
Growing Out of the Past as a Seed for the Future

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Introduction of Hope

The above indication of the year (02018) is not flawed. It tests the possible effect of denoting years not in thousands, but in tens of thousands, in that way indirectly installing a potential hope for imagining a future much further away than we usually tend to think about.

Long-term thinking is an infrequent human activity. Making long-term plans may even seem unrealistic, if not naïve, since so much could be forever changing the initial conditions in ways that render long-term thinking immediately futile at the outset. The paleontologist, Stephen Jay Gould, has claimed about biological evolution that if you were to replay the tape of the last billion years of life on earth, you would be staggeringly unlikely to see the same creatures, including *Homo sapiens*, emerge in just the same way. And from chaos theory, we know that by changing the initial conditions in a complex and unstable system, the subsequent evolution would differ exponentially from current evolutions just with slight changes in the conditions. So, we cannot be confident when considering the future of the earth itself.

Humans are now technologically advanced enough to be able to create not only extraordinary wonders but also civilization-scale problems. Nuclear war and climate challenges are among the riskiest problems facing us right now. And even if nuclear war is not very likely to occur, its consequences would be grave if it did happen. Living in this new geological epoch of the Anthropocene, following the previous Holocene epoch, there seems to be an acute need for more long-term thinkers. I do not claim to be one

of them. But a recruitment of skilled long-term thinkers seems essential to retain hope about the near and distant future. Or perhaps, rather, we need skilled *long-term agents*, displaying real agency on behalf of our future, instead of merely thinking about it—as I do. Notwithstanding, this is a brief review of the concept of long-term thinking.

A group of futurists, or at least future-oriented people, have already entered this field, namely the Long Now Foundation, fostering long-term thinking as their main mission.¹ I discovered this organization late one night when I felt a sudden urge to go ahead and establish a long-term institute, or at least to somehow summon a cohort of like-minded people in a common endeavor to emancipate from the chains of short-term political frameworks of voting cycles, opportunistic behavior, power sickness and other types of infertile megalomania that hamper efforts to make necessary, long-lasting (even if perhaps unpopular) decisions in favor of the long-term viability of humanity and (or rather in) nature. It is vital that we can retain hope of the future.

The future is already here. It is just unevenly distributed.

—William Gibson (allegedly)²

Scaling Long-Term Thinking

Making strategic road maps has long been a part of business strategizing. Failing to plan on the long term in your business has been compared by business strategists to jumping into your car for a long trip without a road map. However, this is old wine in new bottles. Visualizing what actions are needed to help a company achieve its long-term goals for success is already a somewhat antiquated art form of formulating visions, values, critical goals, strategies, tactics, potential roadblocks,

and milestones and then working backwards to implement the strategy in practice. Most people have heard about it all before in one formulation or the other. And business strategists can still make money on facilitating company managers' processes of fantasizing about their favorite future business scenario or utopia. Facilitating long-term thinking has long been a consultancy industry. So, there is a need, it seems. And I respect that. But the long-term scale at hand is often rather limited, in fact. So, what, then, is an appropriate scale?

After all, in the very long term, planet earth will just be evaporated, ". . . with its legacy being a small addition to the heavy element supply of the solar photosphere," approximately 7 billion years from now.³ Or even on a cosmological scale, Bertrand Russell has put the end of life this way: "All the labors of the ages, all the devotion, all the inspiration, all the noonday brightness of human genius, are destined to extinction . . . The whole temple of Man's achievement must inevitably be buried beneath the debris of a universe in ruins."⁴ These time scales do not convey much future hope in this seemingly purposeless universe, so let's change the scale, but keep focusing on the long term.

A reasonable perspective for a long-term temporal setting could be 200,000 years from now, based on the advent of *Homo sapiens* ca. 200,000 years prior to today. Or perhaps 70,000 years is a better time range, since the extant modern humans, the subspecies *Homo sapiens sapiens*, have populated the globe for 70,000 years. The burning question then is if, or how, the subspecies will continue to populate the earth for the next 70,000 years, or if this subspecies is standing on the edge of transformation within a foreseeable future in the earliest stages of the Anthropocene. The first civilization emerged around 4,000-3,500 BC when the Sumerians developed the world's first civilization of Mesopotamia.

Agriculture was a game-changer in human politics, because it "required a sedentary life and allowed for a more stable flow of calories, thereby sustaining a larger population."⁵ Thus, there were the prerequisites for the emergence of mass politics. Anthropologists have even argued how the emergence of agriculture "set an autocatalytic process in motion, where increased population sizes led to the emergence of states in order to increase control and establish order."⁶ So, the emergence of states and mass politics is a very recent phenomenon, even compared to the emergence of agriculture. The first states emerged around 5,000 years ago, and the territories of almost 35% of modern countries were stateless until 250 years ago. "Compared to the previous 1.8 million years of evolution within small-scale groups, mass politics has only been with our species for a fleeting moment."⁷ Perhaps this established fact from the evolutionary psychology of politics calls for some optimism on behalf of the future of humanity, but not necessarily on behalf of the future of our environment.

Destruction of Hope

One very disheartening visualization of the state of the human race on earth is an analogy of bacteria in a petri dish, as presented by planetary scientist Carolyn Porco (referring to a conversation with a pessimistic peer). It simply states that we humans are 7 billion bacteria, earth is the agar in the petri dish, and the bacteria have already reached the edge of the dish.⁸ In other words: It is too late; it is utterly hopeless, and we might as well give up and enjoy life as best we can, while we still have it, a few generations further. One may feel a sense of loss or hopelessness when rejecting long-term perspectives. But in numerous situations, long-term planning could possibly be the only way forward. Notwithstanding, despite intuitive or rational reasons for attempting to plan on a time-

scale of events temporally distant from present circumstances, the attempt often fails. The obvious reason for this is that most people find long-term thinking to be a difficult, un-worldly, utopian, far-fetched and even flawed approach when it comes to solving the problems of today, even though acting on behalf of the long term is often the best argument for caring for the future of humanity.

One obvious example of the necessity of long-term thinking is the geo-political climate-change challenge at hand. Despite climate changes being very real to billions of people, and despite scientifically sound consensus that climate change is, at least partly, affected by human activity on the surface of the globe (one of the nine planetary boundaries discussed below) and indeed happening,⁹ numerous factions work against all sorts of inconvenient long-term-planning consequences that will indeed affect daily life and present-world economy and politics negatively, hence resulting in a standstill. And ultimately, the complete lack of action from the elected world leaders, meeting on a regular basis at the long list of international climate conferences, results in very limited and insufficient impact on the near and far future and hence on the likelihood of our great-grandchildren having a prosperous life like many of us have enjoyed effortlessly.

In 2009, 29 prominent research leaders attempted to define the boundaries of the degree of human influence on earth's natural systems, and nine so-called planetary boundaries were singled out as most prominent. Out of these, three thresholds were already surpassed in 2009. Today, 9 years later, four of the nine boundaries have reached that zone of uncertainty and increasing risk.¹⁰ Objectively speaking, this should be rather disheartening to everyone. So, how can we keep being hopeful? Is it likely that we can

manage to act on behalf of the long-term perspectives of our actions after slamming the door to the Holocene and all entering the Anthropocene?

Interestingly, one planetary boundary was, in fact, crossed already in the early 1980s: the stratospheric ozone depletion. I vividly remember my anxious elementary school report on the global ozone problem that seemed impossible to handle. But humanity did manage to come back from that one. This shows that we are (or at least were), in fact, able to cross a boundary and then take collective global action to address the problem.¹¹ This is a good example of one seed of hope that could ultimately lead to a “good Anthropocene.”¹²

More generally, the idea of natural ecosystems has made it difficult to see humans as anything but standing in the way of nature, by destroying things. The limnologist and marine scientist Elena Bennett appeals to shifting to a new way of thinking where people become part of a biosphere, where there are not *ecosystems* and *social systems*, but *social-ecological systems* of people and nature. If we do not integrate this shift to our thinking, we will most likely affect the planet's stability in an even more threatening direction. The question is how can we integrate people and nature to become more intertwined? If we think of ourselves as outside of the system, our goal is just to get out of the way. This is not feasible. We are too many, and our global impact is too dramatic to just get out of the way by, e.g., making larger and larger nature conservation habitats or national parks. The burning issue is to answer the question of how to move forward and act in order to retain hope and agency.

Long-Term Acting

The story of Amazon CEO Jeff Bezos' obsession with longevity, and his project of

carving a hole in one of the mountainsides of the Nevada desert to build a 10,000-year chronometer—spending \$42 million of his own savings, needless to say, is an interesting exception to most business managers' ideas of thinking about their company in the long term.¹³

Bezos entered the stage of (very) long-term thinking in a semi-famed 1997 letter to his shareholders about the value his company, Amazon, created for the long term.¹⁴ His manifesto was predominantly about the benefits and approaches to long-term thinking. Albeit this is an interesting act, its immediate focus on simply making profit or creating a big company, which he did, makes a rather unsurprising example of an otherwise-impressive thought experiment. However, what makes it interesting is where his manifesto came from: The Long Now Foundation, founded in 1996. As mentioned earlier, he makes it a point to write the year in terms of not thousands, but tens of thousands.

Enter his symbolic 10,000-year clock, designed to be an icon for long-term thinking. The father of the clock was Danny Hillis, who had been thinking about and working on the clock since 1989—or 01989, rather. One can think of the Clock of the Long Now as a temporal analog of the brass plaques accompanying the *Pioneer* spacecraft traversing the outer solar system in the 1970s. A newly built artifact destined to leave the solar system was designed to be intercepted by extraterrestrial aliens and show/tell them about a civilization living in an otherwise-unimpressive solar system. In other words, the plaques were designed to communicate across vast distances, while the Long Now chronometer is designed to communicate across time. A 10,000-year clock somehow forces us to ask what future civilization will be like. How will they live? What will their values be?

What makes reading about the 10,000-year clock so surprising is just how long it has probably been since most people have given any thought to the state of the world 10,000 years hence. Who can even imagine 10,000 years from now? And more interestingly—and this is a core idea of the symbolic project—do we believe that the far future is going to happen, i.e., that the human race will witness a future far from the present time? Will there be human beings around when the 10,000-year clock's bell rings, and will they ponder the immense antiquity of the life of the archaeological skeleton examples from the early Anthropocene? Or what about 2,000 years from now? Or just 400 hundred years from now? Can we imagine our great-great-great-great-grandchildren living on the planet? Hopefully.

Peering into the future is like straining to see through a thick fog. Nearby objects can be seen, at least in rough outline; more-distant landscapes are lost in the midst. Time obscures the view. Who, other than science-fiction writers, really gives any thought to what civilization might be like a thousand years from now? One could endlessly find examples of bad predictions. The internet is full of them. The future of technology is especially a challenge, e.g., the discovery of new materials is not foreseen, and as author Dan Falk commented, “Even when a discovery is already upon us, there can be a kind of ripple effect of unimagined consequences. When the first Model T rolled off the Ford assembly line in 1908, who could have foreseen freeways, traffic jams, suburban sprawl, the rise of the shopping mall (and the decline of the ‘Main Street’), grievous air pollution, global warming” or driverless cars, for that matter?¹⁵

A fair criticism to the Clock of the Long Now would be that of chrono-colonialism, meaning that even though the project seems to be a

noble act in the best interests of posterity, it is impossible to guess what these interests might be, beyond a few generations. “To assume that the values of our own age embody eternal verities and virtues is foolish and arrogant,” the writer Brian Hayes explains.¹⁶

I try to imagine a world without present time.
—Douglas Coupland

Near Future Worries

A common enemy of the idea of prosperous human development far into the future is the decline of enlightenment values. The linguist, psychiatrist, and prolific author Steven Pinker has stated that some of the rise of populism is due *not* to a retreat of enlightenment values, but rather due to huge waves of immigration from the least liberal regions of the world. Possibly, it is a combination having even more contributing factors. However, when dealing with populism, it is important to note that the present period is not the first time that enlightenment values have been resisted. Authoritarianism, tribalism and demonization will always push back against enlightenment, as, for instance, Friedrich Nietzsche did, an esteemed philosopher, yet also a rabid counter-enlightenment figure. After the enlightenment unfolded, there was a romantic counter-enlightenment resistance movement of nationalism, devaluing the individual in favor of the culture of the land. This happened several times in world history. Apparently, it tends to bubble up, and this is what we have been seeing with authoritarian populism. So, speaking in the long-term, this present phenomenon popping up here and there these days should perhaps not arouse too much worry.

A common explanation of the phenomenon of populism, or even sheer fact resistance, is the widespread lack of ability to act on the grounds of long-term thinking. The vast temporal perspective simply is too large for

human beings to fathom. Or at least, the democratic myopia of state leaders makes it impossible to get anywhere. This short-term election-period framework of thinking about politics comprises a likely acute mental condition of many a politician when concerned with large-scale political issues like infrastructure, climate change, reform of the federation, space exploration or means of preventing global risks to the existence of humanity (a list of plausible, yet improbable, risks has been presented by the Future of Humanity Institute¹⁷).

A perennial favorite for academic speculation is the collapse of civilization. The cosmologist and astrophysicist Martin Rees has famously outlined some of his most urgent concerns about the collapse of civilization in his book *Our Final Hour*.¹⁸ Now, not only a single nation can unleash havoc on a large scale. Thanks to advances in biotechnology, according to Rees, we are entering an era in which “a few adherents of a death-seeking cult, or even a single, embittered individual, could unleash an attack.”¹⁹ And another potential danger that has reared its ugly head is the possible danger of AI not only taking our jobs, but also taking our lives, potentially. Especially if so-called Human Equivalent AI’s (dubbed HEAIs by ISPE Fellow Roger Plant) get the same rights as humans, they could pose an imminent threat, I believe.²⁰

What makes humans distinct from animals is a question that has been debated by philosophers for the last 2,500 years. However, with computers, machine learning and artificial intelligence, now we rather investigate what makes us distinct from machines. As the author Brian Christian has claimed, “In a sense, we are now the animals. As a result, we seem to feel more kindred with animals now than we have been doing for a long time. Computers are in the process of teaching us what it means to be human.”²¹

Perhaps the technological developments of AI contribute, in an indirect fashion, to the shift called for by Elena Bennett: that we should work for social-ecological systems of people and nature, intertwined. In this way, perhaps the continuous exponential technological development leading to progress and prosperity in very many ways could hopefully become part of the narrative of a good Anthropocene.

Taking a Progress Holiday

Douglas Coupland once asked, “Wouldn’t it be great to take a progress holiday?” since it gets boring to envisage all the ubiquitous progress around you every single day.²² But in fact, this is almost true, yet only when speaking about progress in very general terms. One specialist of this trade is Steven Pinker. In his latest book, *Enlightenment Now*, he conveys solid data backing up his claims of the progress of humanity, generally speaking, and with numerous exceptions, obviously. His monograph may install optimism in the readers as Pinker unfolds the following:

- Life expectancy has increased, and the rate of childhood deaths in recent years has declined.
- Nourishment and sustenance has been ameliorated since the British agricultural revolution in the 18th century due to advances in agronomy like crop rotation, invention of synthetic fertilizers, mechanization of agriculture, and selective breeding of vigorous hybrids in every region of the world.
- Literacy has increased.
- Crime has reduced.
- We have been getting smarter. In the well-documented Flynn effect, IQ scores have increased by 3 points per decade for a century—a gift of the spread of education

but also a gift of the trickling down of abstract concepts and visual symbols from technical domains like science and technology to everyday experience.

- Running water, electricity and labor-saving devices like dishwashers, fridges, microwaves, etc., have decreased housework from 62 hours a week to 15 hours a week (highly gendered), and thus leisure time has increased by 8 hours a week just since 1965. Happiness has increased, and wealth and happiness are evidently correlated.²³

So, according to Pinker, human progress is not a matter of having a sunny disposition but is an empirical fact—even if the fact of human progress is not reflected in the news. Due to the so-called *availability heuristic*, many people seem to deny human progress. Part of the answer can be found in cognitive psychology. According to the psychologist and Nobel laureate Daniel Kahneman, the human brain tends to estimate risk and probability by a shortcut known as the availability heuristic: The more easily we can recall examples from memory, the more common we think an event is.²⁴ As a result, in Pinker’s example, more people seem to be killed by tornadoes than by asthma attacks. The reason for this is that tornadoes make better television. Common news criteria dictate that news should be about events that happen, not events that do not happen. After all (sadly), it is difficult to imagine a journalist reporting from a country that is not at war or not being attacked by terrorists, if this is the news story itself.

Conflict sells website ads; consensus does not. And news is about sudden events and not gradual changes. By combining the availability heuristic with the nature and criteria of news media (and adding, perhaps, negativity bias that predisposes to pessimism about the world), we get the impression

that the world is getting more dangerous and always has been. If this phenomenon is the fundamental reason for the Long Now Foundation being established, and perhaps even the reason for my urge to create a long-term-acting institute, then it is understandable.

Nothing is more responsible for the good old days than a bad memory.

—Franklin Pierce Adams

The Wizard and the Prophet

Another framing of Elena Bennett’s appeal for shifting our thinking from a division of ecosystems and social systems into their integration is a pedagogical reference to two important figures in the history of technology, particularly agronomy. The idea—which is conventional wisdom both on the green left and on the extreme libertarian right—that we must choose between economic growth and environmental protection is not true.²⁵ The notion that we must choose between pure and protected nature apart from humans and artificial intelligence development also seems false. In science journalist Charles C. Mann’s latest book, *The Wizard and the Prophet*, the author presents two groups of stereotypes approaching technological development in two very distinct ways.²⁶

The *prophets* follow the environmentalist William Vogt’s mantra to “Cut back, otherwise everyone will lose,” while the *wizards* follow inventor of high-yield crops Norman Borlaug’s mantra: “Innovate! Only in that way can everyone win.” Perhaps Elon Musk is—with his Tesla and SpaceX Industries, and not least his upcoming Neuralink-industry project—the most accurate embodiment of today’s Borlaug-style wizard: Innovate or perish. Elon Musk has also proven to be one of the long-term thinkers of our time. His Neuralink project, a future brain/machine interface, is an example of his innovation

strategy with a keen focus on the future of humanity.²⁷

So, the most compelling idea to adopt would be that the wizard and the prophet go hand in hand. The concept of environment protection is not necessarily mutually exclusive of economic growth, and Nature and AI could, and should, also go hand in hand.

Hopefully, the human race is not comparable with 7 billion bacteria in a petri dish that have already reached the dish’s edges. With our civilization on the line, making the wizard and the prophet hold hands may be a welcome action for the sake of our children and their opportunities when faring on an increasingly crowded earth.

It seems that instead of being pessimistic about the near and far future, we need to be accurate instead. Thoughtless pessimism could lead to fatalism (we’re doomed, let’s get high!), but also to radicalism and fundamentalism, if society is in a radical decline. On the other hand, progress is surely not inevitable, and we are very aware of the risks in front of us. As Pinker puts it, “Progress depends on embracing the ideals of the enlightenment, namely applying reason and science to enhance human flourishing.”²⁸ If we continue to apply these principles, then progress may continue; if we don’t, it may not.

Progress and Religion

Evolutionarily speaking, we’re standing on the shoulders of religious predecessors who managed to gather around religious artifacts and relics, making the religious tribes stronger than non-believing tribes, thus surviving battles, having a common deity to add meaning to the likely meaninglessness of physical reality.

But I am positive that we have now passed the need for this kind of gathering around mysterious objects like tabernacles, crucifixes or quaba houses. It seems that what we need to gather around now, having already entered the Anthropocene, is solving the ultimate quest of humanity, namely how to live in harmony with Nature, how to blend in, how to exploit and explore at the same time, in ways that benefit not only the human monkeys—with frontal lobes—that we all are, but also Nature. If we manage to succeed, our great-great-grandchildren could perhaps prosper. If we fail, alas, their future could be bleak.

Statistical evidence is legion that we need to use science and reason, not mystical (mass) belief, to increase human flourishing. We need people to think—for themselves, and critically. Evidently, knowledge will always be stronger than superstition and ignorance. We know this from the history books. We need humanitarian role models for the youth, who can facilitate a new belief in the future progress of humanity and reinstate hope in those who have lost it; we need those role models to instill technological optimism.

To succeed, I believe, we have no need of religious artifacts as gathering points any longer for our future societies to prosper. It seems unnecessary for human survival, contrary to earlier times. What we need are precise facts, democratized knowledge (e.g., free access to satellite data of our common earth), scientific accuracy in education and research (using the ever-so-cumbersome and rigid peer-review processes of ensuring international high standards of the growing body of knowledge—in most cases) and an openness to evident facts that don't immediately please us.

This project is not synonymous with a demeaning of religious belief. It is important to maintain a respect for other people's need

for religious faith as long as it exists, as there is really no reasonable alternative. What we can do, however, is keep working for the necessary and complete secularization of all (democratic) nations, ensuring that we keep facts in the public domain (which has led us to the present state of historic global wealth and prosperity, in general), and then keep faith in the private domain.

Planting Seeds for the Future through our Children

As a comment to Brian Hayes' critique of the Clock of the Long Now as a symbol of chrono-colonialism, let me somehow conclude by quoting the author Michael Chabon, who brings the temporal horizon of expectations of our future world much closer to our present moment in time: "Is it even possible to extend the horizon of your expectations for our world, for our complex of civilizations and cultures, beyond the lifetime of your own children, of the next two or three generations?"²⁹ Are our hopes left blank when we are not generating a full head of optimistic steam about next week, next year, or next birthday, but instead envisage the world a hundred years from now? When we have children, when we love them, and teach them to love and care about the world, we do, in fact, bet on our children, and their children after them, all the way to . . . when, exactly? 10,000 years from now?

As Chabon hints at, there is a potential severity and gloom in the concept of the far future in the mind of a little girl if she sees herself as living on the last page, or even the last paragraph, in the long book of humanity. But if we manage to instill hope in our offspring and future generations, then perhaps the despair could transform into an optimistic image of a brighter future, if she sees herself as co-writing the words of the next paragraphs.

NOTES


1. The Long Now Foundation, www.longnow.org. The Long Now Foundation has an interesting list of articles. It seems rather Anglo-centric, but nonetheless, the efforts of the foundation seem authentic and honest enough. One interesting feat is the Manual of Civilization, a library consisting of 3,500 books most essential to sustain or rebuild civilization (Alexandrian Library 2.0?). The literature is spread on the four categories: cultural canon, mechanics of civilization, rigorous science fiction, and long-term thinking, futurism, and relevant history. But alas, the website seems to not have been updated much since 2014 (02014).
2. Quote Investigator, “William Gibson,” <https://quoteinvestigator.com/2012/01/24/future-has-arrived>. Whether this is in fact an eponymous Gibson quote is investigated here.
3. Fred Adams and Greg Laughlin, *The Five Ages of the Universe: Inside the Physics of Eternity* (New York, NY: Free Press, 2000), https://www.goodreads.com/book/show/401973.The_Five_Ages_of_the_Universe?from_search=true.
4. Bertrand Russell, *Mysticism and Logic Including a Free Man’s Worship* (England: Routledge, 1918), https://www.goodreads.com/book/show/349459.Mysticism_and_Logic_Including_a_Free_Man_s_Worship?ac=1&from_search=true.
5. Michael Bang Petersen, “Evolutionary Political Psychology: On the Origin and Structure of Heuristics and Biases in Politics,” *Political Psychology* 36, S1 (September 1, 2014): 45-78; page 14-15 in the PDF version, http://pure.au.dk/portal/files/81476103/Evolutionary_Political_Psychology_Petersen_Advances_in_Pol_Psych.pdf.
6. Michael Bang Petersen.
7. Michael Bang Petersen.
8. Carolyn Porco, “Searching for Life in the Solar System,” The Long Now Foundation, <http://longnow.org/seminars/02017/jul/24/searching-life-solar-system>.
9. “Global Climate Change: Vital Signs of the Planet,” NASA, <https://climate.nasa.gov>.
10. “The Nine Planetary Boundaries,” Stockholm Resilience Centre, Stockholm University, <http://www.stockholmresilience.org/research/planetary-boundaries/planetary-boundaries/about-the-research/the-nine-planetary-boundaries.html>. The nine planetary boundaries are:
 1. Climate change (increasing risk).
 2. Biosphere integrity (diversity, high risk).
 3. Land-systems change (increasing risk).
 4. Freshwater use (safe).
 5. Biochemical flows (pH, N, high risk).
 6. Ocean acidification (safe).
 7. Stratospheric ozone depletion (safe – again).
 8. Atmospheric aerosol loading.
 9. Novel entities (last two boundaries not yet quantified).

11. W. Steffen et al., “Planetary Boundaries: Guiding Human Development on a Changing Planet,” *Science* 347, no. 6223 (February 13, 2015), <http://science.sciencemag.org/content/347/6223/1259855>.
12. Seeds of Good Anthropocenes, <https://goodanthropocenes.net>. I recommend this website by Elena Bennett et al., presenting existing initiatives that all have the potential to substantially contribute to creating a prosperous and sustainable future.
13. Jeff Bezos, “10,000 Year Clock,” <http://www.10000yearclock.net/learnmore.html>.
14. Jeffrey P. Bezos, “1997 Letter to Shareholders,” <https://www.scribd.com/document/43386750/Amazon-Letter-to-Shareholders-in-1997>.
15. Dan Falk, *In Search of Time: The History, Physics, and Philosophy of Time* (New York, NY: Thomas Dunne Books, 2008), 253.
16. Dan Falk, 270. (Brian Hayes is cited within this reference.)
17. Future of Humanity Institute, selected publications, <https://www.fhi.ox.ac.uk/publications/>. Many of the relatively short articles are read-worthy.
18. Martin Rees, *Our Final Hour: A Scientist’s Warning: How Terror, Error, and Environmental Disaster Threaten Humankind’s Future in this Century—On Earth and Beyond* (New York, NY: Basic Books, 2003).
19. Martin Rees.
20. Roger Plant, “Robots and AI,” *Telicom* 30, no. 1 (Jan-Mar 2018): 97-98.
21. Brian Christian, *Algorithms to Live By: The Computer Science of Human Decisions* (New York: NY, 2016).
22. Douglas Coupland, “The Extreme Present,” The Long Now Foundation (November 1, 2016), <http://longnow.org/seminars/02016/nov/01/extreme-present>.
23. Steven Pinker, *Enlightenment Now: The Case for Reason, Science, Humanism, and Progress* (New York, NY: Viking, 2018).
24. Daniel Kahneman, *Thinking Fast and Slow* (New York, NY: Farrar, Strauss, and Giroux, 2011).
25. At least in the places of the world that I believe to be familiar with.
26. Charles C. Mann, *The Wizard and the Prophet: Two Remarkable Scientists and Their Dueling Visions to Shape Tomorrow’s World* (New York, NY: Knopf, 2018).
27. Tim Urban, “Elon Musk: The World’s Raddest Man,” Wait But Why (May 7, 2015). I recommend this biased and slightly panegyric yet read-worthy blog-article on Elon Musk.

Tim Urban, “Neuralink and the Brain’s Magical Future,” Wait But Why (April 20, 2017), <https://waitbutwhy.com/2017/04/neuralink.html>.

28. Steven Pinker, *Enlightenment Now: The Case for Reason, Science, Humanism, and Progress* (New York, NY: Viking, 2018).

29. Michael Chabon, "The Future Will Have to Wait," The Long Now Foundation (January 22, 2006), <http://longnow.org/essays/omega-glory>.



“The most important thing about global warming is this: Whether humans are responsible for the bulk of climate change is going to be left to the scientists, but it’s all of our responsibility to leave this planet in better shape for the future generations than we found it.”

—Mike Huckabee