A series of excerpts from *Future Rising: A Journey from the Past to the Edge of Tomorrow*

Exclusively prepared for subscribers to andrewmaynard.net

Back in early 2019, I was beginning to explore ideas for my next book. *Films from the Future*, which came out in late 2018 and dives into emerging technologies and their socially responsible and ethical development, had been well received, and I was interested in where I went next as an author.

I was playing with a number of ideas—all associated with technology, society and the future—but these all crystallized into a single, intriguing focus one afternoon while having coffee with a good friend and colleague. As we were talking about the future book, he asked what seemed at the time to be a very off question: "why don't you write about the future as an object?"

I was, I must confess, rather taken aback. The future, as any school child will tell you, isn't an object by any stretch of the imagination. And yet, the idea intrigued me. And within 24 hours I'd gone from skeptic to

enthusiast as I began to see how I might take inspiration from the idea.

To understand why this was the case, I need to step back a bit. Through my work over the past several years, it's become increasingly clear that we are at a tipping point in human history. Given accelerating changes in technological capabilities, planetary stresses, and social norms and expectations, we are caught up in a global nexus of trends that puts us on a rapidly-narrowing knife-edge between incredible success and catastrophic failure. And as a result, if we're to thrive as a species, we need a dramatic shift in how we think about the future and our responsibility to it.

The "we" here is everyone, not just experts and policy makers (who are often stymied by their own blinkered views), but every person who has a stake in the future, and an ability—no matter how small—to impact it.

The question was, how could I capture this in a book that was extremely accessible, and yet drew readers into a unique and powerful way of seeing the world differently.

As it turned out, the idea of thinking of the future as an object is what I needed for everything to fit into

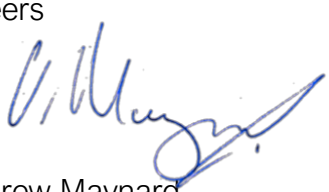
place. It provided a framework where I could develop a series of reflections that, together, allowed me to develop a deceptively rich and deep picture of what the future is and how we act as responsible architects of the future we desire.

Future Rising turned out not to be a book about the object as a future. But that scaffolding was important to how I developed and constructed it. And as you read it, you can still see vestiges of the idea that led to what it became.

If you enjoy this series of excerpts, please do consider reading the whole book—I know I'm biased, but I think it's worth it.

And of course, please do pass the word on, because whichever way you look at it, we all need a reset in how we think about the future and our responsibility to it.

Cheers



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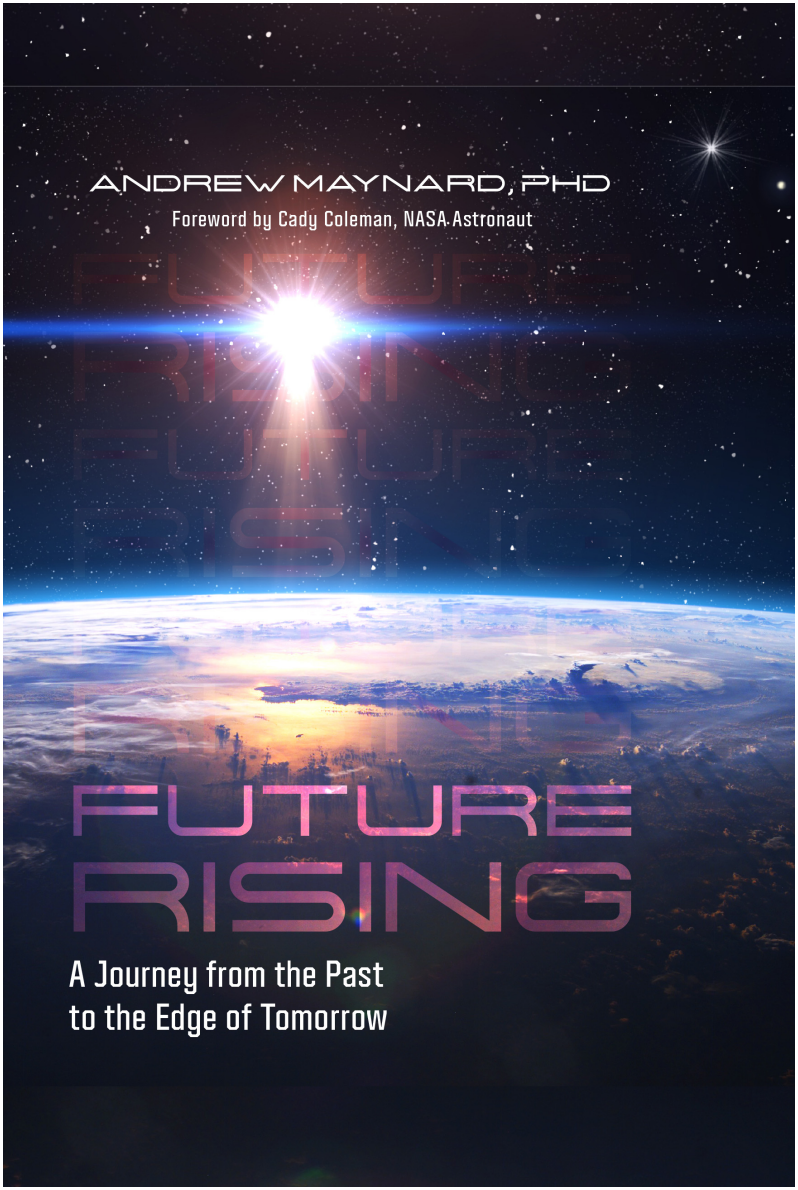
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A Journey from the Past to the Edge of Tomorrow

ANDREW MAYNARD, PhD

Coral Gables

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INTRODUCTION

We live in a world in turmoil. As I write, we are grappling with a future-changing global pandemic, refugees are being held in less-than-human conditions as they strive to build a better future, a growing wave of populism and nationalism is sparking another type of global epidemic—this one of mean-spirited inhumanity, and people the world over are being denied the futures they aspire to because of the narrow-mindedness of others. And over everything, there's the looming disaster of climate change, as we sacrifice long-term sustainability for short-term gain.

It's a picture of the present that doesn't bode well for the future. Yet, dire as the outlook seems, it is not inevitable. Despite appearances, our collective ability to imagine and build the future we aspire to has never been greater. With advances in science and technology, we are on the cusp of mastering biology, of creating machines that think, and of conquering seemingly-incurable diseases. Our understanding of people and society is revealing pathways toward more equitable and just futures. And we're beginning to figure out ever-more-effective ways of living sustainably within the constraints of the planet we inhabit.

And yet, unless we better understand our relationship with the future and our responsibility to it, there will remain a gaping chasm between what we are capable of and what we

achieve. As a species, we are profoundly talented architects of our own future. But to do the job well, we need to get a much better grip on where we're heading, and how to ensure it's a better place than the one we came from. This is a responsibility we all face. And as we do, we each need to find our own personal threads that tie together past and future, and learn how to weave them together into a bigger picture of what humanity could become.

This, though, is no mean task. Every day, we're bombarded with information and advice in a cascade of news, commentary, and opinion that conspires to hide and tangle these threads—often leaving us feeling dazed and confused. And sometimes, we simply need to take time out—to find a still, quiet place, where we can begin to piece together a picture of the future that makes sense.

But finding such a quiet place isn't easy. We're obsessed with the future, to such an extent that it can threaten to overwhelm us. We avidly suck up news feeds and forecasts to get a glimpse of what's coming down the pike. We immerse ourselves in social media to keep up with what's on trend, and what's not. We consume book after book about the future that tells us what we're doing to destroy it, how technology will transform it, how our wrong-headedness is hampering it, and how our intelligence is manufacturing it. And we surround ourselves with science fiction stories that guide and color our ideas of how the future *might* pan out.

And yet, despite all of this, we rarely take the time to hit the reset button and think afresh about what the future is, where it came from, why it's so integral to our lives, and what our responsibilities to it are.

It's this metaphorical reset button that I set out to hit in this series of short reflections. My aim was to make them long enough to help carve out a quiet space for reflection, but short enough that they don't add to the noise. Through them, I hope to take you on a journey into what the future is, why it matters, and how we can collectively navigate toward one we aspire to as we live our lives together.

What emerges is a journey into our understanding of the future that spans history, starting at the very beginning of all things, with the celestial "big bang," and ending with our responsibility to ensure that coming generations inherit a better future than the one passed on to us. It's a journey of twists and turns, of unexpected insights, and serendipitous delights. And it's one that, step by step, builds a picture, not only of what the future is, but what our roles and responsibilities are in crafting and creating it.

Like all pictures, of course, this is one that tells a story that is far from complete. Look closely, and there are broad brushstrokes where you might expect fine detail, and curious omissions where you might expect deep insights. Yet step back, and a unique portrait of the future emerges

that sheds new light on its relationship to us, and our responsibility to it.

It's also a portrait that, despite the turmoil we see around us in the present, gives us hope for a future that could far exceed our expectations—as long as we all play our part in building it.


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PART 1

A JOURNEY INTO THE PAST

"No sensible decision can be made any longer without taking into account not only the world as it is, but the world as it will be."

—Isaac Asimov

1

EARTHRISE

On December 24, 1968, William Anders took one of the most influential photographs of the past hundred years. The picture was taken from the Apollo 8 mission as it orbited the moon, and it showed a startling image of the Earth, suspended in space above a bleak lunar landscape.

Anders's *Earthrise* photo captured a growing sense of our planet as a precious object that, despite its stunning beauty, was in danger of being systematically destroyed by short-sighted consumerism and greed. And it galvanized a generation to protect and preserve a future that was increasingly seen as being under threat.

In the intervening decades since Anders's photograph was first published, our ability to exploit the Earth and, with it, our future, has only escalated. As the Earth's population climbs toward eight billion, with many people still facing poverty, hunger, and substandard living conditions, we are polluting the planet and stripping it of its resources faster than ever. Climate change that's being driven by human activity is now one of the greatest threats we face. At the same time, we are beginning to overstep other environmental boundaries that help keep the world we

live in on an even keel, from decreasing biodiversity to increasing ocean acidification. And this seeming disdain for the future is only being exacerbated by a growing fascination with powerful and potentially destructive new technologies.

Yet within this seemingly dystopian vision of the future, there is room for hope. Since Anders took his photograph in 1968, we've seen profound advances in potentially beneficial science and technology. As a result, more of us are living longer, healthier lives than ever before. We can now treat and manage diseases that were once considered unmanageable. The digital revolution and the internet have put more information, knowledge, and power into the hands of more people than at any previous point in history. Emerging technologies from gene editing to artificial intelligence are opening the door to potential futures that were once little more than science fiction. And threading through all of these advances, social norms and expectations are evolving around how we should behave, and what our responsibilities to future generations are.

Collectively and individually, we have more control now over how our future unfolds than ever before. But our ability to envision and engineer the future comes with almost unimaginable levels of responsibility as, together, we grapple with what we want it to look like, and how to avoid costly and potentially catastrophic mistakes.

Anders's 1968 photograph set us on a path toward powerful new ways of imagining our future. As well as showing us the majesty of our planetary home from space, he encouraged us to think of the future as an "object," something real and precious that we can and should aspire to, and to imagine the possibility of a vibrant home we would gladly bequeath to generations to come. It's a metaphor for what lies ahead that has the power to tear our eyes from the present and focus them on a future that we have a hand in designing and creating. But for it to truly transform how we think about the future, we need to go on a journey that starts billions of years in the past, when the distinction between what was and what is to come was little more than a spark in the cosmos's eye.

2

ORIGINS

Around 13.8 billion years ago, the universe as we know it came into existence. Before this, there was no future, no present, and no past, just a pinprick of potential that existed outside what we now experience as space and time.

Prior to what we think of as the "big bang," time did not exist. There was no sense of what had just happened, or what might happen next. What we think of as the future was only made possible as our present universe popped into existence, much as the cascading, irresistible flow of a flooding lake is unleashed when a dam collapses.

Because of the way our minds work, it's almost impossible for us to wrap our heads around that point of compressed space-time that existed just before the universe came into existence. And yet, over the past hundred years, scientists have, quite remarkably, been able to reconstruct those earliest moments. As a result, we now know that what we think of as "past" and "future" are merely the byproducts of the laws of physics that emerged after the big bang took place—those laws that we often take for granted, yet which govern everything from the behavior of subatomic particles to the movements of the largest galaxies.

It's sobering to think that, had some unfathomable cosmic tick not triggered the big bang, we wouldn't have a future. And yet, because of an event that scientists are still trying to understand, 13.8 billion years ago, time and space came into being and the future was born. The cosmos belched, and the scene was set for creatures like us to emerge—creatures so trapped in the resulting flow of space-time between past and future, that we can't imagine life any way.

Of course, it's easy to get mystical at this point and start to imagine what it would be like to exist outside of time. Maybe the defining essence of humans is a soul that, somehow, escaped the physics of the big bang. Or perhaps our lives are guided by celestial beings that transcend the limitations of everyday reality.

Sadly, intriguing as these ideas are, everything we currently know about the universe indicates that there is no plane of existence that transcends space and time. Every ounce of our existence, it seems, is trapped in this irresistible flow from past to future. With that cataclysmic event that started everything, the die was cast for a universe where, in practical terms, everything has a past and a future that are irrevocably tied together by the present.

It is, of course, disappointing that we can't just step in and out of time at will. But the more we understand this one-way river of intertwined space and time that we're being swept along by, the more we can learn how to nudge the

future in a direction we'd like to go in, rather than the one that fate hands us. That is, if we can see where we're going.

3

LIGHT

Light, in all its forms, is such a basic part of life for most of us that it's sometimes easy to take it for granted. Light from the sun is what powers the Earth, from its geological evolution over vast timescales to its weather, the energy we rely on, and ultimately, life itself. Light has physically and metaphorically guided our planetary and evolutionary history for billions of years. And it continues to illuminate our future.

Walk into a darkened room and flick the light switch and, in most cases, what was invisible immediately becomes visible. And with it, different possible futures are revealed. These may be as mundane as avoiding stubbing a toe on a protruding piece of furniture, or as profound as—quite literally—being *enlightened* by what you can now see.

Light reveals a pathway between where we are now and where we're heading. It enables us to develop new knowledge as it illuminates the world around us. It allows us to explore how the past influences the future by observing the relationships between cause and effect. It even provides the illumination for many scholars to capture their ideas in writing, and for their students to read and

benefit from these—even if that illumination is sometimes the light of a computer screen. More than this, though, light infuses our thinking about what is coming next, as we talk about "seeing" into the future, or "envisioning" it.

Yet, even before humans were on the map in the cosmic scheme of things, light was playing the role of arbiter between past and future.

As the initial maelstrom of the big bang settled down into something approaching the normality we're now familiar with, the cosmos was flooded with the fundamental particles that act as the building blocks that make up the universe and the glue that keeps it together. We're perhaps most familiar with those particles that represent visible light—the photons that are emitted from fires, light bulbs, computer screens, and, of course, the sun. But these represent just a small slice of the spectrum that scientists think of as "light." This spectrum extends all the way from intense, destructive gamma rays to long, lazy radio waves, with visible light sandwiched into a narrow band somewhere in between.

All of these forms of light form connections between the past and the future. This is perhaps most famously seen in Einstein's theory of relativity, which depends on the speed of light in a vacuum remaining the same, wherever you are and whatever you're doing.

Because light travels at a finite speed, we're still, quite remarkably, receiving signals from the very earliest moments of the universe. Incredibly, we can actually detect the afterglow of the big bang in the form of cosmic microwaves that have taken nearly fourteen billion years to reach us. These signals from the universe's past are deeply revealing of where we come from on a cosmic scale, and they help us better understand where we're ultimately heading.

But there's an aspect of light that's even more fundamental to our understanding of the future.

Light is emitted when charged particles oscillate back and forth. This is how transmitters emit radio waves. It's also why atoms emit light as the negatively charged electrons in them move between energy states.

This connection between the electrons in atoms and light turns out to be deeply relevant to the passage of time between past and future. For every oscillation, every turn of the atom-electron spinning top, emitted light waves slice like a metaphorical knife between what has just been and what's to come. Without light, there is no past and no future. And without past and future, there is no light.

Fittingly, we actually measure time using the frequency of light emitted by oscillating electrons. A single second is defined as the time it takes for nine billion, one hundred and ninety-two million, six hundred and thirty-one

thousand and seven hundred and seventy oscillations of an electron transitioning between two energy orbits in a cesium atom. It's a frequency that is, sadly, too slow to be seen as visible light. But it can be picked up by a high-frequency radio receiver. And thus, light becomes the metronome that keeps time as the past transitions to the future.

But as light ticks the seconds away, it reveals yet another important aspect of the transition from past to future: movement.

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REASON

One of the most profound aspects of being human is our ability to predict the future. Of course, there are deep limits to our capacity to see into the future. Chance and randomness tend to throw a wrench into our skill at peering into the unknown, as do the boundaries of our intelligence and knowledge. Yet, every day, we use our reason to anticipate the twists and turns life throws at us, and to adroitly navigate them.

Reason, unlike instinct or intuition, is the culmination of our ability to observe, learn, recognize gaps in our knowledge, fill them, and develop an understanding of how the past and present are connected. It gives us a window into the future that not only enables us to predict what happens next in many cases, but to prepare for what's unfolding, and even to alter it.

This capacity to think about and respond to what the future may hold is not unique to humans. There's growing evidence that a number of animals are able to reason their way through solving simple problems. Yet it's something that has become so advanced in us that it sets us apart from other species.

Our ability to reason is what helps us imagine the possible outcomes of events and actions, and to focus on the more plausible ones. It's a combination of observation, learning, and mental gymnastics, all tied together by our intelligence, that enables our brains to construct future-predicting "if-then" statements that keep us alive and kicking as we move forward.

This ability to peer into the future through the power of reason is so enmeshed in our everyday lives that it's easy to overlook how astounding it is. Its roots lie in the survival mechanisms we've evolved and inherited—a side effect of our biologically encoded instinct to stay alive. But over time, our capacity for reason has grown to the point where it now enables us to envision the future we want, and to work out, step by step, how to build it.

Reason lies at the heart of modern science, as we systematically learn how the universe works, and use this to predict what it's going to do next. It enables us to begin mapping out the consequences of our actions, even if those consequences take time to show themselves, as in the case of human-caused climate change. And it allows us to translate our wildest dreams into concrete realities, whether these entail going to Mars, creating new virtual worlds, or building a better society.

And yet, stupendously powerful as this attribute is, reason can be blind to the future. Reason is what tells us that 2 +

2 will always equal 4, and that the sun will always rise in the east and set in the west. But it can lead to us struggling when we don't have all the information necessary to predict the future, or when the threads tying the present to the future are so complex and convoluted that they defy analysis. And it most definitely runs into difficulties when all of our wonderful human idiosyncrasies are thrown into the mix, and it becomes clear that the past and future are tied together by more than reason alone.


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PART 2

UNIQUELY HUMAN

"The future belongs to those who believe in the beauty of their dreams."

—Eleanor Roosevelt

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FAITH

If reason is deducing what lies in the future based on the logical extension of what we know of the past and present, faith is, in some ways, its antithesis. Faith depends on believing in what lies in the future without supporting evidence, or even despite the evidence in front of us. To a rationalist, faith makes little sense. And yet this ability to believe in a future for which we have little or no evidence seems to be hardwired into the human psyche, irrespective of whether we are religious or not. And as a consequence, it has a profound impact on how we envision the future, and how we live our lives in the present.

Just a few miles from where I live, there's a neighborhood with the rather grandiose name of Valhalla. It's a residential area, where realtors, without any sense of irony, advertise "Tours of Valhalla." It's also, perhaps fittingly, the place where L. Ron Hubbard founded Scientology.

The original Valhalla is, of course, the great hall within Norse mythology where heroes killed in battle are said to live it up after their death. I suspect that the Valhalla just down the road is a little tame by comparison. But both are

testaments to the power of belief and faith in connecting the future to the present.

According to Norse mythology, Valhalla was a reward for courage in battle—a vision of the future that, if the stories have any truth to them, profoundly influenced behavior in the present. Warriors accepted on good faith that a glorious future awaited them after death in battle that would wipe away the pain and guilt of their real-world wounds and atrocities. There was no intellect or reason here, just the reality that persuasive people and compelling stories can hold incredible sway over our visions of the future.

On the face of it, Scientology is very different from Norse mythology. It's a belief system that claims to be based on rational thinking and scientific methodology, even though these lead to some rather unconventional ideas—including the claim that humans are the manifestation of the immortal souls of an extraterrestrial race. Yet as with Valhalla, Scientology inculcates in its followers a vision of a future that transcends death, and a faith where this believed-in future deeply affects the way they live their lives in the present.

Scientology and Norse mythology are extreme examples of faith and its relationship to the future. Yet they serve as a reminder of just how deeply faith in the unknown, and often unknowable, can color our perspective on our future. Almost every religious tradition has a vision of the future

that deeply affects the way its followers live their lives. This is as true for Christian, Muslim, and Jewish traditions as it is for Hindus, Buddhists, and others. And while it's easy to dismiss faith as not fitting in with a rational view of the world, its influence on how many people see the future, and how their imagined future in turn influences them, remains profound.

But faith goes far beyond organized religion. It seems that, along with our reason, part of our common biological heritage is an ability to believe in what we don't understand or cannot prove. For instance, many people who claim they don't believe in a particular God admit that they believe in some divine being or force, or that they think there's something beyond mere mechanics that determines our future. This tendency even extends to people who describe themselves as rational thinkers, including many scientists.

Whether faith is associated with religious belief, a general sense of there being more to life than we can possibly imagine, or simply a willingness to keep an open mind, most, if not all of us, are to some extent motivated by a vision of the future that isn't proven, or even provable. This may be as simple as having faith in the value of the work we do, or as profound as believing in the importance of treating others with kindness, dignity, and respect. Either way, we all have a remarkable faculty for constructing visions of the future that rely as much on faith as they do reason.

It's almost as if, somewhere along the way, we inherited a set of traits that make us predisposed to believing in futures that we cannot say with certainty are plausible. And, truth be told, the world, and the future we strive for, are all the richer for this, especially as our ability to believe in what we cannot see is deeply intertwined with yet another human trait that transcends mere rationality: our imagination.

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IMAGINATION

In 1971, John Lennon's seminal anthem "Imagine" hit the US charts. The antithesis of a call to arms (the Vietnam War was in its sixteenth year at the time), Lennon's song exhorts listeners to imagine there is no heaven, no hell, no countries, and no religion—just "people living life in peace."

However you feel about the sentiment, Lennon's song taps into our amazing ability to imagine alternative futures. It's a talent that builds on and catalyzes our ability to learn, to reason, and to have faith in what we don't see and understand.

It's this ability to imagine a future that's different from the present that inspires us to take steps to build what doesn't yet exist. It's at the heart of our faith in a future we don't know, but that we believe could become reality. It's what inspires scientists to seek out new knowledge they imagine exists, and what drives engineers and technologists to transform theories and equations into tangible products they imagine are possible. Imagination is what allows architects to look at blueprints and see towering buildings, inventors to look at a pile of seeming odds and ends and see fantastic machines, and investors to

look at a decaying brownfield site and see smart cities and thriving communities. And, of course, imagination is what empowers artists to provide often-transformative glimpses into what might be through their work.

Of course, just as Lennon's "Imagine" is a less-than-perfect recipe for universal peace, our imagination is a less-than-perfect conduit between where we are now and the future we'd like to inherit. Our imagination enables us to be inspired by what might be, but that doesn't mean that everyone's going to be in agreement on what the future should look like and how we should get there. Sadly, there's a dark side to our imagination—torture and genocide are as much a product of it as the desire for universal happiness. And often, our imagination far outstrips what is possible. It's easy, for instance, to imagine the transporters and food replicators of *Star Trek*, or the faster-than-light travel that makes so many science fiction stories possible. But these, as with many imagined futures, lie beyond the limits of what the laws of the universe allow.

Yet, even when it strays into fantasy, our imagination enables us to construct different future possibilities. And, even if they are ultimately unreachable, it can inspire us to open up pathways to futures that, without it, would remain forever undiscovered.

But it's one thing to open up a pathway to the future, and quite another to actually take the initiative to head down

it. Our imagination may open the way to the future, but it's our curiosity that leads to us taking the first tentative steps toward it.

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CURIOSITY

On August 6, 2012, NASA's Curiosity rover landed on Mars. Although this was initially a two-year mission to explore the Gale Crater, Curiosity is still going strong in its exploration of the Red Planet.

Curiosity was aptly named. The rover captured our seemingly limitless urge to ask questions, to overturn metaphorical stones to see what's underneath, and to push the limits of what we know. It epitomizes our thirst for knowledge about what our universe is like. And it continues to capture our collective hearts as it embodies our fascination with the new and the unusual.

As an evolved trait, our curiosity makes us exceptionally resilient as a species. Curiosity is what makes us discontent with what we know, and it's what inspires us to constantly develop new knowledge—something that's vital to surviving in a dynamic environment. It's the "what-if" part of us that is fascinated by what's around the corner and where it'll take us. It's our innate curiosity that leads to us delighting in our ability to map out and understand the world we find ourselves in, and that gives us the wherewithal to navigate our way toward a future that's even better than the present.

Curiosity is what leads us to ask questions that help us connect cause and effect, and that result in new knowledge. It's what inspires to us try new things, just because we can. And it's what compels us ask "how" as we begin to see what is possible in the future, but can't quite envision the way to get there.

Of course, our curiosity can also be a liability—at least for those with more curiosity than sense. Driving blind or tasting random substances, just to see what happens, isn't the best way to approach the future, unless it's a rather abbreviated one you're looking for. And this is where curiosity without intelligence and intellect can be dangerous. Yet, without curiosity, we will never be able to work out how to get from where we are now to where we want to be, no matter how compelling our vision of the future is.

Curiosity alone, though, can't get us to the future we imagine. It prompts us to push beyond what we currently know. But as we push, we need some image, some object in our mind, that hints at what we might find there. And for this, we need to turn to a close cousin of curiosity: our creativity.

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CREATIVITY

In its 2018 *Future of Jobs Report*, the World Economic Forum stressed the need for employees to become increasingly creative if they're to ride the wave of the future. Emerging technologies and shifting global trends, the report pointed out, are altering the jobs landscape so rapidly that we all need to become more creative in how we make ourselves useful, if we're to stay ahead of the curve. In fact, creativity is now such a buzzword in business circles that it's led some to speculate that "creativity" is the new "innovation."

And yet, while most of us, I suspect, feel that creativity is important when thinking about the future, it's surprisingly hard to pin down what it is exactly.

The roots of the word "create" lie in the Latin *creare*, meaning to make, produce, or procreate. Over the years, it's become associated with the idea of producing something novel that wouldn't otherwise exist, especially when this something is the product of human imagination and ingenuity.

Building on this, creativity can be thought of as developing and using the ability to produce new ideas and objects

that have potentially greater value than the raw materials that are used to construct them. I say "potentially" as it's sometimes hard to ascertain the value of creativity, and often what is seen as being worth something by one person is dismissed by another. And yet, even with this uncertainty, there is an essence to creativity that captures the process of taking existing ideas, materials, and products, and forming something novel with them that has the capacity to reveal unique insights and open up new possibilities.

In this way, creativity has the power to help us realize new pathways toward the future. In a shifting global jobs market, for instance, it provides insights into ways in which people can realign themselves with changing needs and expectations. But in the broader context of future-building, creativity is far more than this. It's what enables us to build bridges, step by step, toward the future we aspire to.

It's this nature of creativity that makes it a particularly compelling part of our future-building toolkit. Imagination and faith can help us envisage any number of futures. Knowledge and reason help us sift out those that are plausible from those that are mere fantasy. And curiosity expands our toolkit for building the future we desire as we make new discoveries. But it's our creativity that helps us apply these tools in ways that help get us to where we are going.

In this way, our creativity is hardwired into our future. What happens next week or next year is no longer solely a product of the inevitable flow of time, or the fortuitous fluctuations of natural selection. Rather, it's influenced by our ability to create pathways that both are inspired by how we imagine the future, and lead us to futures that would not occur if the world were left to its own devices.

But creativity is more than opening up tangible pathways to the future. It's also about creating pathways within our minds that lead to imagined futures, and the weaving together of our dreams and aspirations with plausible reality. And nowhere is this more apparent than in the creative arts.

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ART

Some years ago, while I was working just off Pennsylvania Avenue in Washington, DC, I remember stumbling across a startlingly simple exhibit in the National Gallery of Art. It was a square of white fabric pinned to a wall, and it bore a striking resemblance to the handkerchief I had in my pocket. At the time, I couldn't help wondering what transformed this seemingly insignificant piece of fabric on the wall into art.

Much art, as an act of creativity, holds value that is firmly lodged in the eye of the beholder. My white fabric square (which sadly, I don't recall either the name of, or the artist responsible for) was part of a rich tradition of using common objects in uncommon contexts, to stimulate new ideas and perspectives. Such artistic creativity, while sometimes seemingly trivial, can hold a quite remarkable power to stimulate the imagination of others as it reveals ways of seeing the world that transcend the limits of what is immediately visible. And this extends through time and space to connect our creative understanding of how past, present, and future are intertwined.

Art, in all its forms, is oxygen to our creativity as we contemplate the future. It fuels our ability to imagine alternative futures, and to construct ways of building them. And it does this by enabling us to share ideas, feelings, and beliefs in ways that mere facts and figures cannot convey. Art, in a very real way, enables us to touch the minds of others, and to be, in turn, touched, as we envision and create the future together.

This "artistry" takes on an incredible diversity of forms. Realism within artistic expression helps flesh out visions of future possibilities that are easy to make sense of, and can make tangible what was previously ephemeral. Where artistic expression is more abstract, it forces us to see and experience the world and our place in it differently, by kicking us out of the rut of conventional thinking. And it feeds our imagination by providing us with a tantalizing glimpse of the future, while leaving our minds to fill in the gaps.

Looking back, I'm intrigued that, even though I struggled to make sense of the white square of fabric hanging in the National Gallery that day, the memory stuck with me, and eventually became grist to my thoughts here on the relationship between art and the future. In the same way, art of every conceivable form can act as a surprisingly powerful catalyst for our imagination as we contemplate the future, and a stimulant that feeds and nurtures our own future-oriented creativity.

As art fuels our creativity, it's capable of revealing insights into the consequences of our actions in ways that transcend rational analysis. As it taps into our emotions and instinct, it complements and extends our intellect as we peer into the future. It inspires us to stretch our imagination, and it fills us with hope for what might be. Yet it also reveals the darker side of what possibly lies beyond the veil of the present. And as it does, it has the power to invoke that most visceral of responses: fear.


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PART 3

BUILDING THE FUTURE

"Tomorrow belongs to those who can hear it coming."

—David Bowie

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COMPLEXITY

On July 31, 2012, one of the largest blackouts in history swept across North India. It started as a single power line in the state of Madhya Pradesh became overloaded and tripped. Within minutes, the disruption had spread through the electrical grid, as system after system struggled and failed to pick up the slack. In the ensuing chaos, over six hundred million people found themselves temporarily facing a future without power.

While power outages are not uncommon in India, the sheer number of people affected by the 2012 blackout is a testament to the unpredictability of complex systems such as power supply grids. As with many such networks, North India's system depends on maintaining a fine balancing act between supply and demand, as unpredictable expectations push a complex web of generating stations, transmission lines, and distribution networks to the limit. And, like all complex systems, the line between normal operations and failure is devilishly hard to spot.

Unlike the predictability of, say, tossing a ball, complex systems are defined in part by their unpredictability. Complexity tangles the threads between cause and effect

to such an extent that some future effects simply cannot be predicted, even if we know everything we think we need to know about the causes we believe contribute to them. Despite the future being the result of cause and effect, complexity conspires to obscure our view of the pathways between them.

For a species that has learned to transcend its evolutionary roots through mastering the links between cause and effect, this is a rude awakening. It goes against everything we've come to understand about how we're connected to the future, and how we can design and engineer it.

It was the mathematician and meteorologist Edward Lorenz who provided some of the earliest insights into complex systems and their sometimes chaotic nature. Lorenz was fascinated with predicting the weather, and fervently believed that, with enough data, this should be possible. After all, it was just physics. Yet the more he tried to model trends in weather patterns, the more he realized that seemingly insignificant variations in his starting conditions led to profoundly different outcomes. Try as he might, he simply could not draw a straight line between initial causes and final effects.

This apparent disconnect is popularly known as the butterfly effect, after the idea that the flapping of a butterfly's wings on one side of the world can lead to a chain of events that results in a tornado on the other. This

is something of an exaggeration, but we now know that the more complex a dynamic system is, the harder it becomes to predict the outcomes of seemingly insignificant chains of events. And at some point, it becomes impossible to predict what the future will look like, despite our best efforts to design, engineer, or hack it.

Of course, there remains a lot that we can predict. We can predict where and when the sun will rise, and the flow of the seasons. We're able to predict the likely outcomes of unhealthy eating and drinking habits, or the consequences of not vaccinating large numbers of people. And we can predict—in broad terms at least—how human activities are adversely impacting the environment. These are all possible because of our unique combination of reason, imagination, and inventiveness. But it's in the details that the devil of complexity hides. The more precise we try to be with our predictions of the future, the less likely they are to be accurate. And in some cases, irrespective of how much we think we know, complexity results in a future that utterly confounds us.

The danger, of course, is that we become so enamored with our brilliance that we choose to overlook this, and act as if the future is something we can fully control.

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HUBRIS

In 2003, the then-director of the US National Cancer Institute, Andrew von Eschenbach, announced an ambitious plan to eliminate cancer by 2015. It was the latest step in a US War on Cancer launched in 1971 by President Nixon. 2015 came and went without von Eschenbach's vision coming to pass. And by 2016, the rhetoric had shifted, as President Obama launched a less time-constrained "national 'Moonshot' initiative to eliminate cancer as we know it."

Cancer is a vicious killer and destroyer of human lives. In 2018, there were an estimated 9.6 million deaths from cancer around the world, with around 17 million new cases of the disease appearing annually. It's not the top cause of death—cardiovascular disease still holds pole position here—but it is one of the hardest to come to terms with. And as a result, it's not surprising that eliminating cancer is a top priority for scientists, politicians, medical professionals, and many others.

Yet, while detection and treatment technologies have advanced considerably in recent years, the global burden

of cancer on society isn't decreasing nearly as fast as many people once believed it would.

If the War on Cancer has taught us anything, it's that our biology is far more complex than we originally thought, and that easy fixes to complex problems are often elusive. Driven by the hubris of believing that, if only we understand how cancer works, we can fix it, we've learned the hard way that we don't have the ability to find solutions to every problem. Just because we are smart and can imagine a future that's different from the present, doesn't mean that it's automatically within our grasp to achieve.

Of course, vision and ambition are important in building the future. We may only see through a glass darkly in the present, but it's our belief that we can build a better future *despite this* that often keeps us going. Our excessive self-confidence is what inspires us to achieve more than sometimes seems possible, whether we're focused on curing cancer, eliminating poverty, or establishing communities on Mars. Our hubris pushes us forward to take small but important steps toward building the future we want, even if the ultimate vision remains elusive.

And yet, because of the unpredictable connections between cause and effect, there's a danger that we become too wrapped up in hubris, and allow our pride to blind us to the realities of what's possible and what is not.

Hubris, if we're not careful, leads to false hope. It tempts us to promise what isn't within our power to deliver, and it encourages belief in the absence of evidence. And the danger is that, when hubris fails to deliver, hope too easily turns to doubt and despondency.

The future is slippery. It can be elusive and unpredictable, and it often doesn't align with what we plan. Without care, hubris becomes a bait-and-switch where we're tempted to make a material and emotional investment that is never going to pay off.

There's also the risk of unintended consequences, as hubris blinds us to thinking critically about what might go wrong as we strive to build the future we desire. It's easy to believe that, with enough time and investment, science and technology can transform any imagined future into reality. It's inspiring, motivating, and exhilarating to be at the cutting edge of ideas that we know with absolute certainty are going to solve the world's problems. Yet such naive myopia too often ends up causing a trail of destruction as the hidden consequences of such hubris reveal themselves. And nowhere is this more apparent than when hubris tips over into delusion.

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DELUSION

In April 2018, Mike Hughes launched himself over five hundred meters into the air while strapped to a homemade rocket. His mission: to prove that the world is flat.

Hughes had a very clear and particular vision of the future. It was one where he debunked over two thousand years of knowledge, and demonstrated once and for all that the world is indeed flat. Sadly, no amount of wishful thinking is going to change the reality that he was wrong. But you have to admire his dedication, even though it was eventually his undoing. Sadly, Mike was killed in a failed rocket launch on February 22, 2020.

Delusion is a particularly intriguing aspect of the human psyche. It has a lot in common with hubris in that it enables us to believe fervently in a future that isn't overly concerned with reality. It draws on our capacity for imagination and creativity, and our ability to use our intellect to fill voids in our understanding with whatever best fits our dreams. And, while it's easy to criticize the specks of delusion caught in the eyes of others, it's often much harder to see the log sticking out of our own—because no matter how reasonable

we think we are, each of us has our own delusions about the future.

For most of us, these delusions don't rise to the level of those entertained by flat-earthers. And yet we're biologically predisposed to create mental models of the world we live in, and the future we're building, that don't always match reality. There are even indications that the smarter we are, the better we are at justifying our beliefs *in spite* of evidence to the contrary.

Of course, the line between inspired imagination and delusion is preciously thin. Our power to change what's coming down the pike arises from our ability to imagine futures that are different from the present. Yet, when our imagination becomes separated from reality, it slips comfortably into the realm of fantasy.

Ironically, ungrounded beliefs can still have a profound impact on our future. Believing fervently that you can fly, or that you're invincible, is likely to lead rather rapidly to a future with a "you-shaped hole" in it. More insidiously, a belief that vaccines are highly dangerous, or that homeopathic remedies can cure cancer, or that climate change has nothing to do with human activities, can all deeply impact the future we inherit. What we learn from delusion is that it's not always what we *know* that leads to actions that influence the future, but what we *think* we know, or what we *perceive* to be true, that matters.

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PERCEPTION

There's a saying among people who study risk that perception is everything.

This is, of course, strictly speaking, not true. No matter how much you fear flying, it isn't going to affect the likelihood of a crash (unless you're the pilot, of course). Likewise, phobias tend to reflect a disconnect between a fear of something—spiders for instance, or open spaces—and the likelihood of them causing physical harm.

And yet, the decisions we make in the present are ultimately based on how we imagine the future to be, and this in turn is colored by how our wonderfully complex, and most definitely flawed brains, perceive the present.

We are constantly creating maps in our minds that describe where we are now, and where we could be a few steps into the future. These maps are built up from signals and inputs from the world around us—what we see, what we hear, and what we perceive to be real and true. In our heads, these maps draw on what we know. And where there are gaps in our knowledge and understanding, our imagination and creativity fill them in.

As a result, we instinctively create a vision in our mind of what our world may look like in the future. As we do so, we make calculated guesses as to whether this future is likely to cause us pain or pleasure, and we take action to avoid the one while embracing the other. In this way, our perceptions color how we think about and move toward the future. And sometimes, they lead to us getting things wrong.

Perception can be a life-saver as it alerts us to impending dangers, but it can also fool us into thinking things are risky that are, in fact, not. Perception affects how we respond to situations that look dangerous. It's what leads to us favoring products that we believe are safer, irrespective of the evidence. And it underpins who we choose to trust and who we decide not to.

Because of this, our ability to design and build a better future depends on how able we are to recognize when our perceptions diverge from reality, and to correct our course when they do. This is possible, but it takes awareness and discipline. And, just to make things more difficult, we live in a world where it seems increasingly easy to be deceived into believing that our perceptions of reality are, in fact, valid—even when they're not.

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DECEPTION

How we perceive the future, and how we envision the various pathways toward it, depends to a large extent on the information we have at our disposal in the present. We develop our mental models of the future based on what we've experienced and what we've witnessed, along with what we've been told, what we trust, and what we believe to be true.

But what if the reality we're building our future aspirations around is, in fact, a fake?

The art of deception has a long, if not necessarily illustrious, history. Ever since we've been able to make use of our imagination and creativity, we've been weaving alternative visions of reality that are intended to fool others. Con artists, marketers, politicians, sociopaths—they all depend on playing to our limitations as they persuade us to buy into a future that serves their purposes, but not necessarily ours.

These are the masters of deception, the "fake future" artists, and they are good at their trade. Thankfully, most of us have a finely tuned antenna for spotting deceptions. However, technology is beginning to challenge this.

Over the past couple of years, there's been growing concern over so-called "deepfakes." These are manufactured videos of people saying and doing things that are so realistic they're all but indistinguishable from the real thing—apart from the content.

Despite the increasing use of photorealistic computer-generated imagery in movies, we tend to trust video from sources like news feeds, bodycams, or even smartphones. We inherently accept that these inform us of the truth of the present, and the pathways we need to take to navigate to a better tomorrow. But if these trusted sources of information become corrupt, where does this leave our visions of the future?

Of course, a video of a politician behaving out of character is a dead giveaway that there's probably a faker behind it. But how about deep fakes that so incense or enamor us that our "fake-o-meter" simply doesn't kick in? Just how vulnerable are we to having our perceptions of the future clouded by fake videos of protesters, for instance, or police brutality, or even terrorist activity? Where our minds are primed to believe we're heading for a dystopian future that's going to take radical action to avoid, how susceptible do we become to deepfakers who are intent on nudging our vision of the future toward one where they are the ultimate beneficiaries?

The hope is that we learn to inoculate ourselves against such fakes, including using techniques like seeking out multiple sources of information before jumping to convenient conclusions. Yet even with these precautions, deceptions are a growing part of a broader landscape of challenges that threaten our relationship with the future we aspire to.

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CHANGE

Change is the lifeblood of our existence. It governs the planet we live on. It marks the passage of our lives from conception to death. Change is at the heart of innovation and invention, and of learning and growth. It permeates our imagination and creativity. And it is indelibly woven into our deepest hopes and aspirations.

Change is simultaneously a medium we travel through, a force we reckon with, and a doorway to untold opportunities. If we were left to the whims of change, our history as a species would be very different. Over millennia, however, humans have learned how to understand and predict change, and use it to their advantage. And nowhere is this clearer than in the discovery of the mathematics of small differences, better known as calculus.

Truth be told, calculus, for most people, is at best an irrelevance, and at worst, part of their tortuous and seemingly unnecessary rite of passage between grade school and what lies beyond. And yet it's sobering to think that, without calculus, few if any of the innovations we now rely on would have been possible. The cars we drive, the clothes we wear, the food we eat, the electricity that powers our

homes, and so on—none of these would be possible without this branch of mathematics.

Calculus gives us the mathematical and scientific tools to work with differences. These may be differences associated with the shapes and contours that define the three-dimensional world we live in. But where these differences involve time, calculus becomes part of a powerful mathematical language of change, and one that enables scientists, engineers, economists, artists, and many others to understand and use the transition from past to future to their advantage.

Perhaps not surprisingly, this is a far-from-perfect language, as our lives are defined by more than mathematics alone. And yet it's one that has enabled humanity to take huge strides in overcoming the uncertainty of being adrift and rudderless in a vast and unending sea of change.

Thankfully, and despite this, not everyone needs an advanced degree in calculus to thrive in the modern world. But when we collectively set out to design pathways toward the future we hope for, this ability to understand, model, and work with change is pivotal to our success.

Using the mathematics and science of change, it becomes possible to get a sense of where observed trends and trajectories are heading, and where they're likely to speed up, slow down, stay steady, or die out. The same science and math help identify impending dangers, as change threatens

to take away what we value. They also play a crucial role in building resiliency and agility in the face of change as we work toward building a better future.

Of course, these admittedly powerful ways of understanding and utilizing change have their limitations—the future is, after all, a journey into the unknown, and complexity and uncertainty can confound even the most sophisticated of predictions. And yet, when tempered with humility and guided by our humanity, our technical mastery of change can help set boundaries around what we don't know or cannot predict, and it can reveal pitfalls that may otherwise deeply harm us on our way.

As we stand on the edge of tomorrow and look out toward an uncertain future, this ability is becoming more important than ever as we chart our way across an increasingly turbulent sea of change. And yet, for all the power that our fluency in the language of change endows us with, it's worthless if we don't have a clear eye on where we're heading, and why—especially as the world we live in comes under increasing stress from the demands we make of it.


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PART 4

THE EDGE OF TOMORROW

"...there's no single answer that will solve all of our future problems. There's no magic bullet. Instead there are thousands of answers—at least. You can be one of them if you choose to be."

—Octavia Butler

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LIFE

The cosmologist, writer, and science popularizer Carl Sagan is famously credited with observing that "The universe is a pretty big place. If it's just us, it seems like an awful waste of space."

Sagan was right, of course, if life, and intelligent life in particular, are the inevitable expression of the driving forces behind the universe's progression from past to future. While we still don't know if we're alone or not, the more we discover about our neighboring planets and moons—including the existence of Earth-like planets in other solar systems—the more likely it becomes that we'll find evidence of life elsewhere.

When we do, though, it's not clear how this will disrupt our visions of the future, and the pathways we're building to get there.

Our visions of extraterrestrial life, and how its discovery might potentially impact us, are ultimately constrained by what we know. Just a few decades ago, we knew next to nothing about the possibility of alien life existing, and so we filled the void in our heads with fantastical ideas. These

fantasies colored our visions of the future, but not to the extent that they substantially influenced our actions in the present—at least, not for most people.

Then, scientists began to discover that some terrestrial organisms can thrive under seemingly impossible conditions. These are the "extremophiles"—organisms that can survive around hot thermal vents, in lakes buried far under the Antarctic ice, or even deep in the Earth's crust. Researchers then started to find evidence of astronomical objects that could potentially harbor their own forms of such extremophiles. We began to detect traces of chemicals that could be the precursors of life, far beyond the limits of the Earth. And we started to find planet after planet in the galaxy that could, in principle, support the emergence of life not too dissimilar from that found here.

As a result, in just a few short years, the chances of us discovering life elsewhere have shot from being highly unlikely to looking increasingly probable. And with our changing perspective, our ideas about the future, and how it in turn defines and guides us in the present, have begun to shift.

Sadly, the chances of us discovering intelligent life that didn't originate on Earth are remote—not because it's not there, but because, in the vastness of the universe, the likelihood of our paths crossing is infinitesimally small. And yet, as scientific efforts to detect evidence of

extraterrestrial life in the solar system ramp up, there's a growing possibility that, in the coming decades, we'll discover that we're not the only place in the universe where life has existed.

Whether this will shatter our preconceptions of the future and cause us to rebuild them in new and intriguing ways, or lead to us simply hunkering down in the comfortable but increasingly erroneous stories we tell ourselves about how unique and special we are, remains to be seen. But as we probe our planetary neighborhood and look to distant galaxies and beyond, we're likely to find something that, one way or another, profoundly challenges how we think about the future.

Yet as we embark on this grand adventure, there is another search for "alien" life that is going on, and one that could impact our vision of the future just as profoundly as if we discovered the existence of extraterrestrial organisms. And this is the quest to create, through our own ingenuity, the first completely artificial life forms here on Earth.

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HUMANITY

For most of us, our vision of the future is uniquely human. It's driven by the skills, attributes, and perspectives we've evolved to be capable of, and it's intimately connected to who we think we are, and who we aspire to be. And yet, what it means to be human, or to be imbued with "personhood," is surprisingly elusive. In the words of author John Green, "the deeper I dig, the harder it becomes to understand what makes people, people."

Biologically, we're merely a by-product of a constantly evolving environment. And genetically, we're not that different from many other organisms. But of course, it's the differences, deceptively small as they may seem, that help define us as a unique species.

These differences have led to us emerging as animals with an exquisite sense of the future. More than any other organism living on Earth, we are capable of imagining a future that's different from the past, and actively charting a way toward it.

Humans are, in a very real sense, architects of the future. We live in a present that is dominated by our perception

of the future and what it might hold. Our every action is determined by what's coming down the pike, and how we can ensure that it's good for us—often, it has to be said, to the detriment of other people and other organisms. Despite our future-oriented ambitions, we're also short-sighted.

Of course, we're not the only evolved organisms that can anticipate and respond to the future. But we've taken it to a level beyond anything seen anywhere else. Through our intellect, our creativity, and our ability to innovate, we are crafting new technologies, new societies, and new worlds. We're on the cusp of designing new organisms, even brand-new forms of biology. And if we crack artificial intelligence, we could be heading toward designing a future in which we are, for all of our capabilities, redundant.

This in-built ability to envision the future, combined with a compelling desire to change it, is part and parcel of what it means to be human. And yet it's only part of the story. Our humanness extends to less tangible qualities that include how we feel and how we behave toward others. And sadly, it includes a tendency to exclude from the future that we're building those we consider to be in some way less valid, less entitled, even less "human" than us.

Up to now in this exploration of the future, I've been rather loose with the term "we." I've implicitly assumed that there's a homogeneous "we," where "we're" building a future that "we" will all benefit from as "we" work together to make

it so. And yet, the reality is that the "we" of humanity encompasses a diverse collection of individuals who all have their own ideas of what the future should look like. And the danger is that, as we come into conflict with those who threaten our particular vision of the future, we delegitimize their claim by undermining the very validity of their humanity.

This is a particularly ugly and insidious part of being human. It draws a tight circle around our conception of "we" that conveniently excludes those who don't look and think like us, or don't share our views and our visions, or who otherwise threaten what we value—whether that's our worldview, or our greed for a future that's just about us and our desires.

This is a deeply selfish and destructive approach to building the future. Instead, we should be striving for this "we" to be as big and inclusive as possible. And we should be collectively building a future where everyone has the right to thrive, as long as in doing so, they don't deprive others of this selfsame right.

Here, I deeply appreciate John Green's perspective when he says, "I believe that when we acknowledge each others' consciousness and complexity we lead better lives, and feel less alone in our grief and in our joy...I believe that we're human because we believe in each other's humanness and because we can listen and we can work together to alleviate

each other's suffering. And in that sense I guess that being human is both something that we are and something that we must always aspire to be."

This is a vision that inspires us to build a future that's inclusive, that puts others first, and that is designed for the benefit of the many, not just the few. It's one that opens the door to understanding what it means to be human and to have "personhood" long after we've outgrown the constraints of our biological heritage. And it gets us thinking about the *why* of future-building, as well as the *how*.

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MORALITY

Wouldn't it be nice to think that, if only we tried hard enough, we could create a utopian future where everyone has what they want? Sadly, the laws of time, motion, and human idiosyncrasy mean we're committed to a future where someone, somewhere, is not going to be happy.

Just as we can't be everything to everyone in our personal relationships, we cannot design and build a future that fits everyone's idea of what it should be like. One of the ways we collectively cope with this is to develop a sense of norms and expectations around what a shared "minimum viable product" of a future might look like. These are often self-defined rules that establish what we think of as "good" or "right," versus "bad" or "wrong."

Naturally, because we're a hot mess of social instincts and individual desires, we struggle to agree on a basic set of morals that collectively guide us in designing and crafting the future. We even disagree on the very essence of what morals are in some cases. And yet despite this, there are widely agreed-on morals-based design principles that help guide how we think about the future, and our obligations to it.

For instance, we tend to collectively share a sense that killing or maiming others is probably bad, and that children are precious. And we have a tendency to believe it's important to be kind and caring, and to help others less fortunate than ourselves—as long as it doesn't cost us too much in return.

Most of us also have a deeply ingrained sense of justice. Sadly, this more often than not kicks in when it's someone else who seems to be getting something we think they don't deserve at our expense. But as a species, we have a surprising capacity to be moved and motivated by the injustices we see others experiencing.

These tendencies coalesce into moral frameworks that help guide our decisions around future-building. And as they do, they help add meaning to our actions and aspirations.

Our individual and collective morals act as a set of principles to help guide us as we translate our imagined futures into reality. And they help us feel okay (or at least virtuous) if the future we end up with isn't quite the one we hoped for. They also set the ground rules for punishing those who don't play along, and marginalizing and penalizing those we fear have a vision of the future that is dangerously out of step with the majority's. Sadly, our morality isn't always what it should be.

But our morals merely establish our principles for future-building. When it comes to converting these into actions, we need to turn to ethics.

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STEWARDSHIP

I don't often tear up when attending conferences. Of course, viewing tear-jerker movies on the flights there and back is another matter entirely—I remember John Green's *The Fault in Our Stars* having me in floods on a flight when it first came out. But conferences? Not so much. Yet I couldn't help myself while attending a panel discussion on the last morning of the 2011 World Economic Forum Annual Meeting in Davos.

The panel was chaired by the Forum's founder Klaus Schwab, and included the then-French Minister of Economy, Finance and Industry, Christine Lagarde, together with three remarkable young people: Nick Vujicic, Raquel Helen Silva, and Daniel Joshua Cullum. The topic of the session was inspiration. But what it indelibly left me with was a deeper appreciation of what it truly means to be a steward of the future.

As the panelists spoke of their experiences and perspectives, they painted a picture of the future where each and every one of us has the responsibility to inspire others and add value to their lives. But what moved me was that these weren't just platitudes. Each member of the panel had

grappled with hardship in some way, and had come through with a greater sense of what they had to give to others. And I have to confess that what tipped me over the edge was how profoundly the selflessness of the three young people on the panel affected their audience—including Schwab and Lagarde.

I still think about that panel as I consider the future and our collective responsibility to it. None of us has to be a steward of the future. There's no universal law that says we can't be selfish—although there are always consequences to our actions. And yet, whether through some random quirk of the universe, or by some inscrutable divine intervention, we've been given the gift of being able, not only to imagine and design the future, but to take joy from building a future that values, nurtures, and celebrates others. We have a profound ability to give to others around us, and even to generations to come. And as a result, we are, by design, stewards of the future.

What remains unclear, however, is whether we have what it takes to be *good* stewards.

Sometimes, the evidence is dispiriting. Selfishness and short-term gains all too easily seem to supplant our ability to envisage, care for, and nurture distant futures. And as our ability to alter the future becomes more powerful, there is a worryingly large gap emerging between what we can do, and what we should be doing. This gap has already

led to widespread pollution and global warming, and is exacerbating social evils in the name of progress around the world. And it's a gap that too often seems to defy our best efforts to invest in the future and its well-being.

And yet, looking back to that 2011 panel in a snowy Alpine town, I'm filled with hope. If the upcoming generation can imagine a different pathway forward, and inspire a room of hardened global movers and shakers to tear up as they do, there's surely still a chance for us all to learn how to be good stewards of the future as, together, we learn to build something that is better than the present.

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FUTURERISE

On December 24, 1968, William Anders's *Earthrise* galvanized a generation into thinking differently about the future. It made us realize how precious and fragile this planet we live on is, and what a profound responsibility we have to its future and the futures of those who inherit it. And yet, half a century on, we face more challenges than ever as we struggle to reconcile our actions with their future consequences. At the same time, we have a greater ability than ever before to not only envision a better future, but to work together to make it so.

As we grapple with this growing tension, what will be the equivalent of this generation's *Earthrise*? What vision will inspire us to leave the ruts of narrow-mindedness and selfish short-termism, and strive together to build a better future? What imagined "object" will show us the way to becoming what we can be, rather than being resigned to what we assume is inevitable?

It may be images associated with disaster that motivate us to take action: nuclear war, a devastating pandemic, or the collapse of social order. Or it could be game-changing breakthroughs in technology, perhaps the emergence of true

artificial intelligence, or mastery over our genetic heritage. It could even be awe-inspiring images associated with our exploration of space, or visions of increasingly powerful spacecraft lifting off on missions to Mars and beyond.

Perhaps we're looking at a future where we need multiple equivalents of *Earthrise* to inspire us. Or maybe we need to be reinspired by that image of Earth rising above the horizon of the moon, and consider afresh the perils and possibilities in front of us.

As our space-facing technologies improve, there are plans afoot to send humans back to the moon and establish a permanent base there. As we do, we'll have another chance to look back on Earth from our celestial neighbor, and once again marvel at the beautiful, complex pale blue dot we live on. And as we look back on where we've come from, maybe we'll be inspired afresh to imagine what this precious Earth will be like fifty years from now, and how we can work together to achieve it.

From this future moon station, and maybe one day the red planet of Mars, we'll once again look out and see our future as a pale blue object, full of potential, hovering above the horizon of possibility. And as we contemplate this "futurerise," we'll renew our vows to generations to come, and the future they stand to inherit.


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AFTERWORD

Despite our best efforts, the future will likely always remain intangible, ephemeral, constantly beyond our grasp. And yet, on this journey into what the future is and how we might think about it, I've found myself at times surprised, delighted, and humbled. There have been moments of serendipity as I realized just how deep the connections are between the way the universe works and how we feel about the future. And there's been a gnawing worry that our growing ability to mold and change the future continues to exceed our understanding of how to do this responsibly.

There's also been hope. When seen from the perspective of something that we can imagine, aspire to, and begin to design, the future reveals what exquisite and astonishing creatures we are. The fact that we can break away from the constraints of time's arrow and create a tomorrow that is different from today is quite astounding. Add to this our sense of justice and responsibility, our capacity to empathize with others, and our growing ability to map a course between what we know and what we imagine could be, and it becomes clear that we have the means to build a future that far exceeds the limitations of the present.

What hangs in the balance is whether we have the will to embrace this path forward.

The irony is that, while the universe conspired to create the conditions that led to the emergence of intelligent and visionary humans, it doesn't need us when all's said and done. We could be wiped out tomorrow, and there would still be a future—it just wouldn't be one that involved people. The universe doesn't care if we squander the talents we've been given—we're an aberration, a fortuitous but ultimately insignificant blip—in the grand scheme of things. But we *should* care. We've been given the gift of being the architects of our own future. And because of this, we have a responsibility to ourselves, and to future generations, to learn our trade and to build the best possible future we can imagine.

Whether we will collectively rise to this challenge remains to be seen. But for the future we have the potential to build together, I hope with all my heart that we do.

EMBARK ON A JOURNEY INTO THE FUTURE

The future holds a unique fascination for most of us. Simultaneously unknowable yet strangely malleable, it saturates our lives as completely as the air we breathe. Yet how many of us can truly say that we understand what the future is, and how we're connected to it?

In *Future Rising,* Andrew Maynard takes you on a remarkable journey from the Big Bang to our collective responsibility to future generations. Weaving together ideas and insights from science, philosophy, art, and more, *Future Rising* traces a pathway along the emergence of intelligent life, through what makes us uniquely capable of imagining and creating different futures, to the profound challenges and opportunities that come with this. Through sixty short reflections, *Future Rising* reveals a compelling vision of the future and how it impacts our lives. Beguiling, serendipitous, often startling, and ultimately life-affirming, *Future Rising* will change how you think about the future and your relationship with it.

"Andrew Maynard implores the reader to understand our relationship to technology and plan ahead so that when the future rises to meet us, we are prepared to make it a future of which we can be proud."

—**Dr. Kelly Weinersmith**, coauthor of *Soonish*

"Taking the reader on a journey through time, space, and the human experience, *Future Rising* makes you think about our responsibility to the future of our species and our planet in a refreshing way without a complete 'doom and gloom' lens that so many futurism tales can take."

—**Dr. Tanya Harrison**, coauthor of *For All Humankind*

"*Future Rising* explores topics ranging from art and creativity to memory, intelligence and potential threats ahead in a series of short essays. This book could easily be enjoyed in short bursts, but more likely, readers won't be able to put it down once they start."

—**Ramona Pringle**, Director of Creative Innovation Studio and Associate Professor, Ryerson University

Andrew Maynard,
author of *Films from the Future*

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