our people stay, fighting their Mother of All Battles daily, in relentless heat.

So much for my past: where I lived happily and less so, throughout my childhood and as a young adult. Today I "stay" in Fife, Scotland. I am a refugee, forced to leave my homeland behind, gone but never forgotten.

I am getting to know the local culture here, ways of living, speaking — for example they say "stay" rather than "live" — and song. I love music, and also humour. Without being able to laugh at life I don't know how I would've kept going through these last, painful years. "It started up in Fife, and ended up in tears" sings a band from Edinburgh. Your national capital is closer to me now than Baghdad was to my home, before my long journey. In truth, for me the tears have never been far away, whether in the lands of my birth or now in Fife.

Climate change is an important part of the story but does not encompass the whole. Upstream dams, both in Iraq and beyond, denied water to our marshlands. My

parents told me that for many decades our homeland was drained intentionally in an attempt to reclaim farmland and, later, to punish us. But it was the ever-rising temperatures that finally killed off those marshlands, and attempts to revive them. What marshland can survive the torching heat that I, myself a hardened son of the soil, must flee?

My faith keeps me strong, and I constantly give thanks to *Allah* in my prayers for leading me to this odd place of refuge. Is it a coincidence or divine providence that I have gone from one place of Eden to another? My homeland, you see, is known as the original Jannāt 'Adni, or Garden of Eden, spoken of in the Holy Quran and also in holy books of the Jews and Christians alike. Now, the river Eden flows through the town of Guardbridge, the town I must now call home. I am trying. "It started up in Fife, and ended up in tears"... my tears, that is. The Eden never leaves Fife; will I stay here forever too? Or will I return to Iraq one day, like river water to the sea?

Even amongst my tears, and my yearnings, I find this funny Eden-here, Eden-there coincidence comforting — as perhaps I am meant to? *Allah* moves in unknowable ways, and I am thankful for *His* blessings. *Allahu Akbar*.

I would never have guessed that I would end up in Scotland. Not least since, until recently, I was unaware that such a country existed! In Iraq, people talk of England and the English, or the British, but not really Scotland or the Scots. Yet the Scots are truly a welcoming people and I have been treated with great hospitality since my arrival; hospitality is proud trait of the Ferayghāt people, and we mark it as a sign of civility.

Scotland has had it tough in recent years, and for some of the same reasons as Iraq. In common between us, the price of crude oil has collapsed, swamped by new supplies made possible by new technologies and undermined by the steady switch to electric vehicles. Scotland has also accepted many tens of thousands of climate refugees, its cities swelling with new populations even as stronger waters push into its "firths," its river

estuaries, swelling the Eden and pushing up against the gardens of the town's most exposed "sea-view" properties.

The loss of land and houses has stretched services and further rocked the finances of newly independent Scotland. Independence is exciting, but Scots — dare I say it — weren't really ready to manage on their own. That they have pulled through is due to both their determined, stubborn nature — a stubbornness that I have seen the wrong end of — as well as to the efforts of the New Scots they have welcomed to their shores.

Yes: we immigrants are proving our economic worth, helping to pull our adoptive country back to its feet — if I may be so bold. In so doing we help ourselves and repay Scotland's hospitality. We come from countries like Iraq where the State barely functions. We do not rely on any State to provide for us — we provide for ourselves.

Even as a New Scot there is no danger that I will forget my heritage from amongst the Ma'dān. Every Friday at *dhur* (noon) I hear the *Khutbah* (sermon) amongst fellow Muslims at the newly built Guardbridge mosque and I am part of a Fife-based community of Marsh-Arab immigrants who maintain their traditions in this new and strange land. I am teaching Arabic as an additional source of income. Arabic is an increasingly popular language to learn amongst Scots here. They are keen to trade with the world, not just with England, to the south. That makes me proud.

I think I will be happy too. My beautiful new bride thinks so. A native of this land, she quoted to me a verse from another Scottish band: "for the family; for the lives of the children that we've planned; let's get married; c'mon darlin', please take my hand". The wedding is next month. I cannot wait.

Daniel Gilbert is a World Bank natural resources consultant who holds Masters Degrees from both Dundee and Edinburgh universities. He has provided both leadership and hard graft taking forward water, renewable energy and minerals projects in Africa, Asia and Europe.

UnSETTled 31

Paul McDermott

"Where is all this water coming from?"

Bella Badger scrubbed at the cloying, evil-smelling mud between her long, beautifully-manicured claws. They were strong and flawless, without a single chip or rough edge, but several hours of strenuous digging and repairing one of the deeper runs of the family's sett had left their mark. As she inspected them closely, checking for damage, she wondered if she'd ever manage to get them properly clean again.

An untidy hump of soil quivered and collapsed as her partner backed awkwardly out of his latest excavation. He shook himself, muttering and cursing as soil and rubble flew in every direction. Within seconds, Bruin's fur was as clean as if he'd spent the last hour or more grooming for the annual Woodlands Ball.

"How bad is it?"

"Most of the tunnel I dug last season has fallen in. Just as well we didn't have anything stored there yet: we'd have lost it, for certain! We won't be able to dig in that direction for some time. We'll have to tunnel off on the other end of the sett next time we need more living space, the ground out that way" — he flicked his tail in the direction of the collapsed passage — ". . . needs time to settle."

"Best we go tell the cubs, sweetheart. They'll soon be old enough to help me dig — and we'll need an extra bedroom before long," he added with an exaggerated wink. Bella's pot belly was rounded with the promise of twins in the not-very-distant future.

"Where's all this water coming from, Dad? And why does it stink so much?"

Billy hero-worshipped his father, and believed without question that Bruin knew all that could possibly be

known about everything Above and Below the entrance to the complex maze of tunnels he'd carved to meet the growing family's needs.

Bruin sipped thoughtfully at his dandelion tea. Billy's younger sister Blue put aside her favourite doll, begging her father for a solution.

"The Tall Ones are building more of their Caves not far from here," Bruin sighed. "They don't know how to manage their waste properly, as Nature intended. . . "

"Like we do!" Billy chirped.

Bruin nodded and smiled, but it was a reluctant agreement and tired smile of resignation. "That's right, little one. We take only what we need, recycle what we can, and bury our waste. Much of what we bury will break down and fertilise the soil, so your children and theirs will have more plants in the future."

"The Tall Ones, on the other paw, use water as if it's endless, to send their waste Somewhere Else, for others to deal with — at least, that's what I think." Bruin was on unsteady ground here. He didn't really know what happened to the waste flushed away from the ugly Caves.

"You mean, the Tall Ones don't even know how to shit in the woods?" Billy asked, his eyes wide with horror.

"You mind your language, Billy Badger!" his mother warned, trying to hide her smile.

"All the same, he's right." Bruin said.

Billy's heart swelled with pride at the sign of his superhero's approval, the highest compliment he could imagine. He raised himself to sit on his haunches. "What can we do, Dad? I'm big enough, I can help you dig — even if we have to build a whole new sett. . . !"

Bruin shook his head and put down his empty mug. "For the moment, son, we can only do what we've always done. We adapt ourselves, protect our warm home, and carry on. In a few years, we may be able to work in that direction, but for now we must find a new direction. And yes, I believe you're old enough to help me build a new bedroom. . . "

This with a loving glance at Bella, who suddenly decided on a totally unnecessary claw inspection.

"The Tall Ones fight Nature, dumping polluted water and stinking wastes everywhere Above," he declared. "We will continue as we have always done, adapting in our cozy homes Below ground, at one with Nature and at peace with ourselves."

Paul McDermott's natural curiosity combined with the deep-seated feline need to roam has meant that over the years he's never been able to call any one place home. He has always followed his instincts without question or complaint, and in true cat fashion he has always landed on his feet. Paul's debut novel, The Chapel of Her Dreams, is the first volume of a planned trilogy.

32

Wall Street predators

Richard Friedman

Jessica urged her customers, “Hurry up, guys. You paid a lot of money for this charter. Check your gas levels. We’re almost at the drop zone. Stay together. If you wander too far apart, you’ll be out of communication range and on your own. Remember, there’s safety in numbers. Also, you signed papers. Look, but don’t touch.” She then pointed to a tan, willowy man, “That’s Tim Trenton. He’s my right-hand man. He’ll be diving with you, to protect you if there’s an emergency.”

Trenton pulled back his vest, exposing a gun and a spear. He smiled and said with an Aussie accent, “No worries, mate, I’ve got your back.”

Patrick, Josh, and Griff were all friends from Lincoln, Nebraska, visiting New York City. They gave Jessica the thumbs up and waited patiently for the boat, *The Downtowner*, to reach its destination.

Five minutes into the descent, Patrick said, “Can you believe it? I’ve already seen a hundred species!”

The divers moved away from the boat at a steady clip. When they reached the maximum allowable distance, Jessica pressed a button on her control pad and instructed the men to stop their advance. “That’s far enough, enjoys the sights!”

Josh signaled for his friends to follow. They headed to the floor of the ocean. He said, “We’re on 44th Street! My great-grandfather told me stories about coming here to see musicals. Now they’re only playing *The Incredible Mr. Limpet*.”

His crack about a hundred year-old movie drew no laughter.

Griff was a professional photographer who planned on selling pictures from the trip. He clicked away as they

swam past retail stores of yesteryear like Bergman's Deli, Styles by Rene, and a tattoo parlor.

They swam closer to a building to read a sign, now practically worn away by the rushing waters: *Flood Damage, Everything Must Go!*

"Ha! Good one," said Tim. "It's not like they can get the water out, eh?"

Griff took a few photos and swam east on 44th Street, passing landmark theatres now entertaining the inhabitants of Atlantis.

Suddenly, an alarm bleeped in his ear. He was outside the safe zone. A clipped male voice steadily repeated "Return, return, return." Griff did not return. He swam onward, away from the group. His friends were too far away to warn him of the impending danger. Tim frantically tried to reach him, but it was no use.

He felt a slight tug on his left leg. Thinking it was one of his friends, he said, "Hey, knock it off." Then a sharp pain made him howl, "Ahhhhhh!!"

Blood filled the area outside his mask, and then inside his mask, too, and he began to lose consciousness. Tim fired a spear at the shark, but it only nipped the dorsal fin. The Mako turned and set out for a second victim while Griff, missing one leg and doomed, drifted with the current. His trail of blood attracted two other sharks, who proceeded to finish him off, nibbling at his remains like guests at a wedding.

Tim reloaded and fired again. He scored a direct hit on shark #1, which disappeared into the depths. His hungry friends caught Tim off guard. Rising from below, each grabbed a leg, and they tore him apart like a Thanksgiving wishbone.

Jessica heard Tim's cries and screamed, "What's going on?! Tim! Speak to me! What's happening? Get back now!"

Patrick and Josh didn't need advice, they needed to get back to the boat before they were dessert. The sharks gave them a head start before racing after the divers. Jessica saw the disaster at a distance. The shark's fins

poked through the choppy waters, closing in on the swimmers.

With ten feet separating them from certain death, the crew reached out to haul Patrick and Josh out of the water. Patrick went under first, lost forever. Josh extended his hand towards the boat. Jessica grabbed it and pulled with all her strength and fell backwards. She had Josh's bloody arm, but the rest of the poor man never made it. Jessica shrieked and dropped the bloody limb. It landed, ironically, in the bait bucket. Jessica vomited and broke down in tears, trembling.

The Downtowner approached the dock. Jessica, eyes-red, turned to the captain, "They knew this was coming, and they did nothing. They just kicked it down the road. They knew the water was going to rise, dammit. They knew it, and didn't do a damn thing."

The captain looked up. "Yep, and that's why we have sharks in Manhattan."

Richard Friedman lives in Cleveland, Ohio. His eco-fiction novels Escape to Canamith and The Two Worlds of Billy Callahan remind us to cherish our planet. In October of 2017, Richard became a certified member of Al Gore's Climate Reality Project.

33 *Death by a drop too many*

Rene Evans

We knew we had to move fast when the Suisun Marsh became this week's new beachfront. Sacramento was next in line to get sucked into the Pacific. Then the old mine shafts started imploding under the pressure and spewing like one Old Faithful after another. You could see the trail of impending doom coming up the hill. We had to move quickly. For weeks, I had had a false sense of security. We had started out 1,800 feet above sea level, but now we were only 200 feet above certain death. The swelling tide never ebbed. It only flowed.

I smelled them before we heard them. The putrescence of dying, feral humans preceded the clamor of insanity. A wave of tired, sweaty bodies flowed with deadly purpose. They wanted our hill. My exceptional sense of smell had served me well, but today it was half a liability.

Suddenly, we all felt it. Tens of thousands of feet pummeled the ground, heading east. They were coming fast. We struggled to control our panic.

In my previous life I rescued people from general stupidity and specific homelessness. Very soon everybody would be homeless, and I knew we couldn't save them all. I shook off my sense of responsibility and called my kids aboard. Our supplies were expected to keep the six of us alive for at least three month once we landed in Denver. Life after that? We hoped we could count on the generosity of a few thousand strangers and a few old friends and colleagues from Oracle.

The last good engine on the Cessna had been reassembled. We were gassed up and ready to soar. We only needed 130 feet to get out. I felt woefully underdressed, but a chill was nothing compared to the chaos that was about to break out. As we rose above the human

tide, my thoughts were of our futile efforts to survive the Big Swallow.

And so it goes. . .

We made it out of California, but what of the others? We don't know their fates. The reports are few and confused. I do know that we have run out of fresh food, clean water and most of our humanity.

We prepare for another evacuation. This time, we will head north to Minot, North Dakota. Why Minot? Because Lake Sakakawea hasn't breached its natural shoreline, silly, that's why. And don't forget the Air Force silos. I'm not sure whether they represent survival or a sarcophagus, let alone how I would feel about living underground for 50 years.

I see my children and grandchildren preparing to leave. I can only respond with a prayer: for reprieve but mostly forgiveness. I am old. My heart is heavy with the guilt of repeated warnings that began as far back as the Ban-the-Bra movement. Sadly, I recall every V-8 I drove, the enormous piles of waste I created, the squandered natural resources. I can only hope that the next generation sees what we wrote on the wall.

I am deeply ashamed, but I don't want to die just yet. Unfortunately, today is my 75th birthday, or what we now call the Date of Expiration. I will not be joining them. How long *can* I hold my breath, I wonder?

As a species, we have destroyed this planet because we are selfish and greedy. Now we must repay an old, unavoidable debt.

It's funny that in all of my working years, I had expected to die from a million paper cuts. Now I'm going to die from just a few too many drops of melting ice and rising seas.

Rene Evans is a single mom, sci-fi fan, life lover. Armed and waiting for the Apocalypse. She has been an advocate for the under-served in El Dorado County, CA for the past 20 years. Known for her tough love stance, she helps people re-stabilize after a crisis.

Dusk 34

Ignacio Carlucho

The boat drifted through the silent forest. Sol was paying almost no attention as she was busy reading her father's notes. For anyone else, finding their way through the countless trees and small passageways would seem impossible, but not for her. She was born and raised on these lands. Every branch, stream, and bird's nest confirmed her exact location.

Every morning she got on that boat and steered it through the currents. Her task was simple: to monitor and record data from each station. Sol had learned all this from her father. He was a great man, whose love for science was only surpassed by his love for his only daughter. Sol's mom was also a scientist, but she died after giving birth. Sol's memories of her came from old photographs and her father's stories.

Sol's parents met when they were young students. They shared a love for science and a mission to minimise the impact of climate change on Earth. They dedicated their lives to this goal. After the big floods they relocated to the Amazonas and committed their lives to recording, analysing and understanding.

"The lessons we learn from the stations will be vital for future generations." Sol could almost hear her father say. She was now following her parents' legacy.

When her parents first arrived to the forest, they discovered an isolated tribe. Sol's parents tried to make contact with the tribe, to learn about their culture and trade scarce supplies. Despite multiple attempts, trading was nearly impossible. Members of the tribe blamed white men for the floods — and they were right.

"You take and take, now earth dies" said the old man in broken Portuguese.

Sol's parents paid no attention, convinced they were helping the Earth. Soon after that, Sol's mother gave birth and fell sick. Desperate, her father took Sol's mom to the tribe. The old man did all he could, but it was not enough.

"The forest kill you and girl. Come, live with forest, with earth" said the old man, gesturing around them.

"No" Sol's father said. His task was too important.

"Break machines. Heal earth." said the man.

"They do no harm!" Sol's father cried. The engineers said the stations had no impact on the environment, apart from cutting a few trees.

"You have eyes, open! If eyes closed, forest will not be friend" said the old man, in a last attempt.

Devastated at his partner's death, Sol's dad abandoned the tribe with her in his arms. He was even more focused now. His work was for her.

Sol's father died seventeen years after that day. Sol never found her father's body, only the boat, drifting. Two months went missing from the logs of that year, as Sol spent most of her time crying and searching.

Alone and weak, she saw the old man coming.

"Sorry." He said as he dropped a bag of supplies.

"Thank you."

"Come with me. Live with forest."

"No! This is important. We can save the Earth with this information."

"White man is problem."

"You don't understand, I want to help!"

"Your eyes are closed, earth is dying" the old man said gravely, and sailed away.

She knew the old man was right. But she was doing all she could to prevent damage. But those stations, how could she be sure? They were installed years before Sol's parents came to the forest. Sol never questioned how those gigantic measurement stations could get sufficient energy with those small solar panels. But she was doing the right thing, as her dad had told her. Science was

right. This work would help solve climate change, and then everything would go back to normal. Sol went back to her routine: every day checking the stations, collecting data.

Months passed, seventeen since her dad disappeared. That day, as she had done every month, Sol was on her way to visit his grave. She steered the boat against the slow current. The forest was silent. Too silent. Her head turned as she listened. Why were the birds not singing? Or the trees shaking in the wind? Nothing. It was as if some kind of spell had fallen over the forest. The water pushed forward.

A snap broke the silence. Her eyes widened. The arrow made no sound as it perforated her lung, but the pain was unbearable. She looked down. She could see more than half of it sticking out. She recognized the wood, babassu. She played on that tree as a child. She caressed the feathers, urubu, and thought she could hear its call in the distance. A second snap. This time the arrow hit her left shoulder. She screamed in pain, and yelled to the Forest:

"Please I am just trying to help!"

The Forest was silent.

"I am not like the white man. My faa—"

Arrow number three. She touched her mouth, and saw blood on her fingers. Her legs failed and she fell on her knees. Eyes filled with tears. No air in her lungs.

She whispered "Why?"

Four. Five. Six.

The boat drifted through the silent forest.

Ignacio Carlucho is a Doctoral researcher at the National University from Central Buenos Aires in Argentina. His main research interests are underwater robotics and reinforcement learning.

Now what?

David Zetland

We authors hope that these visions help you think of the various ways that climate change may impact your life — and the lives of everyone else in our world. Our advice is that you prepare for life in a different world as it's much easier to adapt to change than react to it. Besides considering your own actions, please also participate in your community's actions and preparations. Human civilization has brought us this far due to cooperation, and cooperation will be key to our futures.

This book is the second in the Life Plus 2 Meters project. If you enjoyed this book, then please recommend it to friends and review it for others on Amazon.com and elsewhere. You may also want to read Volume 1. That book, like this one, is free to download from www.lifeplus2m.com or available for purchase (at cost) from Amazon.com.

Thank you for reading!