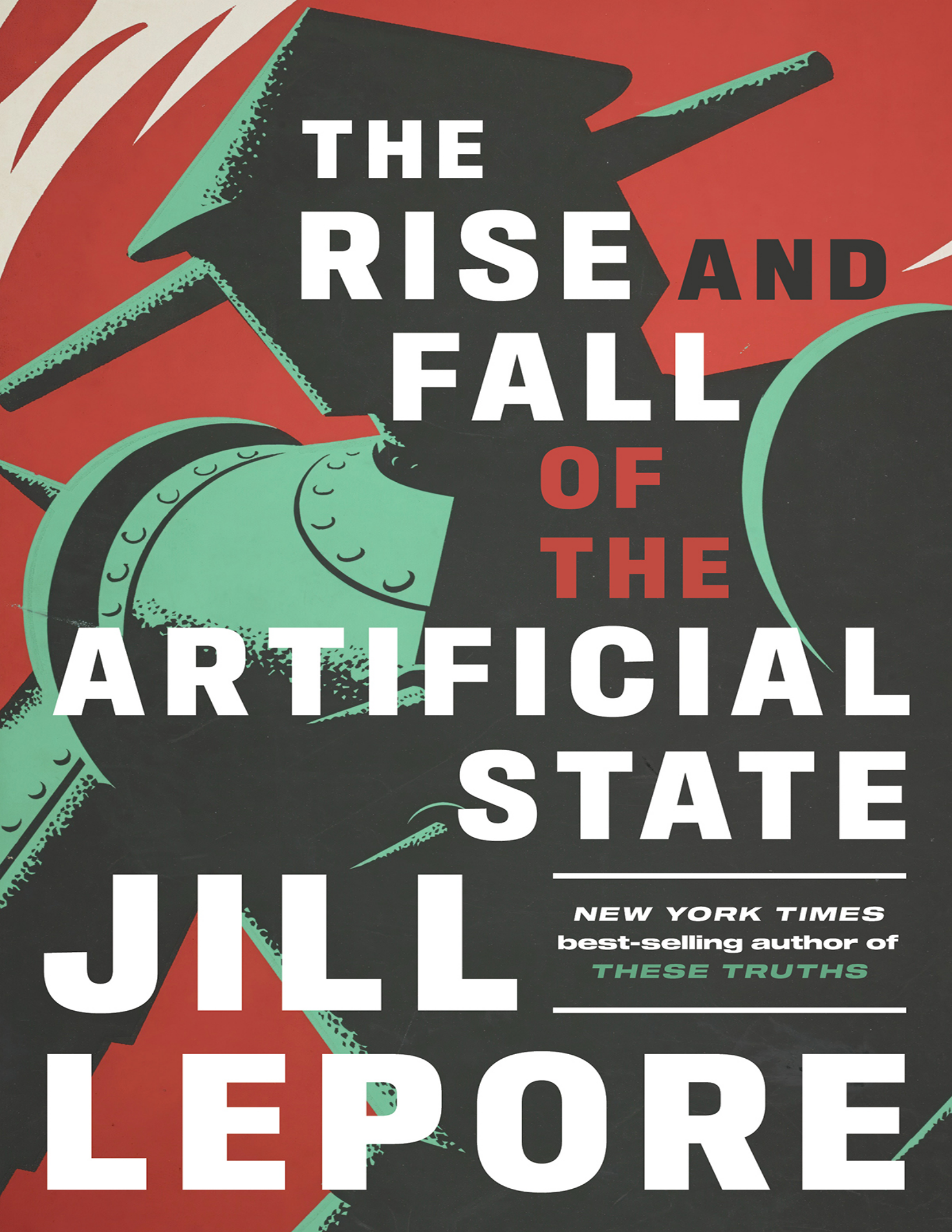

THE RISE AND FALL OF THE ARTIFICIAL STATE
JILL LEPORE
NEW YORK TIMES best-selling author of THESE TRUTHS

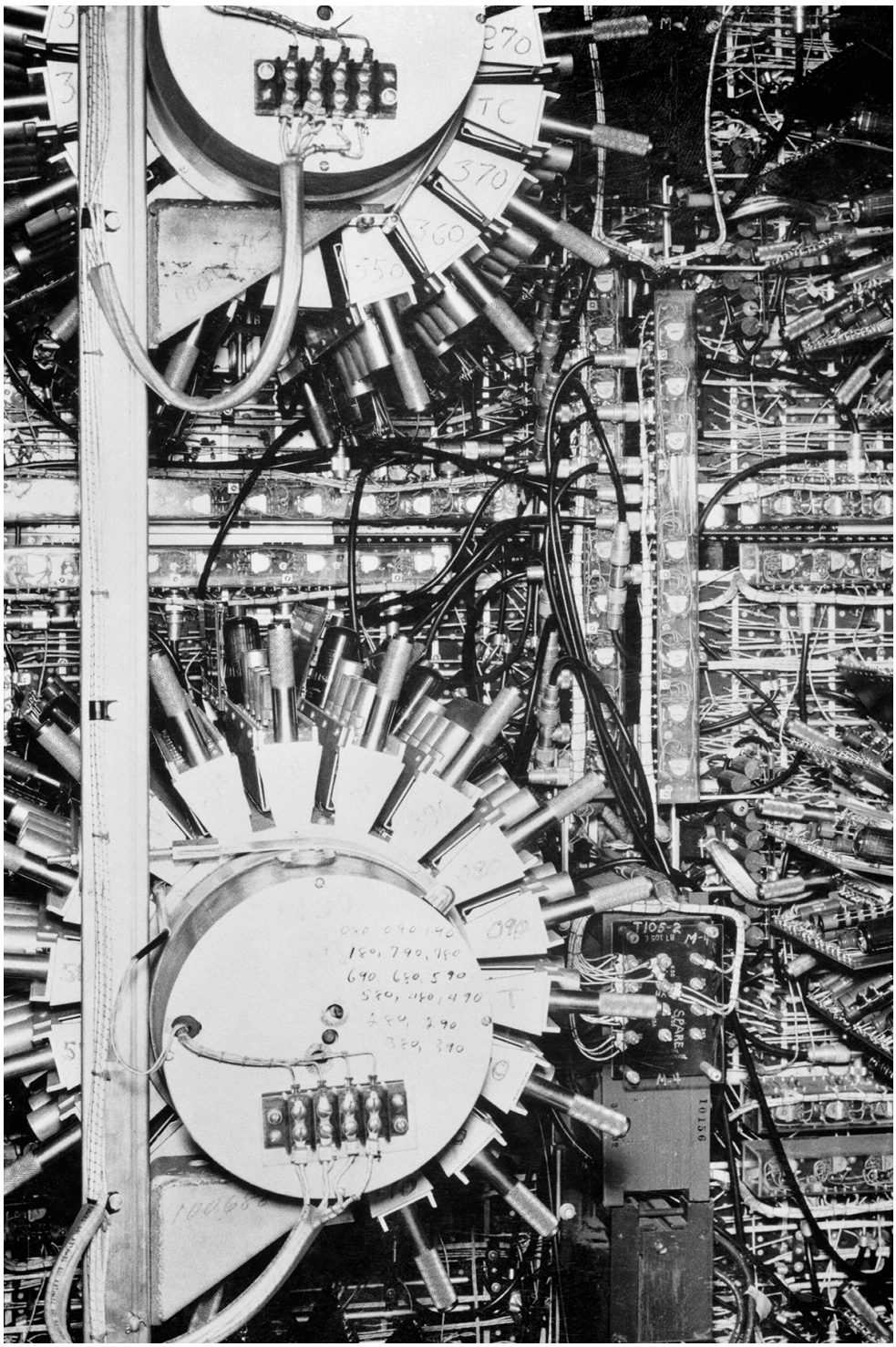
THE RISE AND FALL OF THE ARTIFICIAL STATE

JILL LEPORE



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A view inside the UNIVAC in Philadelphia in 1949. (Mary Evans / Classic Stock / H. Armstrong Roberts)

In memory of Cooper, Webster, and Daisy and for Greta and Rufus

There is much which we must leave, whether we like it
or not, to the un-“scientific,” narrative method of the
professional historian.

—*Norbert Wiener*, Cybernetics, or Control and Communication in the Animal and the Machine, *1948*

You haven’t lived until a fox
has whispered something the ferns told him
in your one good ear.

—Gabrielle Calvocoressi, “‘I was popular in certain circles,’” 2015

After Event A comes Event B, followed by Event C.
But in Our programmatic framework, it is always possible
to select a different option.

—*Hamid Ismailov*, We Computers, *2022*

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PREFACE

> What I propose in the following is a reconsideration of the human condition from the vantage point of our newest experiences and our most recent fears. . . . What I propose, therefore, is very simple: it is nothing more than to think what we are doing.
>
> ***—Hannah Arendt*, The Human Condition, *1958***

> Like, I do guess that a lot of the world gets covered in data centers over time, but I don't know because maybe we put them in space.
>
> ***—Sam Altman, CEO of OpenAI, 2025***

This book is an inquiry into what humans mean and intend in abandoning constitutional democracy, the liberal nation-state, and even humanity itself for rule by automation, government by machine, and replacement by artificial intelligence. Much in history is headlong but few grand transformations have been more precipitate or more heedless than the rise of what I call the Artificial State. Yet little seems to me more inevitable than its eventual fall, the exhale that follows every inhale, the day that follows night, Icarus's plunge to the ocean after flying too close to the sun.

The Artificial State is a fantasy about humans, machines, and the earth. This book is an archaeology of that fantasy. I was driven to write it by the same concerns that in the 1950s led the German-born political theorist Hannah Arendt to consider how humanity had been altered by automation.[1] Arendt's best-known book, *The Origins of Totalitarianism*, appeared in 1951. It ends with Arendt expressing concern about how the machinery of modern life was reshaping the very fundamentals of human existence. Arendt became convinced that both totalitarianism and automation render humans superfluous—unnecessary and expendable—in the first case politically and in the second case technologically. This led her to write *The*

Human Condition, which she was just finishing in 1957 when the Soviet Union launched Sputnik 1, the first man-made satellite, into orbit. From Earth, you could hear it, a "deep beep-beep" in the key of A-flat, a sound that, NBC News said, "forevermore separates the old from the new."[2] According to Arendt, reporters described the launch of this "artificial satellite" as "the first 'step toward escape from men's imprisonment to the earth.' " There were and remain excellent reasons to explore space. But to escape? Arendt found this language astonishing, pointing out that, until very recently, "nobody in the history of mankind has ever conceived of the earth as a prison for men's bodies."[3]

Not counting the idea of heaven, the dream of escape from the prison of Earth had only really begun to take shape in the middle of the nineteenth century, including in Jules Verne's 1865 novel, *De la Terre à la Lune (From the Earth to the Moon)*, in which, after the end of the U.S. Civil War, American gun enthusiasts shoot three men to the moon from a giant cannon.[4] Defying gravity was only the beginning. "For some time now," Arendt argued, little more than a decade before NASA sent three men to the moon on the Apollo 11 mission, "a great many scientific endeavors have been directed toward making life also 'artificial,' toward cutting the last tie through which even man belongs among the children of nature." She wondered whether humans would one day soon "need artificial machines to do our thinking and speaking."[5] That day has now come.

Arendt had been able to glimpse this day, so long ago, because research into how the human brain and human society can and ought to be artificially simulated by machines was just then emerging. In 1956, the year the term "computer science" was coined, a dozen or so American mathematicians and scientists gathered for a summer workshop at Dartmouth College, having settled on the term "artificial intelligence" to describe their research project. In 1958, the year *The Human Condition* was published, many more mathematicians, engineers, and linguists from around the world met in England for a conference on the "Mechanisation of Thought Processes": its aim was to accelerate the computer simulation of human cognition and behavior.[6] These and many other developments led to the dreaming of a new dream, a dream of escape from the constraints of nature and even from the burdens of being human, and especially from the obligations of human family, society, and government.

The Artificial State is less a state than a dream of being without one, the dream of the severing of humans not only from the natural world but also from one another, every umbilical cord cut. An extreme form of this dream is the actual plan of a very small number of staggeringly powerful twenty-first-century merchant princes, Silicon Valley billionaires who, seeking escape from the prison of their own bodies, intend to have their consciousnesses uploaded onto computers when they die, an idea that, like much of what they want, comes from a story published nearly a century ago in a science fiction magazine for boys.[7] The Artificial State they envision for everyone else, and have begun to build, is a future in which humans are ruled, and many replaced, by machines owned by corporations owned by themselves. This future, too, comes from science fiction. It involves both the desertion of liberal democracy and the destruction of the natural world. The very planet, once a home to be tended, is to become instead a warehouse, its surface covered in data centers powering artificial brains.

I am interested in the dreaming of this dream because some of it has come true and more of it might. My Sputnik was ChatGPT, first released in 2022. It didn't say "beep-beep-beep" in the key of A-flat, but it did lead to a global mania that rivaled the mixture of panic and excitement over that first artificial satellite. And, like Sputnik, it both sped up an arms race and raised new alarms about the possibility of human extinction through annihilation.

In the summer of 2025, as I was finishing this book, Mark Zuckerberg, CEO of Meta, a multinational corporation valued at nearly $2 trillion, announced the formation of an artificial intelligence division, Meta Superintelligence Labs, committed to building a corporate-owned "personal superintelligence for everyone."[8] Zuckerberg's first company, Facebook, a social media behemoth whose stated mission had been to connect humans to one another, had destabilized democracies, undermined journalism, polarized political communities, and threatened civil society while making Zuckerberg the third richest person in the world.[9] For his new initiative, Zuckerberg pledged to invest hundreds of billions of dollars in data centers all over the world—vast metropolises, some as big as the island of Manhattan, consisting of sprawling homes for humming machinery—beginning with a 1-gigawatt, fossil-fuel-fired data center in Ohio called Prometheus (each of Meta's data centers was to be named after a Greek Titan).[10]

Personal superintelligence for everyone was expected to require extracting from the earth nearly incalculable amounts of land, minerals, water, and energy.[11] "Grow tomatoes, not data centers," read the protest signs. Two weeks before Zuckerberg made his announcement, Sam Altman, CEO of an artificial intelligence company called OpenAI, said that "a significant fraction of the power on Earth should be spent running AI compute": the planet itself was to be harnessed to what Zuckerberg called a "new era for humanity."[12] The next month, the U.S. government announced its determination to win "a race to achieve global dominance in artificial intelligence" by building "the largest AI ecosystem"—as if it *were* an ecosystem. To accelerate the construction of new data centers and remove any possible obstacles, the government's new "AI Action Plan" recommended lifting the provisions of the U.S.'s landmark environmental legislation, the Clean Air Act, the Clean Water Act, and the National Environmental Policy Act, and required the elimination of all references to climate change from government documents whose purpose was to document the risks of AI.[13] The plan, in effect, made it impossible to know what we are doing, in order that it might be done.

I have been trying for a long time to think about the Artificial State and its relationship to the natural world. I have often found this difficult, first because thinking straight is made harder by the ceaseless rattle and clanging of the machinery of the under-construction Artificial State, its noisy, polluting furnaces of interruption, distraction, and alienation; and second because although as a political philosopher Arendt was in her element in writing about "our newest experiences and our most recent fears," historians shy from the present and shudder at the rawness of the news: we prefer our meat cooked. I like thinking about the past, about origins. But how are we to see what we are *in*? What finally led me to set aside my historian's timidity and set me on a path to write this book was an invitation to deliver the 2026 Tanner Lectures on Human Values at Yale. Those lectures form the core of this book. The book also draws on other lectures I've delivered over the years, including the F. E. L. Priestley Memorial Lectures at the University of Toronto and the Hegel Lecture at the Freie Universität Berlin, as well as on teaching, thinking, and writing I've done on these subjects in classes I have taught at Harvard on the history of technology, politics, evidence, and the law; in a radio series I created for the BBC; in a thousand conversations with students, colleagues, friends, and

neighbors; and in articles I've written for *The New Yorker*, including, more than a decade ago, an essay criticizing the theory of disruptive innovation whose publication led Silicon Valley kingmaker Marc Andreessen to troll me, tweeting, "Why hasn't anyone invented a robot that will write anti-technology essays for East Coast literary magazines?"[14]

A robot did not write this book. I wrote most of this book in the woods, sheltered by trees and serenaded by birdsong, in the company of dogs, cats, sheep, chickens, ducks, and one very old and rickety dying goat, and not far from bears and porcupines, owls and coyotes. Taped to my desk, next to my thrumming laptop, I've got an old bookmark on which I've scribbled Richard Brautigan's 1967 poem "All Watched Over by Machines of Loving Grace":

> I like to think (and
> the sooner the better!)
> of a cybernetic meadow
> where mammals and computers
> live together in mutually
> programming harmony
> like pure water
> touching clear sky.

Brautigan, a broken man even as a young man, wrote these lines after serving as a poet-in-residence at the California Institute of Technology in Pasadena and not long before the publication of his absurdist novel *Trout Fishing in America*. He had "All Watched Over by Machines of Loving Grace" printed in a chapbook handed out for free on the streets of San Francisco.[15]

> I like to think
> (right now, please!)
> of a cybernetic forest
> filled with pines and electronics
> where deer stroll peacefully
> past computers
> as if they were flowers
> with spinning blossoms.[16]

This poem has often been read as a manifesto, a countercultural blueprint for an eco-cyber-utopia, “a future world held in a balanced equilibrium by the fusion of nature and computers.”[17] But “All Watched Over by Machines of Loving Grace” reads to me instead as a very dark satire, a kick-in-the-shins critique of a new, man-in-the-moon, machine-in-the-garden dream, the fantasy of a future that will never come.[18] Brautigan titled his next book of free, giveaway poems *Please Plant This Book*; it came with envelopes stocked with seeds.[19] You could use it to plant flowers, or a vegetable garden. You could not use it to grow a keyboard. There is no cybernetic meadow. No pine-and-electronic trees, nor any silicon flowers, ever grew in any cybernetic forest. What arrived instead was the Artificial State. And it ravaged the world.

Part One

GOVERNMENT BY MACHINE

You never had a mother,
let's say? no digital Gertrude
whom you'd as lief have seen
Kingless?

—Adrienne Rich, "Artificial Intelligence," 1961

The artificial state is the dream of a future in which humans are untethered, free and alone, disembodied minds, with no ties, not to one another, not to any place, not to any village or city or nation or mountain or forest or valley or ocean, lake, or river, or possibly even to Earth itself, nor even to any physical self, the bruisable flesh, the breakable bone, the aching heart. But the Artificial State is also more than a dream. It is a construct, at once an idea and a thing, both a fantasy and an infrastructure, an artifice, something already being built: a state.

What is a state? The state is "but an Artificiall Man," Thomas Hobbes wrote in *Leviathan* in 1651. By this, Hobbes explained, he meant an automaton, an intricate machine in the shape of a man whose parts "move themselves by springs and wheeles as doth a watch"—something like a wind-up toy, with each of the body's organs replaced by a mechanism, a substitution easily accomplished, according to Hobbes, "For what is the *Heart*, but a *Spring*; and the *Nerves*, but so many *Strings*; and the *Joynts*, but so many *Wheeles*."[1] (Later, centuries later, a machine in the shape of a man would no longer be known as an automaton or an artificial man but as a "robot.")

Even early modern philosophers who disagreed with Hobbes about everything else agreed on the artificiality of the state: no state is natural, like a lagoon or a desert or a colony of seals. "The constitution of man is the work of nature; that of the State is the work of art," Jean-Jacques Rousseau wrote in *The Social Contract* in 1762.[2] In the Hobbesian sense, all states—all organized political communities—are artificial because they are human inventions, works of art or artifice, each with its own instruments: veined lines inked on maps, armed troops stationed at borders, portraits of dead rulers printed on paper currency, vinyl-backed passports.

What is true of a state is true of a nation-state, too: they are devices, artifices. Nation-states are inventions of the age of nations and especially of the long nineteenth century, which began in 1776, with the American Declaration of Independence, and ended in 1914, with the First World War.

By then nation-states across much of the globe had adopted written constitutions, framing governments, separating powers, and declaring rights.[3] In Europe and the United States and soon in much of the rest of the world, fitfully and sometimes fleetingly, rule by the people replaced rule by one man. Kings and queens were toppled; empires collapsed. Fascism and communism rose and fell. Great wars were fought and forgotten. This was the age of liberal democracy and of the liberal nation-state. It was not perfect. It did not last.

Because all states are artifices, their qualities are greatly shaped by the possibilities of technology. Constitutional democracies are artifacts of the technologies of pen and paper and printing press, technologies whose obsolescence was set in motion by the invention of the general-purpose computer during the Second World War. A future in which humans are governed by machines was first imagined even before the term "artificial intelligence" was coined in 1956. By the end of the twentieth century, liberal democracy was being replaced both by a return to autocracy, a great reversion in the affairs of humankind, and by the less clearly seen rise of automatocracy, rule by automation, government by machine-driven computation, prediction, and persuasion. The corporations that owned those machines began to subsume the state. By the early decades of the twenty-first century, a successor to the liberal nation-state had begun to emerge, a new, fantastical form of tyranny: the Artificial State.[4]

By an "artificial state" I mean something capacious, something changeable, something multifarious, something as slippery and shifting, as real and as unreal and as many-headed as its near relation, "artificial intelligence." I also mean something different than Hobbes's Leviathan, not something made by man but something nonhuman, something beyond human, something inhuman: the rule of humans by machines manufactured by corporations. This "Artificiall Man," this new Leviathan, is both a figurative automaton—an ethos, an idea, an act of imagination—and an actual robot, an unfinished infrastructure, a state in which the gears of politics are being replaced by networked computers—*farms* of servers, *clouds* of data, AI *ecosystems*—the allusions are always to the natural world that the machinery is destroying. The Artificial State is a fantasy half built, dreaded, adored, awaited. I also believe it to be doomed.

The Artificial State is an unfinished digital communications infrastructure with which governments and especially private corporations

organize and automate political behavior and public discourse by way of everything from direct mailing and robocalls to predictive algorithms, social media campaigns, AI agents, and bots (programs that mimic and often pass as humans).[5] Within the Artificial State, nearly every element of public and democratic life—civil society, representative government, an informed citizenry, equality of rights, freedom of thought, freedom of expression, and faith in elections—is vulnerable to subversion through the reduction of politics to the digital manipulation of attention-mining algorithms, the trussing of government by corporate-owned digital architecture, the diminishment of citizenship to minutely message-tested online engagement.[6]

The liberal nation-state requires the consent of the governed, the voice vote, quavering; the raised hand, sweating; the signature, wavering; the heart, pulsing. The Artificial State is government without consent, even government without humans. It is the severing of humans from one another and the replacement of human discretion with machines that predict, manipulate, and control human desires and decisions. In lieu of persuasion by conversation and decision-making by democratic deliberation, the Artificial State offers prediction by calculation, the capture of the public sphere by data-driven commerce, and the replacement of humans with machines—drones in place of the *demos*.[7]

To deplore the inhumanity of the Artificial State is neither to decry technological marvels nor to rage against artificial things, which of course are very often beautiful, wondrous, hallowed: a piano, a fetal heart monitor, a suspension bridge, and—amazingly, breathtakingly—the content of the world's libraries on a device that fits in your pocket. The machinery is scarcely the problem, nor the making of things: the art, the artifice. The mainframe computer, the personal computer, the internet, algorithmic prediction, pattern detection, machine learning, large language and large vision models and artificial intelligence yet to be imagined have made possible and will continue to make possible astounding and invaluable advances in scientific research, communication, education, medicine and public health, urban planning, agriculture, ocean and space exploration, and a thousand other realms of human endeavor. But their effects on political discourse, representative democracy, and constitutional government have

been almost wholly malign.[8] Liberal democratic states make citizens; the Artificial State makes trolls.[9]

The Artificial State is not a shadow government. It is not a conspiracy. There's nothing secret about it. Nor, when it began, was the building of its infrastructure anything sinister, or even deliberate. The first mainframe computer dates to the Second World War and was used to calculate codes and missile trajectories. After the war, much of industry and commerce began to be automated, payroll and inventory, manufacturing and assembly. The perfectly sensible automation of certain government functions, like counting the population or distributing benefits, happened swiftly: speed, after all, was the animating idea. Automating the workings of politics and the functions of democracy took longer but it very often happened first in the United States. Soon it spread to the four corners of the globe by way of American ingenuity and innovation, especially the internet, the "international network" first planned by the U.S. military in the 1960s.[10] Yet as early as 1962, Americans were already wondering whether they lived in a "cybernation"; by 1967, the fear of an "automated state" had been named.[11] By 1986, one political theorist could remark, "The map of the world shows no country called Technopolis, yet in many ways we are already its citizens."[12] For a very long time, Technopolis remained a creature of science fiction, a genre that with fevered frequency over the course of the twentieth century told, foretold, and retold the rule of robots—the tyranny of the Machine of the Benefactor, of Alpha 60, of HAL 9000, of Colossus, of the Terminator, of Blade Runner, of the Matrix—until the creature escaped the confines of fiction, a clever laboratory animal unlocking its cage.

Still, assembling the elements of an artificial state took decades, and until the very end of the twentieth century it happened mainly by accident. There was no grand plan, no diabolical scheme, nor any dream (instead, in science fiction, the Artificial State is nearly always a nightmare). But year by year and decade by decade, technologies with origins in U.S. missile defense, counterinsurgency, and psychological warfare moved from the military, often by way of the advertising industry, into commerce and journalism, politics and governance. Everything from town meetings to door-knocking was replaced by targeted messaging and automated influence campaigns. By the second decade of the twenty-first century,

these instruments were powered by artificial intelligence and could be found all over the world. The very exceptions to the algorithmic political campaign—the occasional spontaneous, charismatic, plain-speaking, poll-defying candidate, invariably hailed as "authentic"—only demonstrated its predominance. The line between human and machine became so blurred, so fast that humans on every continent were every day, all day long, asked by programs like one called CAPTCHA (Completely Automated Public Turing test to tell Computers and Humans Apart) to prove their humanity—to machines—by certifying to the statement "I'm not a robot."[13]

Being not-a-robot fell far short of being a citizen. Well-intentioned advocates heralded the rise of "AI governance" as enhancing the efficiency, responsiveness, and fairness of democracies, much as they had hoped the internet and social media would have these same effects, only to find themselves gravely disappointed.

The Artificial State honored no boundaries and conferred no rights. Its emergence was inseparable from the deepening connections of transportation, communication, and trade that became known, in the 1980s, as globalization, and ushered in an era of declining faith in democracy all around the world. The opening of the internet in the 1990s and the start of social media in the early to mid-2000s—Facebook was launched in 2004, Twitter in 2006—for all their much-ballyhooed promise of participatory democracy, had by the 2010s begun to undermine democracy and promote autocracy, abetting a process political scientists call "democratic erosion," the slow falling away of democratic norms, practices, and expectations.[14] Beginning about 2005, the number of democracies around the world began to fall as authoritarians became heads of governments and seized new powers: Vladimir Putin in Russia, Recep Tayyip Erdoğan in Turkey, Viktor Orbán in Hungary, Jarosław Kaczyński in Poland, Rodrigo Duterte in the Philippines, and Donald J. Trump in the United States.[15] In 2006, the Democracy Index rated the United States a "full democracy," the seventeenth-most democratic nation in the world. In 2016, the index downgraded the U.S. to a "flawed democracy."[16] By 2024, the U.S. had fallen to twenty-eighth place.[17] By the 2020s, slightly more than half of Americans between the ages of eighteen and twenty-nine believed either that American democracy was "in trouble" or that the country was a "failed democracy."[18] Between 2017 and 2024, satisfaction with democracy fell in

every one of twelve high-income nations studied.[19] Everywhere, loss of faith in democracy was steepest among the young who, even as they doubted democracy, came to admire populist leaders. They were also the most wholly online bracket of the population, addicted to a matrix of machines: untethered, severed, alienated, alone.[20] Meanwhile, trust in artificial intelligence rose; by 2025, nearly two in five of people surveyed across seventy countries agreed with the statement, "AI could make better decisions on my behalf that my government representatives."[21]

The liberal nation-state and constitutional democracy are hardly perfect. As a matter of history, they are also an aberration. Yet the forms of rule that preceded and began to replace them were far worse. For most of recorded history, the mass of humanity has been ruled by tyrants wielding unchecked powers. This was true before the rise of the printing press, mass literacy, and liberal democracy, and it will be true again under the reversion to tyranny that is the Artificial State. Hence the significance of the Constitution submitted to Americans for their approval in 1787. "Thus I consent, Sir, to this Constitution because I expect no better, and because I am not sure that it is not the best," declared Benjamin Franklin at the close of the U.S. Constitutional Convention in Philadelphia in 1787.[22] Its proponents heralded its faith in the people to govern themselves as ushering in a new era for humanity. "It has been frequently remarked that it seems to have been reserved to the people of this country, by their conduct and example, to decide the important question, whether societies of men are really capable or not of establishing good government from reflection and choice, or whether they are forever destined to depend for their political constitutions on accident and force," wrote Alexander Hamilton in Federalist No. 1. "If there be any truth in the remark, the crisis at which we are arrived may with propriety be regarded as the era in which that decision is to be made; and a wrong election of the part we shall act may, in this view, deserve to be considered as the general misfortune of mankind."[23]It was extravagantly stated; it was also true.

Nearly two and a half centuries ago, Americans decided that societies of people are indeed capable of governing themselves by reflection and choice rather than being ruled by accident and force. But the question has returned, slightly revised: Are humans to abandon government by consent for government by machine?

The United States offers a chilling case study, an illustration of how the automation of politics decays democracy, producing an alienated, polarized electorate mistrustful of elected officials who in turn are paralyzed by their ability to calculate, in advance, the likely consequences of their actions, down to the last lost primary or donated dollar. Instead of making decisions based on principles or values, legislators and other policymakers make decisions based on predicted outcomes; conscientious leadership, under these conditions, proves all but impossible. Between 1958 and 2024, and for reasons that, to be sure, had to do with far more than technological change, the percentage of Americans who said they trusted the U.S. government to do what was right most of the time fell from more than 70 percent to barely above 20 percent.[24] Much the same was true elsewhere. In 2002, the Pew Research Center asked citizens in twenty countries whether they agreed or disagreed that "the state is run for the benefit of all of the people." In nearly every nation, far more than half of respondents agreed. By 2019, in eleven of those twenty countries, less than half of those surveyed agreed. In Italy, agreement fell from 88 percent to 30 percent, in Germany from 86 percent to 48 percent. Asked in 2019 whether elected officials care what people like them think, 70 percent to 84 percent of people in Greece, Bulgaria, France, Spain, the Czech Republic, Hungary, the U.S., and the UK said no, along with more than 60 percent of people in Canada, Italy, Lithuania, Slovakia, and Germany.[25] Wherever citizens gave over more and more of their autonomy, forfeiting not only constitutional rights but also their very selves to private corporations under inscrutable Terms of Agreement, polarization grew and trust in government fell. A 2022 report analyzing nearly five hundred large-scale studies undertaken around the world concluded that social media was associated with both rising polarization and a declining trust in democratic government in nations as different as Austria and Rwanda, Sweden and Ukraine. The more established the democracy, the greater the effect. Over much the same stretch of time, people in the most tightly wired parts of the world became lonelier and angrier and at once more susceptible to conspiracy theories, hoaxes, and frauds, and likelier to believe that much of what they had once thought was true and real was false and fake.[26] Nothing was to be relied upon. Only machines.

The rise of the Artificial State is inseparable from the fall of the natural world. The Artificial State is the factory farming of humans, the sorting and

segmenting, the isolation and alienation, as if humans were becoming to machines what animals had become to humans. “The modern world worships the gods of speed and quantity, and of the quick and easy profit, and out of this idolatry monstrous evils have arisen,” the American ecologist Rachel Carson warned in 1964, writing about the raising of animals from birth to death in cages hardly bigger than themselves. “Yet the evils go long unrecognised,” Carson wrote. “Even those who create them manage by some devious rationalising to blind themselves to the harm they have done society.”[27] So too the merchant princes of Silicon Valley. If the executives in charge of the corporations building the infrastructure of the Artificial State had once been blind to the social and political problems they were causing, they eventually came to see at least some of those harms. This did not deter them. Instead of expressing concern about the fate of free people and liberal nations, they instead expressed both scorn for and impatience with democracy: their dreams lay beyond democracy, beyond the nation-state, beyond Earth’s orbit. They appeared to have remarkably little interest in statehood, or in what a state actually is or does or once was or might become. “I no longer believe that freedom and democracy are compatible,” Peter Thiel, founder of a global data analysis and artificial intelligence company, Palantir, announced in 2009, urging the abandonment of the democratic nation-state for stateless, start-up settlements in international waters.[28] (Thiel subsequently set aside “seasteading” and instead bought land on an island in New Zealand to wait out any coming global catastrophe.)[29] By the 2010s, undermining the free will of the mass of humanity was no longer an unintended consequence of technological innovation, collateral damage. It was the deliberate objective of the heads of a small number of multinational corporations—call them, by this point, the architects of the Artificial State—intent on amassing a kind of planetary power that required dismantling democracy, constitutionalism, and the nation-state for the sake, they said, of saving humanity from the risk of extinction: the risk, that is, of an apocalypse brought about by the very machines they were building.[30] (By 2025, a survey found that more than a third of Americans were concerned that AI would “cause the end of the human race on Earth.”)[31]

If what began as an accident became a dream, it was never a good plan or a coherent one. Instead, it was a tangle of schemes as snarled as a knot of

old extension cords stuffed in a floppy-lidded cardboard box. In 2014, when Eric Schmidt was executive chairman of Google, a Google software engineer and leading Occupy Wall Street activist proposed a three-part plan to turn the United States into a corporation (the engineer was not joking): "1. Retire all government employees with full pensions. 2. Transfer administrative authority to the tech industry. 3. Appoint Eric Schmidt CEO of America."[32] Many more schemes came from the right, and had in common contempt for democracy, frustration with government regulation and inertia, unquestioning faith in technology, a preference for the market as the maker of rules, and a commitment to private corporations taking over the infrastructure of public life and responsibility for the functioning of the nation-state, so long as the nation-state were to exist. A lawyer who'd started out in Silicon Valley and became policy director of the Cato Institute wrote a book, funded in part by the Charles Koch Charitable Foundation, calling for the founding of technological "stateless nations."[33] The self-described "neo-monarchist" Curtis Yarvin, a onetime computer programmer and Silicon Valley tech entrepreneur whose Substack influenced Thiel, venture capitalist Marc Andreessen, and U.S. vice president JD Vance, called for a return to the rule of kings and queens (he was not joking): Yarvin married the business guru Clayton Christensen's theory of disruptive innovation to far-right conspiracy theories in hopes of using the methods of start-up culture to destroy what he called "the Cathedral"—elite-controlled government, media, and universities—so as to replace democracy with dictatorship aided by artificial intelligence.[34] Thiel, despairing of any form of government on Earth suitable to his personal preferences, helped fund Elon Musk's company, SpaceX, with an eye to the "limitless possibility for escape from world politics."[35] Alex Karp, the pensive CEO of Palantir, a firm he founded with Thiel and others, at once indicted Silicon Valley for frittering away its great powers on the trivialities of consumerism and declared that "the future of the West" depended on corporations dedicating themselves to building a "technological republic." Yet little that he endorsed bore any relationship to the principles of republicanism.[36] Meanwhile, Thiel launched a campaign to defeat the Antichrist, whom he identified as anyone urging scrutiny of the development of artificial intelligence out of concern about either human freedom or the natural world.[37]

Efforts to thwart or at least slow the rise of the Artificial State by regulating the development of artificial intelligence were many in Europe, if few elsewhere. Pope Leo XIV called on developers of artificial intelligence "to cultivate moral discernment as a fundamental part of their work" (leading Marc Andreessen to troll him); he also expressed concern that companies developing artificial intelligence were "totally ignoring the value of human beings and of humanity" (comments that placed him, according to Thiel's eschatology, among the "legionnaires of the Antichrist").[38] Europeans, wary, in a way that Americans were not, of machine-driven rule after the scourges of the twentieth century, attempted to constitutionalize a list of rights that might protect humans from machines—rights to privacy, rights to data. But in the U.S., where regulation had been the weakest, due both to the dysfunction of Congress and to the influence of billionaires, even such meager efforts were limited. Instead, the government deferred to merchant princes who endorsed a political philosophy that came to be known as techno-libertarianism.[39] And because so much of the technology—and money—that undergirded the Artificial State came from the U.S., its laissez-faire posture had outsize consequences everywhere.

Denying a role for voters or lawmakers and claiming that their priorities and power superseded that of the nation-state—because they were concerned with the salvation of humanity, civilization, and the future of the species, protecting *Homo sapiens* from the robot apocalypse of their own devising—the executives of leading tech companies routinely presented themselves as the only possible force of restraint, regulation, and redirection, and then, having no real theory of the state or respect for government, invariably failed to restrain, regulate, or redirect themselves. Elon Musk, founder of both an electric vehicle company and a space exploration company, claimed his purchase of Twitter in 2022 was an act of patriotic sacrifice. "I just think it's important to the function of democracy," Musk said. "It's important to the function of the United States as a free country and to freedom in the world more broadly."[40] He then attempted to use his platform, its algorithms, and his wealth to bend political discourse, politics, and government to his will, both in the United States and abroad.

In the aftermath of the debut of ChatGPT, more conscientious tech executives began to acknowledge the damage their own industry had caused or might cause to freedom and democracy around the world. "Plausible theories suggest that internet technology may actually advantage

authoritarianism, not democracy as initially believed," admitted Anthropic's principled CEO Dario Amodei in 2024, confessing that he feared the same would be true of artificial intelligence: "AI seems likely to enable much better propaganda and surveillance, both major tools in the autocrat's toolkit."[41] Yet this moment of hesitation and such candid confessions of doubt proved fleeting. Even careful executives soon began to insist that the only solution to the authoritarianism of AI was to develop artificial intelligence faster, and without any restraint or regulation whatsoever—even as four out of five Americans supported establishing and maintaining rules for AI, even if that slowed its development.[42]

Often lost in the blur of Silicon Valley's dizzying, ever-changing schemes, prophesies, and predictions was that building the Artificial State came at the expense of the natural world, contributing to catastrophic loss of wildlife habitat and biodiversity and accelerating climate change due to the massive energy and water consumption and acquisition of public lands used to build, expand, and maintain the data centers that support its infrastructure.[43] In the AI gold rush, many tech companies that had pledged to meet greenhouse gas emissions goals simply abandoned those pledges as they increasingly chose to build data centers powered by fossil fuels. Between 2005 and 2017, the growth in computing had been offset by gains in energy efficiency; data center electricity use had been flat. That changed with the arrival of hardware built for AI. By 2023, data centers had doubled their electricity consumption.[44] That year, 30 percent of the world's data centers were located in the United States, generally far from public view and often in water-stressed areas, where a single data center might use as much as five million gallons of water a day, the amount consumed by a town of up to fifty thousand people.[45] If data centers had been a U.S. state, they would in 2023 have ranked fourth for total power consumption, after Texas, Florida, and California.[46] By 2024, Microsoft was opening a new data center every three days, and the world's digital sector was producing, by some estimates, nearly 4 percent of all global greenhouse gas emissions, greater than that of the airline industry—usage slated to rise steeply, given that a third of the world's population remained unconnected to the internet.[47] But what was really expected to drive energy consumption were data centers for the age of AI. Tech companies like DeepMind, owned by Google's parent company, Alphabet, claimed that "AI is going to be one of

the main drivers of solutions to the climate situation," but experts dismissed these promises as PR folderol. (The tools to avert or mitigate climate change had existed for decades; the problem was that governments had failed to use those tools.)[48] Between 2025 and 2030, AI was expected to drive a power increase for global data centers of as much as 200 percent.[49] And, given the pace of the race, the power used by data centers was far likelier to draw on fossil fuels—especially coal—than the power used by other industries.[50]

Techno-utopians promised a freedom from constraint, a limitless future for humankind, liberation from laws and rules and the authority of states, an escape from the prison of Earth, from the prison of the human body, even from death itself: resurrection, immortality, salvation.[51] In 2023, Marc Andreessen celebrated the triumph of the "techno-capital machine" and humankind's emancipation from nature by way of everything from robots and brain implants to space colonies and the uploading of human minds to machines.[52] This fantasy had been a long time coming. In 1958, Hannah Arendt had asked why humankind ever became "possessed by a rebellion against human existence as it has been given," consumed by the idea that "something he has made himself," the artificial, would always and inevitably represent an improvement.[53] More recently, the scholar Sunil Amrith described the historical emergence of "a notion previously unthinkable: that true human autonomy entailed a liberation from the binding constraints of nature."[54]How had this come to be?

Why and when did the unthinkable become thinkable? How did a nightmare become a dream? The first part of this book, which chronicles the rise of the Artificial State, attempts to find answers to those questions in the history of science. The second part, which anticipates the fall of the Artificial State, looks for answers in the history of science fiction. But the best answers to the hardest questions are very often found in the murky bottoms of wind-rippled fishing ponds, in pastures dotted with the frowsy blooms of white and red clover, and beneath the wispy, yellowy whips of willow trees. I looked there, too.

1.

THE BOOK OF NUMBERS

> We have only to discover these Laws of Nature, and man will no longer have to answer for his actions and life will become exceedingly easy for him. All human actions will then, of course, be tabulated according to these laws, mathematically, like tables of logarithms up to 108,000, and entered in an index; or, better still, there would be published certain edifying works of the nature of encyclopaedic lexicons, in which everything will be so clearly calculated and explained that there will be no more incidents or adventures in the world.
>
> ***—Fyodor Dostoevsky,* Notes from Underground, *1864***

Excavating the origins of the Artificial State requires taking a rather long view of the human past and raising a host of questions, many of them having to do with the nature and history of knowledge itself. When did humans invent the categories of the natural and the artificial? How did they cleave man from animal, man from gods, man from machine, the man from the man-made? And under what circumstances did they come to imagine the possibility of being ruled not by gods or by men or by laws but by machines?

The establishment of a state requires an accumulation of knowledge. The form that any government takes depends, in part, on the nature of the knowledge it holds. The emergence of the earliest states of significant size depended on rulers' attempts to number the ruled, to take note of them as a collective, a body, a count, a population. Ruling a large number of people, which was generally done by daunting them with weapons and collecting goods or money from them, required knowing, even roughly, how many of

them there were, in order to command enough military power to force their submission. This power, the ability to tally, torment, and tax a population, represented, then, a turning point both in the history of government and in the history of knowledge.

Up until about ten thousand years ago, only about ten million humans lived on Earth, and any given human had only ever met a few dozen other humans (one theory has it that this is why some very old languages have no words for numbers).[1] No one could count any large group of people until populations began to cluster together and to fall under the authority of powerful states. Ancient rulers counted their subjects to measure and gather their strength: to muster armies and to levy taxes whose collection was ensured by the size of those armies.

Taking a census required the administrative skills, coercive force, and fiscal resources of sovereigns ruling over vast territory, which is how it came to pass that the first reliable censuses were taken by Chinese and Roman emperors. Who got counted depended on the purpose of the census. Count everyone, beginning with babies who have teeth, decreed census takers in China in the first millennium BCE, under the Zhou dynasty.[2] "Take ye the sum of all the congregation of the children of Israel, after their families, by the house of their fathers, with the number of their names, every male by their polls," God commands Moses in the book of Numbers, describing a census taken in about 1500 BCE.[3] In England, William the Conqueror commissioned the Domesday Book in 1085 CE to count land and livestock and, for the purpose of taxing them, heads of household.[4]

But counting people was also considered by some Christians to be a usurpation of power, as the size of any population was a mystery, something known only to God, like so much other knowledge of the world—knowledge denied, even, to rulers: "Wee speake the wisedome of God in a mysterie, even the hidden wisedome, which God ordeined before the world unto our glory. Which none of the princes of this world knewe," wrote Paul and Sosthenes to the Corinthians.[5] When, in the second book of Samuel, King David orders Joab to count the people of Israel, "David's heart smote him after that he had numbered the people. And David said unto the LORD, I have sinned greatly in that I have done."[6] Early English colonists in North America forswore counting, as Massachusetts governor John Winthrop explained in 1634, because "David's example stickes somewhat with us."[7]

For much of human history, not only the numbers of people but most other knowledge of the natural world—why stars exist, what causes thunder, when life begins—had been the domain of deities, mysteries known only to gods, wonders to hold in awe. Only over centuries, but accelerating during the scientific revolution, were mysteries revealed and the secrets of nature unveiled by way of observation, detection, and experiment. Many mysteries became things knowable, discoverable, proven: they became facts.[8]

A "fact" is an act, something done, a deed. In the history of the West, its prominence as an elemental unit of knowledge is closely associated with the emergence of trial by jury. In 1215, in Magna Carta, King John of England pledged that "no free man is to be arrested, or imprisoned . . . except by the lawful judgment of his peers or by the law of the land." The establishment of trial by jury—replacing trial by ordeal, which allowed the hand of God to determine guilt or innocence—led both to a new law of evidence and to what has been called "the culture of fact": the idea that an observed or witnessed act or thing—the substance, the *matter*, of fact—is the basis of truth. Later, when the scientific revolution got underway, facts could be established by observation, and also by experiment.[9] To learn about the world, Francis Bacon advised in a 1620 treatise on how to interpret nature, "we must lead men to the particulars themselves, and their series and order; while men on their side must force themselves for awhile to lay their notions by and begin to familiarize themselves with facts."[10] Lay aside your notions, your superstitions, the world of mystery and enchantment, and face facts.

The turn from mystery to facts, like every other transformation in the history of knowledge, had consequences for government. In seventeenth-century England, monarchs began claiming the divine right of kings, cloaking themselves in the power of mystery. "That which concernes the mysterie of the Kings power, is not lawfull to be disputed," declared James VI and I in 1616.[11] It was this idea that the seventeenth-century English revolution and the eighteenth-century American one would defeat. In 1776, the U.S. Declaration of Independence abjured mystery. Instead, Thomas Jefferson wrote, "Let Facts be submitted to a candid world."

The founding of modern liberalism, the beginnings of the liberal nation-state, required questioning the mysteries of state: challenging the divine

right of kings, and arguing instead for the sovereignty of the people, whose power was to be exercised in proportion to their numbers. This required counting. The first modern census, in the sense that it counted everyone and had nothing to do with raising an army or collecting taxes, dates to 1703 and was taken in Iceland, where astonishingly accurate census takers counted 50,366 people (they missed only one farm). The modern census is a function of the modern nation-state and also of the emerging science of demography. It began with the study of records of births and deaths from parish registers and bills of mortality conducted by the Englishmen Sir William Petty and Captain John Graunt, who extrapolated from these records to derive the population of England, founding the field that Petty called "political arithmetic." Another way to do this is to take a census. In 1753, Parliament considered a bill for "taking and registering an annual Account of the total number of people" in order to "ascertain the collective strength of the nation." This measure was almost single-handedly defeated by the Parliamentarian William Thornton of York, who asked, "Can it be pretended, that by the knowledge of our number, or our wealth, either can be increased?" To the contrary, he argued, a census would reveal to England's enemies the very information England sought to conceal: the size and distribution of its population. Also, it violated liberty. "If any officer, by whatever authority, should demand of me an account of the number and circumstance of my family, I would refuse it," he announced.[12] Two years later, in Pennsylvania, Benjamin Franklin published *Observations Concerning the Increase of Mankind*. Franklin had every reason to want to count the people in Britain's North American colonies. He calculated that they numbered about a million, roughly the population of Scotland. Scotland had forty-five members in the House of Commons and sixteen peers in the House of Lords. How many had the Americans? None.[13]

The scientific revolution advanced by observation and experiment, quantification and calculation, which made possible the deduction of the laws of gravity and of energy and allowed for increasingly accurate mathematical prediction. The very movement of the heavens could be calculated. Soon the work of prediction would be applied to human populations. Much eighteenth-century interest in counting people arose from attempts to apply to politics and even morality the methods that Isaac Newton had applied to physics to deduce the law of gravity. In 1725, the Scottish philosopher Francis Hutcheson undertook "an Attempt to introduce

a Mathematical Calculation in Subjects of Morality." His "*universal Canon* to compute the *Morality* of any Actions" included the formula B = (M ± I)/A, where B is "*Benevolence*, or *Virtue* in any *Agent*"; M is the agent's "Moment of publick Good" or "the Quantity of publick Good produc'd by him"; A is "his natural Ability"; and I is "private Interest."[14] If goodness itself could be reduced to a mathematical formula, why not the public good?

Hutcheson founded what came to be known as utilitarianism, writing, "That Action is best, which procures the greatest Happiness for the greatest Numbers."[15] Jeremy Bentham, in 1780, elaborated on Hutcheson's work, describing "the felicific calculus" as "the calculus of pleasure and pain" by which all legislation ought to be measured.[16]

Democracy, while not so relentlessly rational, depended on counting, too. The first mandatory national census, an enumeration of the people, every ten years, was established by the 1787 U.S. Constitution in order to make rule by the people possible: proportional representation is, of course, a mathematical formula.[17] As Pennsylvania delegate James Wilson said at the Constitutional Convention in Philadelphia, "If . . . we depart from the principle of representation in proportion to numbers, we will lose the object of our meeting."[18] The task was herculean: the first time around, it took six hundred fifty census takers eighteen months to count the population of the United States.

The modern state's capacity to count people and Enlightenment philosophers' interest in deducing the mathematical rules that govern human political and social affairs gave rise to what became known as statistics—etymologically, population data recorded in the interest of the state. As the Scotsman Sir John Sinclair would write in 1791, this had begun among Germans who "were engaged in a species of political inquiry, to which they had given the name of *Statistics*; and though I apply a different idea to that word, for by Statistical is meant in Germany, an inquiry for the purpose of ascertaining the political strength of a country, or questions respecting *matters of state*, whereas, the idea I annex to the term, is an inquiry into the state of a country, *for the purpose of ascertaining the* quantum *of happiness employed by its inhabitants, and the means of its future improvement*."[19] Even heads of state who were unpersuaded by the Englishman Thomas Malthus's 1798 *Essay on the Principle of Population as It Affects the Future of Society*, which warned that rapid population

growth leads, inevitably, to poverty, agreed that people needed to be counted.[20] In the decades after the first U.S. Census, in 1790, fifty-four nations, including Argentina in 1853 and Canada in 1867, adopted requirements for a decennial census in their constitutions.[21]

The rise of statistics, or what one historian of science memorably called an "avalanche of printed numbers," contributed to the structure of the modern state.[22] Eager to compile not just tallies but statistics, census takers all over the world went census-crazy. There were six questions on the first U.S. Census. In 1840, by which time the census questionnaires were printed, rather than written by hand, enumerators had to fill in more than seventy columns of answers per household. Many involved sorting people into categories like age and sex and "color."[23] In 1872, the Chief Clerk of the Census devised a machine that could speed up the tallying and tabulating, if not by much (the census of 1880 took nearly a decade to process), and so in 1888 the Census staged a competition for a faster machine. That competition was won by Herman Hollerith, a census analyst and MIT instructor who founded the company that later became IBM. The Hollerith electric sorting and tabulating machine, first used for the census of 1890—which was also the first to sort everyone counted by "race"—turned people into punch cards and allowed not only for faster counting but faster sorting and cross-tabulation, processing five hundred punch cards a day.[24]

This counting and collecting of information about populations likewise undergirded the age of imperialism, which required the bureaucratic control, the sorting and ranking, of distant peoples. The rise of modern empires also led to assessing populations at an even greater scale. Attempts to reliably estimate the population of the whole world began in earnest in 1911, with a count of the population of the British Empire.[25]

As for new nation-states, using mechanical calculating machines to count people made perfect sense, and so did using mechanical devices to cast ballots. Democracy involves not only counting people but also counting votes. In 1849, Jan Józef Baranowski, a Polish polymath, published in Paris a pamphlet announcing a *Nouveau Système de voter au moyen d'un appareil dit: Scrutateur mécanique, donnant immédiatement sans dépouillement, le résultat contrôlé du scrutin de toute* élection *et délibération politique ou commerciale* (New System of voting by means of a device called: Mechanical scrutineer, giving immediately, without

counting, the controlled result of the vote of any election and political or commercial deliberation).[26] Ten years later, the German electrical engineer Werner von Siemens is said to have suggested adapting a telegraph he'd invented into Abstimmungs-Apparate, yes-no machines for legislators. A Sicilian priest invented an ingenious voting machine in 1897, though it appears to never have been adopted.[27] And the very first patent filed by Thomas Edison, who promised "a minor invention every ten days and a big thing every six months or so," was for an automatic vote-recording machine.[28]

The most influential voting machine, "Myers' automatic ballot-cabinet," was introduced in a local election in New York in 1892 by Jacob H. Myers, a maker of highly secure bank vaults. Voters entered a closet-sized box where they punched keys to cast votes that were then automatically tallied while the voters exited by a back door. Versions of the Myers cabinet were swiftly adopted by several U.S. states, although in states whose constitutions mandated paper ballots, turning to machine voting required a constitutional amendment.[29] The turn to voting machines was of a piece with the introduction, beginning in the 1880s, of the secret ballot, also known as the Australian ballot—the practice was imported to the U.S. from Australia—as an anti-corruption and anti-fraud reform. "This system puts an absolute stop to ballot stuffing and box stealing and false counting," as one American reformer reported in 1901. "It checkmates bribery by its perfect secrecy."[30] It was also touted for its ease, accuracy, and, above all, speed.[31]

In the nineteenth century, machines for casting and counting votes aided the establishment of mass democracy, just as in the eighteenth century demography—counting people—made republicanism possible by allowing for proportional representation. In the twentieth century, new tools turned people into digits and, increasingly, into what were called not mysteries or facts or numbers but "data"—a term that came to mean any knowledge impossible to acquire without the aid of a machine. Proponents of the vast world of knowledge made available in the form of and by the processing of and detection of patterns in data found it superior to all other kinds of knowledge, not often realizing that it represented, too, a return to the age of mystery—knowledge as enchantment, wonders to hold in awe.

The building of the Artificial State was never inevitable—it remains evitable—but it was set in motion, the winding of a clock, by the development of machines that can count people, sort them into categories, turn them into numbers, and measure, predict, and influence their behavior. In the nineteenth century, even before those machines were built, they existed as a fantasy, ultimately an authoritarian fantasy, that all of human behavior—and even all events, the future itself—can be predicted and, quite possibly, controlled. Life itself, as Fyodor Dostoevsky's Underground Man warned in 1864, might one day be reduced to "tables of logarithms up to 108,000" and "encyclopaedic lexicons" where "everything will be so clearly calculated and explained that there will be no more incidents or adventures in the world."[32] There would be, instead, only mechanically calculable inevitabilities.

2.

TECHNOCRACY INC.

> Will the technology of the computer and the atom constitute the ineluctable cause of a new social order?
>
> ***—Robert L. Heilbroner, "Do Machines Make History?," 1967***

The Artificial State rests on two ideas. The first is mechanical philosophy, the idea that everything, the natural world, the entire universe, is a machine that operates according to deducible laws, rules subject to quantification, calculation, and prediction. The second is technological determinism, the idea that machines determine the course of history and represent a march of progress. The first idea dates from the seventeenth century, the second from the nineteenth, a century that saw an explosion in machinery, in machine-driven economic growth, and in an enthusiasm for machinery that, married to the era's impassioned evangelism, amounted to mechanical millennialism.[1]

One way to trace this history is through the shifting definition of key terms. "Technology" comes from the Greek word *technē*, meaning the skill required to make something; it has an ancient relationship with the word "artificial." The Romans translated *technē* into *ars*, and added *facere*, meaning to make, to get *artificium*, something made. The modern divide between the arts and sciences, between *ars* and *technē*, words that used to mean the same thing, came about in the eighteenth century (in the division between the fine arts and the technical, or mechanical, arts). The term *technology* began to come into use, in its modern sense, relating to machinery, in 1829—in *Elements of Technology*, by Jacob Bigelow, Harvard's Rumford Professor of Physical and Mathematical Sciences.[2]

By “technology,” Bigelow meant the application of science to useful ends for the benefit of society. He celebrated an age of mechanical revolutions, from the steam engine and the cotton gin to the power loom and the railroad. “Technology” soon came to mean not the making, the art, but the machinery itself, the artifice.[3] In this understanding, the artificial invariably represented improvement over nature.

What Bigelow celebrated, the Scottish historian Thomas Carlyle lamented. “There is no end to machinery,” Carlyle complained in 1829. The world had begun to look like one great machine, “the Machine of Society.” Mechanical philosophy was, to Carlyle, not only a fallacy but something akin to religious delusion—“our true Deity is Mechanism”—one he compared to seventeenth-century New Englanders’ belief in witchcraft. If we think that machines liberate us from the past, he argued, we are wrong; it is we who are their prisoners. “Practically considered, our creed is Fatalism; and, free in hand and foot, we are shackled in heart and soul with far straiter than feudal chains.” We may be blind to those shackles, blinded, as Carlyle put it, by a fog as thick as London’s, but we are just as surely “fettered by chains of our own forging.”[4]

In 1831, in “A Defense of Mechanical Philosophy,” an Ohio lawyer named Timothy Walker offered one of many rebuttals to Carlyle. Machines not only define us but also drive progress, Walker argued: economic progress, moral progress, and political progress, and, by liberating the ordinary man from drudgery that would otherwise prohibit his full political participation, they drive democracy. Walker believed that machines drive history.[5] His mechanical philosophy was millennial.

But the very tools that, for Walker, drove democracy, also drove imperialism. A belief in technology as progress served as a justification for conquest, replacing the missionary zeal for spreading Christianity—saving souls—with a new zeal for improving other people by bringing them new machines. Consider James Mill’s 1817 *The History of British India*, a work said to rival in importance Edward Gibbon’s *The History of the Decline and Fall of the Roman Empire*. Mill—father to John Stuart Mill—believed that there was no better “index of the degree in which the benefits of civilization are any where enjoyed, than the state of the [society’s] tools and machinery.” The more machines, the higher the degree of civilization. Having never been to India proved no obstacle to Mill’s demonstrating, in six volumes, that Indians were stalled at the lowest stage of development,

just past barbarism; something easily measured by the state of their technology, which suffered from "a great want of ingenuity and completeness in instruments and machinery." For decades, Mill's *History of British India* was required reading for civil servants heading to India, where regular steamboat service began running on the Ganges in 1834; by 1852, news of the second Anglo-Burmese war was sent to Calcutta along newly erected telegraph lines; in the 1860s, the British promoted cotton manufacturing and the expansion of the railway—which grew from two hundred miles of track in 1856 to twenty-five thousand miles in 1899.[6]

As the pace of inventions increased, everyone—critics and boosters, imperialists and anti-imperialists—seemed to agree that machines were driving history. "We do not ride on the railroad; it rides upon us," Henry David Thoreau wrote from Walden Pond in 1854.[7] By the middle of the nineteenth century, the question seemed no longer to be whether machines were driving the course of human events, or who was riding and who was ridden, but where everyone was going. In *The Poverty of Philosophy* (1847), Karl Marx argued that every social order is determined by its machinery: "The handmill gives you society with the feudal lord; the steam-mill, society with the industrial capitalist."[8] Writing the next year, John Stuart Mill found it "impossible not to look forward to a vast multiplication and long succession of contrivances for economizing labour and increasing its produce; and to an ever wider diffusion of the use and benefit of these contrivances."[9] In *Capital* (1867), Marx argued that machinery, by creating surplus value, produced the tyranny of capitalism, though for Marx machinery also held out the promise of liberation, the means of reducing human labor to a minimum, but only under communism.[10] Either way, there was no end to the machinery; and that humans and not machines were driving history was a truth lost, ground in the mill, crushed in the gears.

Institutes of technology were soon established. After Bigelow popularized the use of "technology" to cover "the application of the sciences to the useful arts," the word found a place in the name of the Massachusetts Institute of Technology, founded in 1861, the same year telegraph wires reached across the continent. Four years later, when Bigelow delivered an address to MIT's first graduating class, he marveled at how the world had changed in the three decades since he had published his *Elements of Technology*. War had torn the United States apart, but trains

and telegraphs promised to tie it together again: everywhere, technology was changing everything for the better, saving the union, saving democracy. Bigelow's faith was not clockwork deism but mechanical millennialism. "Next to the influence of Christianity on our moral nature," Bigelow said, technology "has had a leading sway in promoting the progress and happiness of our race."[11] *That machine is best which procures the greatest happiness for the greatest numbers.*

The changing definition of "technology" affected the definition of the "natural" and the "artificial" and the line between them, too. In a book published in 1874, John Stuart Mill objected to the increasingly common usage "by which Nature is opposed to Art, and natural to artificial." It was typical to describe, for instance, a steam engine as artificial. But a steam engine is natural, Mill wrote, since it is built by a human—a child of nature—and it uses a force that exists in nature, steam. No machine, for Mill, was artificial. Instead, he insisted, "everything which is artificial is natural."[12]

Mill, however, did not win this argument, and the distinction was widely adopted. It represented the artificial as existing not only outside the natural but above it, an improvement upon it. This conception of the world was fundamental to the Machine Age, which ran from about 1880 to 1945 and saw a transformation in the workings of the state. During the Machine Age, faster, more accurate, and more detailed censuses and more sophisticated tabulating and calculating machines made possible the building of bureaucracies, the quantitative study of social and economic problems, the collection and distribution of resources by social welfare states, especially in western Europe, and the emergence of the administrative state in the United States. It also made possible the workings of empire and the centralization of national power under socialist and communist regimes.

An increasingly sophisticated capacity to count and classify people by way of machine tabulation made possible, too, the rise and influence of newly scientized ideologies of racial difference, including the pseudo-science of eugenics. And the reverse was true: the study of race contributed to the rise of modern statistics. The founders of modern statistics, including Darwin's cousin Francis Galton and Galton's colleague Karl Pearson, developed its key tools—correlation, deviation, regression, the bell curve—in order to advance "eugenics" (a word Galton coined in 1883). Where Darwin had studied animals, Galton studied inherited traits in humans. "The instincts and faculties of different men and races differ in a variety of ways

almost as profoundly as those of animals in different cages of the Zoological Gardens," he wrote. And it was in the study of these differences that Galton devised his statistical methods.[13]

Policy implemented by way of the twin fields of statistics and eugenics became ubiquitous. In the 1890s, for instance, the Prudential Insurance Company, a U.S. firm, hired a German immigrant named Frederick Hoffman to defend the company against the charge that it had engaged in discrimination in refusing to provide insurance to Black Americans. In *Race Traits and Tendencies of the American Negro*, published in 1896 by the American Economic Association, Hoffman delivered that defense by arguing that the statistical analysis of mortality rates and standards of living demonstrated the inherent inferiority of Blacks and the superiority of "the Aryan race."[14] In vain did W. E. B. Du Bois point out that suffering more and dying earlier than everyone else are consequences of discrimination, not a justification for it.[15]

For the 1910 U.S. Census—a census accelerated by the latest calculating machines, capable of still more elaborate tabulations and cross-tabulations—Congress debated adopting an even more extensive taxonomy for "color or race," a classification scheme initially devised by Edward F. McSweeney, the assistant commissioner of immigration for the Port of New York. Devising a "List of Races and Peoples," McSweeney conflated four different, then-current ideas about divisions among humans: "race," "people," "stock," and "nationality." One of the "races" on his list was "Jews."[16]

From the U.S. Census Bureau to the British Colonial Office, census takers were increasingly concerned with sorting humans into categories. Nazi Germany pursued a policy of Erfassung, the total registration of the population. "We are recording the individual characteristics of every single member of the nation onto a little card," the head of an IBM subsidiary in Germany explained in 1934. Questions on the Nazi censuses of 1938 and 1939 were those the U.S. Congress had considered, and rejected, for Jews, but left intact for other "races and peoples": "Were or are any of the grandparents full-Jewish by race?"[17] Then began the deportations, the movement from punch cards to boxcars of humans tattooed with numbers.

Assigning numbers to humans as a means of identification soon became commonplace. The U.S. in 1936, under the Social Security Act, assigned a

unique nine-digit number to Americans for use in payroll deduction into a pool to provide benefits to the elderly, the dependent, and the jobless (not all Americans were required to participate).[18] To its critics, requiring some American workers to register with the federal government looked like despotism. In 1936, the head of the Republican Party, attempting to whip up opposition to FDR's campaign for reelection, warned that "if the Roosevelt administration is returned to power, we shall see two groups of citizens in this nation: those who are numbered and those who are not numbered."[19] The system was remarkable, less for those who protested it than for the very many who embraced it, engraving their Social Security numbers on rings and bracelets, emblems of equal citizenship.[20] Nor was the U.S. alone. Sweden assigned a *personnummer* to all citizens beginning in 1947; Icelanders were assigned a *kennitala*, an eight-digit number, beginning in 1952, when each person in the country was given a punch card in the National Register.[21]

Yet no development from this era more uncannily anticipated the rise of the Artificial State than Technocracy, with a capital *T*, at once an idea and a movement that first gained worldwide attention in 1931, in the midst of the Great Depression, when a onetime construction worker and charismatic fraud named Howard Scott, variously calling himself Director-in-Chief and Chief Technocrat, founded an organization he called Technocracy Inc. With offices in Los Angeles, Calgary, and Chicago, and a "Continental Headquarters" in Midtown Manhattan, Technocracy Inc. issued a flurry of tracts, periodicals, and pamphlets explaining how "life in a technocracy" would be utterly different from life in a democracy: "Popular voting can be largely dispensed with," for instance, because "it is stupid."[22] As banks closed and the masses starved, Scott, whose followers ranked him with Galileo and Darwin, argued that both capitalism and liberal democracy had failed, as had communism, socialism, and fascism. He therefore proposed the abolition of all existing economic and political arrangements and their replacement by engineers, who would rule by numbers. "A new scientific state known as an 'energy state' was to be set up," wrote a reporter for the *New York Herald Tribune* in *What Is Technocracy?*, a 1933 book.[23] This scientific state would comprise all of North America and would be called the "Technate of America." The members of Technocracy, Inc. referred to themselves not by names but by numbers. A Minnesota-born chiropractor

and amateur aviator named Joshua N. Haldeman, who had lost his Saskatchewan farm during the Depression, became the party's national chairman in Canada.[24]

Scott explained that Technocracy "does not subscribe to the basic tenet of the democratic ideal, namely that all men are created free and equal," since, in the modern world, only scientists and engineers have the intelligence and education to understand the industrial operations that lie at the heart of twentieth-century life. His army of Technocrats intended to replace or eliminate most government services: "Even our postal system, our highways, our coast guard could be made much more efficient."[25] Also, overlapping agencies could be shuttered and "ninety percent of the courts could be abolished."[26] There was very little need for any government, any state, at all. Or for banks. "There will be no place for Politics or Politicians, Finance or Financiers, Rackets or Racketeers." There would be only scientists and engineers. "Technocracy, briefly stated, is the application of science to the social order," according to a pamphlet called *Technocracy in Plain Terms*. "Money cannot be used, and its function of purchasing must be replaced by a scientific unit of measurement," Technocrats explained, assuring doubters that nearly everyone "would probably come to like living under a Technate."[27] Members of the Technate did not have names; they had numbers: one Technocrat called himself "1x1809x56."[28] Joshua Haldeman was Technocrat number 10450-1.[29]

"In its best moments Technocracy Inc. was an organization of crackpots; in its worst, an inept swindle," as one commentator nicely put it.[30] Influenced by Thorstein Veblen's *Engineers and the Price System*, Technocrats proposed replacing the price system with a unit of energy known as an "erg" that took into account the supremacy of machines over the human body. "Up to less than one hundred years ago the human body was the most efficient machine for energy conversion on earth," Scott said in an interview at Columbia University. But "the advent of technology makes all findings based on human labor irrelevant, because the rate of energy conversion of the modern machine is many thousand times that of man."[31]

Technocracy briefly seemed poised, if not to prevail over then at least to contend against, democracy.[32] At its height, in 1932 and early 1933, Technocracy dominated headlines across the United States and Canada and

drew in hundreds of thousands of members—white-collar and middle-class—to chapters and organizations across the continent, from the All American Technological Society in Chicago to the American Technocratic League of Denver. The Continental Committee on Technocracy counted more than a quarter of a million members. Seven thousand people showed up for a rally in Seattle. Los Angeles alone published four Technocracy periodicals and boasted six Technocracy organizations, including the American Council of Technocracy. A Technocrat rally drew ten thousand people to the Hollywood Bowl. Technocrats promised that they alone could save humanity from destruction: "What Technocracy Inc. is chiefly engaged in now is the organization of an army of trained men and women in the United States and Canada who, when the present interference controls break down and the intricate machinery of production and distribution is in danger of stopping, will be able to prevent that catastrophe before it is too late."[33]

In the four-month period between November 1932, when FDR was elected, and March 1933, when he took office, *The New York Times* published more than one hundred seventy stories about Technocracy.[34] "For a moment in time, it was possible for thoughtful people to believe that America would consciously choose to become a technocracy," writes the author of the definitive historical study, *Technocracy and the American Dream*.[35] And then: the bubble burst. In January 1933, *Harper's* published a piece by Scott, touting Technocracy; in February, *Scribner's* published a withering takedown, "Technocracy—the New Bunk."[36] By summer, two of the movement's organs, *The Technocrats' Magazine* and *Technocracy Review*, had gone out of print.

There were a few reasons for Technocracy's quite sudden implosion, among them the revelation that Scott was a fraud (he had, for instance, claimed to be an engineer with a doctorate from the Technische Hochschule in Germany, but he had no degree, nor does it appear that he ever worked as an engineer).[37] Also, it was difficult to take Technocrats seriously; they had something of the quality of the P. G. Wodehouse character Roderick Spode, he of the Black Shorts, cut-rate Brownshirts. (In February 1933, *The New Yorker* published a short story in which two couples head to New Hampshire, joking that they're looking for "a place to hide out in. . . . In case of Communism or technocracy.")[38] Then too, because Technocrats did not believe in parties, elections, or politics of any kind—"Technocracy has

no theory for the assumption of power," as Scott put it—they had little means by which to achieve their ends.[39]

But the chief reason for Technocracy's failure was democracy's success. FDR was inaugurated on March 4 and immediately began implementing his promised New Deal while calming the nation with a series of fireside chats. In May, E. B. White in *The New Yorker* wrote what he expected to be Technocracy's epitaph: "Technocracy had its day this year, and it was characteristic of Americans that they gave it a whirl and then dropped it as they had dropped miniature golf." Well, he was wrong about miniature golf, but he was right about the rest:

> Two months was all this country could spare technocracy. The first month was spent cringing at the sound of the name and quailing at the pictures of robots and Sunday-supplement monsters. The second month was spent discovering the wholly satisfying news that Howard Scott had lived in Greenwich Village and that therefore there could be nothing to the energy notion because it was the work of a bohemian. This quality of the American people of being able to worry greatly about a thing and dismiss it fast is one of the factors to be taken into account in the social revolution; any plans made for society will have to recognize it.[40]

None of this flagged the enthusiasm of Joshua Haldeman. He remained a stalwart, loyal even to the defrocked Howard Scott, who still headed the movement from its Continental Headquarters on East Forty-Fourth Street in New York.[41] Haldeman led mass demonstrations of Technocrats at a time when they wore identical gray suits and drove identical gray cars in what was known as the Gray Fleet. In 1940, when Canada banned Technocracy Inc. out of fear that its members were plotting to overthrow the government, Haldeman took out an ad in a newspaper, proclaiming Technocracy a "national patriotic movement."[42] Weeks later, when Haldeman tried to enter the U.S. for a Technocracy speaking tour, he was denied entry at the border.[43] (This may have been due either to a 1938 passport regulation that barred travel into the United States to any "alien whose entry would be contrary to the public safety" or to new passport requirements under the 1940 Alien Registration Act.)[44] Provincial police and the Royal Canadian

Mounted Police raided Technocracy offices, seizing movement literature and documents.[45] In Vancouver, Haldeman was arrested, convicted, and, for two months, imprisoned.[46]

But his ideas lived on. Joshua Haldeman, Technocrat 10450-1, was Elon Musk's grandfather. For all of Musk's supposed futurism, nearly everything he promised as he rose to prominence, wealth, and power came from Technocracy's past, from a failed movement that advocated some of the most discredited ideas of the twentieth century.

3.

MACHINES THAT THINK

> The sea pronounces something, over and over, in a hoarse whisper; I can't quite make it out. But God knows I've tried.
>
> ***—Annie Dillard, "Teaching a Stone to Talk," 1981***

Mocked, defeated, beset by scandal after scandal and even outlawed, the Technocracy movement wilted, shrank, and died. In Canada, Technocracy Inc. having been banned by the government, Joshua Haldeman joined the infamously anti-Semitic Social Credit Party, becoming its national chairman. In 1947, he defended the party's publication of *The Protocols of the Elders of Zion* (an infamous literary forgery purporting to provide proof of an international Jewish conspiracy), maintaining "that the plan as outlined in these protocols has been rapidly unfolding."[1] The next year, in the U.S., more than a hundred New York members of Technocracy Inc. sued Howard Scott, describing him as possessed of "an unquenchable thirst for power" and accusing him of compensating himself excessively and misusing funds.[2] In 1949, after the white government of South Africa announced the policy of apartheid, Haldeman began thinking of moving there. The next year, he emigrated to Pretoria, where he became an ardent defender of the apartheid regime and continued his career as a prolific conspiracy theorist, railing against Jews, Blacks, Communists, universities, the press, and vaccines.[3]

Meanwhile, the age of numbers yielded to the age of data. It was during this era, beginning in the 1950s, that the building of the infrastructure of the Artificial State began, with the construction of machines that could count better, faster, and more accurately than humans by orders of magnitude,

developments that took place during an era historians call the Great Acceleration and some geologists call the Anthropocene. Beginning about 1945, the human population of the planet exploded, fossil fuel consumption skyrocketed, and digital technologies proliferated, while wildlife populations, wildlife habitat, and tree cover plummeted.[4]

During the Second World War, statistics became more mathematical, for the sake of becoming more predictive, which was necessary for wartime applications involving everything from calculating missile trajectories to cracking codes. This work—government-funded and undertaken in the public interest for the sake of winning a war—required faster and more adaptive calculating machines, leading to the development of the general-purpose computer. Then, during the Cold War, mathematical modeling, increased data storage capacity, and computer simulation were used not only in classified military and intelligence work but also in social science research and government administration of everything from welfare provision to national security.[5] Only later would these tools be applied, by private companies, as substitutes for the democratic functions of representation, deliberation, and participation.

None of this had been anticipated by the mathematicians and engineers who pioneered increasingly sophisticated calculating machines before and during the war. In 1936, in an article called “On Computable Numbers,” the English mathematician Alan Turing ventured the possibility of “a single machine which can be used to compute any computable sequence.” Turing went on to devise a single-purpose computer able to break German codes.[6] Beginning in 1937, Howard Aiken, working first for Harvard and then at IBM, developed Mark I.[7] At the start of the war, it took women mathematicians known as “computers” a month to calculate the possible trajectories of certain missiles. In 1943, the War Department commissioned the University of Pennsylvania physicist John Mauchly and the electrical engineer J. Presper Eckert Jr. to build a digital electronic computer that could do that same work nearly instantly. Not until the end of the war did they complete work on ENIAC (Electronic Numerical Integrator and Computer), whose eighteen thousand vacuum tubes, seventy thousand resistors, and ten thousand capacitors filled a thirty-by-fifty-foot room.[8]

Peacetime conversion led to new applications for wartime technologies. “I am thinking about something much more important than bombs,” John

von Neumann wrote in 1945. “I am thinking about computers.”[9] That year, Eckert and Mauchly unveiled their previously top-secret machine during a demonstration for reporters. “The robot possibly opened the mathematical way to better living for every man,” the Associated Press reported. The *Times* went further: “The ‘Eniac,’ as the new electronic speed marvel is known, virtually eliminates time in doing such jobs.”[10] Its inventors then set about developing a commercial version through the former typewriter manufacturing firm Remington Rand; they debuted the UNIVAC, or Universal Automatic Computer, in 1951. It was half the size of ENIAC, and even faster. Reported the *Times*: “In one-sixth of a second the electronic device can classify an average citizen as to sex, marital status, education, residence, age group, birthplace, employment, income and a dozen other classifications.”[11]

As the *Times* report made clear, the most readily obvious application of such a machine was in counting and sorting people, their votes, and their opinions. The UNIVAC’s first use was to tabulate the 1950 U.S. Census. But making population and voting records available on punch cards that could be fed into a UNIVAC also promised to extend the reach and influence of the self-described “scientific” polling industry that both measured public opinion and predicted the outcome of elections. That industry had been born in 1935 with George Gallup’s founding of the American Institute of Public Opinion Research and Elmo Roper’s inauguration of the Fortune Survey. “Perhaps it is a symbol of our lost individualism that one can today look at a crowd of people at a ball park and feel sure not only that most of them carry in their pockets cigarettes of three leading brands, but that 62 percent of them think that government regulation of the stock market has helped investors,” *Harper’s* had observed in 1938. As for the man in the street, “we know what he is thinking to the third decimal place.”[12] Roper used a tabulating machine that he described as capable of doing “everything but scramble eggs for breakfast.”[13] Public opinion surveys helped constitute the very notion of a mass public, a collective “we.” Even as pollsters acknowledged that “the American people are as various as their land,” they sought to reduce the population to the “average American,” emphasizing, as one report’s title had it, that “We, the People, Are Like This.”[14] Replacing tabulating machines with general-purpose computers transformed the polling industry by accelerating its

calculations and allowing for more precise segmentation of the population and more elaborate predictions of people's behavior.

But what about the behavior of the machines themselves? They processed information. Could they be said to be exhibiting intelligence? In 1948, in an unpublished report titled "Intelligent Machinery," Alan Turing outlined an investigation into "the question as to whether it is possible for machinery to show intelligent behaviour"; described what would come to be called "artificial neural networks," or ANNs (on the theory that "it is possible to make machinery to imitate any small part of a man"); and, to assess whether a machine had acquired intelligence, proposed what would eventually be known as the Turing test.[15] Turing presented the report's key arguments in an essay published in the philosophy journal *Mind* in 1950.[16] Two years later, the Vassar mathematician and computer-language pioneer Grace Murray Hopper described the aim of the general purpose-computer as being "to replace, as far as possible, the human brain."[17]

Leaping ahead of the science and invoking specters more commonly found in science fiction, the press described the new machines as if they were so many squishy brains in glass jars. A 1949 book called *Giant Brains: Or Machines That Think* defined a "mechanical brain" as "a machine that handles information, transfers information automatically from one part of the machine to another, and has a flexible control over the sequence of its operations."[18] Mauchly was unhappy with the public response to "giant brains," given that it was not yet clear who, other than the Census Bureau or a mad scientist, could possibly use such a device. The UK's first computer, the pioneering LEO (Lyons Electronic Office), was built between 1949 and 1951 by J. Lyons & Co., a cake and tea shop conglomerate. Its first use was to calculate bakery valuations.[19] It never quite took off, outside of running Lyons's catering operations, and no one in the UK, or in Europe, would use a general-purpose computer for political campaigns for decades.

In the U.S., to explain that businesses could use a UNIVAC for tasks like payroll and inventory, Remington Rand produced a promotional film that established the conventions of boosterism about intelligent machines. "The scientists at Remington Rand have created a miracle of electronic development: UNIVAC! A complete electronic system for sorting, classifying, computing, and decision-making," it promised. "Right now,

UNIVAC is handling, automatically and economically, unbelievable volumes of statistical work for the United States Bureau of the Census." Computers, Remington Rand promised, would be "powerful servants, designed to further mankind's future progress in all fields of endeavor. . . . Tomorrow's miracle of electronics, here today!"[20]

Observers in the U.S. and around the world were dazzled, too, by two widely read books by the MIT mathematician Norbert Wiener: *Cybernetics, or Control and Communication in the Animal and the Machine* (1948), on the possibilities of the new machines, and *The Human Use of Human Beings: Cybernetics and Society* (1950), on his ethical concerns about those same machines.[21] Wiener, who coined the term "cybernetics" from a Greek word that has the same root as the English word for "governor," hoped "to find the common elements in the functioning of automatic machines and of the human nervous system, and to develop a theory that will cover the entire field of control and communication in machines and in living organisms."[22] *The Saturday Review* declared it "impossible for anyone seriously interested in our civilization to ignore" *Cybernetics*.[23] Wiener, however, was not sanguine about the development of increasingly intelligent machines. The "real danger," he later warned, "is that such machines, though helpless by themselves, may be used by a human being or a block of human beings to increase their control over the rest of the human race or that political leaders may attempt to control their populations by means not of machines themselves but through political techniques as narrow and indifferent to human possibility as if they had, in fact, been conceived mechanically."[24]

Yet reticence about the possible ethical chaos unleashed by the political use of the new machines did not characterize the American response to them. Frustrated by his company's inability to find buyers for the UNIVAC, Mauchly hired a publicity team that came up with an ingenious scheme to convince CBS News to use a UNIVAC on election night 1952 to predict the outcome of the voting on live television, convinced that, as one CBS executive put it, "we could in all probability announce the winner of the presidential race while our competitors were still floundering in a sea of unsorted data."[25] The network prepared a press release: "CBS-TV to Use Giant Electronic 'Brain' Election Night," describing the UNIVAC as about eighteen thousand times the size of a human brain.[26] There was no way to

move a UNIVAC from Remington Rand's headquarters in Philadelphia to the CBS studio in New York, so CBS correspondent Charles Collingwood sat at a fake console while results from Philadelphia were phoned in to New York. "A UNIVAC is a fabulous electronic machine, which we have borrowed to help us predict this election from the basis of the early returns as they come in," Collingwood told his audience as the evening's coverage began. "This is not a joke or a trick," he said, feeling the need to clarify. "It's an experiment. We think it's going to work. We don't know. We hope it'll work."[27]

Not to be outdone, NBC devised its own scheme for what it was calling "Operation Election Night." It debuted the Monrobot Electronic Calculator, manufactured by the Monroe Calculating Machine Company, which described it as a "general-purpose, sequence-controlled, digital computer." Weighing only a thousand pounds, it was portable and so was installed at Rockefeller Center. "Meet Mr. Mike Monrobot, 'Electronic Brain,' Who Will Compute Election Count for NBC Radio and TV; Mechanical Wizard Can Tackle Many Problems at Once," read NBC's press release. "Mike's real name is Monrobot and naturally he has a great head for figures. His electronic gray-matter perks so fast that Mike needs a cooling system to keep him from working up a sweat." Meanwhile, ABC News, which in truth was relying on IBM machines, informed viewers that it was covering the election with old-fashioned pencil and paper, announcing that "the trends, percentages, comparisons, analyses, and above all, the returns, will be reported over the ABC radio and TV networks by not one but 40 of the fastest, most accurate brains known to human science": reporters, including Walter Winchell, whose brains weighed an average of 53 ounces each.[28]

There were, in fact, very few giant brains. By 1953, between those manufactured by Remington Rand and IBM, there were nine general-purpose computers in the United States.[29] Nevertheless, an explosion of population, voting, and polling data, combined with the development of the UNIVAC, the IBM 650, and less powerful data-processing computers, drove the new field of voting behavior studies, as quantification for the purpose of prediction became the lodestar of all research into societies and governments.[30] These tools, combined with the intelligence mandates of the national security state during the Cold War, led to a dedicated focus on prediction.

This turn in the history of knowledge—toward machine-calculated, data-driven prediction—also contributed to the diminishment of the prestige and influence of the humanities, year by year, decade by decade. Humanistic inquiry traffics in facts and truth, the making of meaning through close reading and the exercise of human discernment, not in data and prediction, the automated detection of pattern. It looks to the past. The age of data looks to the future.

Less than a century after Dostoevsky predicted that one day "encyclopaedic lexicons" and "tables of logarithms up to 108,000" would make it possible for everything to "be so clearly calculated and explained that there will be no more incidents or adventures in the world," that day seemed at hand, no longer a matter of literary speculation but the particular plan of funders of research in the physical and social sciences.[31] Mid-twentieth-century computing systems provided the infrastructure for what the historian of science Paul Edwards has called "the closed world discourse" of the Cold War, the fantasy that computing technology could allow for the prediction of all future events and possible conflicts between the world's superpowers such that global catastrophe could be averted.[32] If essential to the U.S. government's "grand strategy" abroad, this dream of the perfect predictability of future events ran through domestic discourse as well. It entirely transformed higher education, flooding certain university departments with money and leaving others with hardly any resources at all.

The RAND Corporation—RAND is short for "*R*esearch *AND* *D*evelopment"—began as an arm of the U.S. Air Force but, in 1948, newly independent, it launched a Social Science Division, whose projects included devising, mathematically, "a general theory of the future."[33] Predicting the motion of everything from distant stars to tectonic plates using these tools made perfect sense; predicting consumer spending or political belief was considerably sketchier. The mandate that the only things worth studying were things that could be quantified and predicted distorted many realms of human inquiry. In 1954, Claude Lévi-Strauss argued that social scientists need "to break away from the hopelessness of the 'great numbers'—the raft to which the social sciences, lost in an ocean of figures, have been helplessly clinging."[34] It was too late. National funding agencies had already started to require that projects submitted by applicants be predictive. The Ford Foundation announced that it would no longer fund

nonpredictive research in fields like philosophy and political theory, deriding such disciplines as "polemical, speculative, and pre-scientific," and would instead fund only research that could be, like physics, based on "experiment, the accumulation of data, the framing of general theories, attempts to verify the theories, and prediction."[35] The quantitative social sciences grew; the humanities shrank.

The notion that machines built during the Cold War might one day create an artificial state had become by now a regular and even predictable feature of science fiction. In 1952, the Russian-born American writer and biochemistry instructor Isaac Asimov watched UNIVAC's election-night coverage and began writing a series of stories featuring a very thinly disguised "Multivac."[36] In 1955, in a short story called "Franchise," Asimov explored the possibility of an artificial state in a tale set in Bloomington, Indiana, a half century in the future—on the eve of the U.S. presidential election, November 4, 2008—a world in which the United States has become a wholly "Electronic Democracy" whose elections are fully automated. "There was a time I voted," an old man, Matthew, overcome with nostalgia, tells his ten-year-old granddaughter, Linda. "Marched right up to the polling booth, stuck my fist on the levers and voted. There was nothing to it. I just said: This fellow's my man and I'm voting for him. *That's* the way it should be."

Long since, that system had been replaced by the Multivac, which uses population data to choose a single, mathematically representative American man to answer a series of questions. His replies allow Multivac to determine the next president of the United States. Linda can't fathom a better way, asking her grandfather,

> "How did all the people know who to vote for? Did Multivac tell them?"
>
> Matthew's eyebrows hunched down and he looked severe. "They just used their own judgment, girl."
>
> She edged away from him and he lowered his voice again. "I'm not angry at you, Linda. But, you see, sometimes it took all night to count what everyone said and people were impatient. So they invented special machines which could look at the first few votes and compare them with the votes from the same places in previous years. That way

the machine could compute how the total vote would be and who would be elected. You see?"

She nodded. "Like Multivac."

But it had happened slowly, bit by byte, device by device. "The first computers were much smaller than Multivac," the old man tells the little girl.

"But the machines grew bigger and they could tell how the election would go from fewer and fewer votes. Then, at last, they built Multivac and it can tell from just one voter."

Linda smiled at having reached a familiar part of the story and said, "That's nice."

Matthew frowned and said, "No, it's not nice. I don't want a machine telling me how I would have voted just because some joker in Milwaukee says he's against higher tariffs. Maybe I want to vote cockeyed just for the pleasure of it. Maybe I don't want to vote. Maybe—"

The old man is especially furious at the promises made by the men who designed the Multivac. "It would end partisan politics, they said. No more voters' money wasted on campaigns. No more grinning nobodies high-pressured and advertising-campaigned into Congress or the White House. So what happens? More campaigning than ever."[37]

Liberal democracy depends on free and fair elections. Asimov's "Franchise" is an expression of a 1950s-era concern about unfree and unfair elections, elections conducted by automation involving the calculation of averages and the machinery of prediction, a cautionary tale about the rise of the Artificial State. (The fear was common. The year 1956 saw a story called "2066: Election Day," in which the president of the United States is elected by a computer called SAM until this "last and the greatest of all the electronic brains" determines that no human is as qualified to run the country as SAM itself is. The president's closest advisors fear that SAM will indeed soon be running the country. "That is government by machine!" cries one member of the cabinet. "I will not tolerate it!")[38] These literary cautionary tales had their counterparts in nonfiction. In 1956, the political scientist Eugene Burdick published a magazine article called "How You'll Vote in '56," in which he explained that quantitative research had proven

that party preferences are determined by factors that include your age and your parents' party affiliation. You could see it for yourself, by taking Burdick's quiz ("Is your father a Democrat or Republican? Put 5 points under the column of your father's party"; "If you are below thirty years of age put 4 points in the Republican column") and using a chart to calculate your probable vote: "In 9 cases out of 10, it will forecast your ballot now!"[39] Even without the Multivac, Americans' votes could be predicted.

In August of 1955, the month "Franchise" appeared in a pulp science fiction magazine, the field of artificial intelligence was born, in a proposal submitted to the Rockefeller Foundation by the Dartmouth mathematics professor John McCarthy; Marvin Minsky, then a junior fellow in mathematics and neurology at Harvard—his PhD thesis at Princeton was called "Theory of Neural-Analog Reinforcement Systems and Its Application to the Brain-Model Problem"; Claude Shannon, a mathematician at Bell Labs and founder of information theory; and IBM's Nathaniel Rochester, who had helped design the IBM 701. They proposed to hold a two-month, ten-man summer research seminar at Dartmouth on what McCarthy described as the possibility "that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it." Were machines to be taught to use language, the men suggested, computers could one day soon solve the "kinds of problems now reserved for humans, and improve themselves." They proposed to call this new field of study "artificial intelligence."[40]

They had to call it something, and they were (most of them) irritated by Norbert Wiener, with all of his ethical fretting, so they couldn't call it "cybernetics." They settled on artificial intelligence. Both words in that phrase were imperfect. Did or could machines really possess "intelligence"? That was and remains debatable.[41] Also, not everyone who participated in McCarthy's research project at Dartmouth was persuaded that it was a good idea to call what they were conceiving of *artificial* intelligence. Didn't that make it sound fake? "The word artificial makes you think there's something kind of phony about this," Arthur Samuel of IBM pointed out, "or else it sounds like it's all artificial and there's nothing real about this work at all."[42] It somehow sounded . . . bogus.

But calling a computer's intelligence "artificial" was, at the time, an excellent marketing decision given the 1950s love for all things artificial.

Right on the packaging, food companies hawked “artificial sweeteners” and “artificial fruit flavors” as better than the natural ones; baby formula was sold as “artificial milk.” On your legs you could wear not silk stockings or nylons but “artificial silk”; during the holidays you could stick up an “artificial Christmas tree,” made of aluminum. Outdoors, there was “artificial weather,” the attempt to control or enhance conditions by methods that included everything from cloud-seeding and mechanical fog dispersal to snowmaking and hurricane diversion.[43] “Artificial suns” were expected to extend the growing season for farmers.[44] The U.S. Army was purported to be developing “artificial moonlight.”[45] Indoors, electricity and air-conditioning created “artificial light and weather” in windowless factories.[46]

If there was enthusiasm for these schemes, they were also deftly mocked. In a satirical essay called “The Last Days of the Machine Age,” in *Harper’s*, the literary critic Stanley Edgar Hyman suggested that Americans would reject General Electric’s “artificial snow” because while its flakes were “1/50 the size of natural snowflakes, much more regular in shape, easier for the robot snowplows to handle, and could be colored any shade desired,” they couldn’t be packed into snowballs. Interested, too, in the possible overthrow of artificial politics, Hyman imagined a near future in which the “last days of the Machine Age” arrive in 1948 when “a special election was called hastily, without voting machines, and when the ballots were counted it turned out that the new President was neither of the party nominees but an eccentric middle-aged poet who lived in New Jersey, working by kerosene light and raising his own food,” and who, once in the White House, proceeded to “put a confiscatory tax on anything using motive power other than the human limb, and the rest is, of course, history.”[47]

How had “artificial” achieved such prominence? In the early postwar years, “artificial” connoted scientific mastery over nature.[48] John Stuart Mill had observed decades before (when he objected to it) that the word *artificial* had come to mean an improvement over the natural; the Cold War’s understanding of the word went much further. “The world we live in today is much more a man-made or artificial world than it is a natural world,” wrote Herbert Simon, a founder of Carnegie Mellon’s School of Computer Science and a participant in the Dartmouth project. (He went on

to win both a Nobel Prize and a Turing Award.) In *The Sciences of the Artificial*, Simon sought to further elevate the man-made by proposing four criteria for distinguishing the artificial from the natural:

1. Artificial things are synthesized (though not always or usually with full forethought) by man.
2. Artificial things may imitate appearances in natural things while lacking, in one or many respects, the reality of the latter.
3. Artificial things can be characterized in terms of functions, goals, adaptation.
4. Artificial things are often discussed, particularly when they are being designed, in terms of imperatives as well as descriptives.

For Simon, who strenuously rejected Wiener's ethical concerns about the possible use of machines to control humans, "no artifact devised by man" was so perfectly or so wonderfully artificial as the digital computer.[49]

"Artificial intelligence" stuck. In 1955, the Rockefeller Foundation agreed to fund McCarthy's proposal, although it offered only half the money requested, explaining that "the general feeling here is that this new field of mathematical models for thought, though very challenging for the long run, is still difficult to grasp very clearly." The gathering, however, failed to generate a report, much to the frustration of its funders.[50] But if that Dartmouth summer didn't establish a uniform direction for an emerging field, it did generate excitement and interest, including among those who were there only as visitors, like IBM's Alex Bernstein, who had written the first program allowing a computer to play chess.[51] Bernstein would soon be featured playing chess against an IBM 704 in a film reel titled "Thinking Machines." He suggested that one day a computer would be able to learn from its mistakes and improve its game.[52] That was also the promise made by Cornell psychologist Frank Rosenblatt, working at the U.S. Office of Naval Research. In press appearances in 1958, using another IBM 704, Rosenblatt explained his intention to build "the first machine which is capable of having an original idea": "an intelligent automaton."[53] He called it the Perceptron, a computer program that operated by mimicking the structure of the human brain—a network of neurons—making it capable of

learning by experience and able to "grow wiser."[54] *The New Yorker* called it "the first serious rival to the human brain."[55]

Only months after Rosenblatt announced his intention to build the Perceptron, a second meeting, much larger than the Dartmouth seminar, was held at the National Physical Laboratory in Teddington, England. The authors of the thirty-two papers delivered at the 1958 conference in Teddington, including Rosenblatt, whose paper on the Perceptron was among the submissions, glimpsed the possibility of artificial humans. Unlike the Dartmouth group, the Teddington meeting generated a report, *Mechanisation of Thought Processes*—two volumes, and nearly a thousand pages. The four-day meeting was also international and included representatives not only from the academy and industry but also from the military, government, and business. Speakers included French, Israeli, Russian, and Hungarian scientists, and the conference's more than two hundred attendees included participants from Holland, Germany, Sweden, Switzerland, and South Africa. (Only 24 of the 242 attendees were from the U.S.)[56]

Had a race to build an intelligent machine—a machine that could think and talk—begun in earnest? Some experts had suggested that the invention of a truly intelligent machine would need to await the scientific penetration of the intricate workings of the human mind. But at Teddington, Marvin Minsky, now at MIT, argued otherwise, declaring that "even for those whose central interest is in unraveling the mysteries of the brain, it might be well to devote a major share of the effort, at the present time, to the understanding and development of the kind of heuristic considerations that some of us call 'artificial intelligence.' "[57] Minsky dismissed Rosenblatt's Perceptron and the idea of simulating the structure of the human brain with neural networks. ("This is an idea with no future," Minsky scoffed.)[58] You don't need to simulate human intelligence by building a machine that mimics the human brain, Minsky insisted, so there was no need to wait for scientists to unravel the mysteries of the human brain before building a brainy machine; you could instead synthesize a brain: making something quite like it by making something entirely different.

Whichever side of the argument you took, a new day appeared to be dawning. "There was something dizzying in this feeling that we had located the mystery and the existence of Man, and then seeing human beings recast

in the hands of men of science," a French philosopher reporting on the conference in *Le Monde* observed, remarking that the feeling that would linger after the conference was one of the "resurrection of the human, this impression that, after so many disappointments, we are within sight of a New World"—the resurrection of the human as a machine, the final mystery solved.[59]

That New World featured, too, a series of tragedies: an atomic arms race, changes to the earth's climate, and, everywhere in the industrialized world, pollution, deforestation, and the eradication of wildlife species and habitats. "It is only within the moment of time represented by the twentieth century that one species—man—has acquired significant power to alter the nature of his world," Rachel Carson wrote in 1962, "and it is only within the past twenty-five years that this power has achieved such magnitude that it endangers the whole earth and its life."[60] During the Great Acceleration, at the dawn of the age of data, humanity glimpsed not only the possibility of the resurrection of the human as a machine but the possibility of humanity as a menace to the planet itself.

4.

COMPUTOPIA

> I am led to the conclusion, which I trust others will find persuasive, that we are becoming the servants in thought, as in action, of the machine we have created to serve us.
>
> ***—John Kenneth Galbraith,* The New Industrial State, *1967***

Between the 1950s and the 1980s, computers got smaller, faster, cheaper, and more powerful; computer languages became more sophisticated; and electronic data, once a molehill, became a mountain. As data processing and general-purpose computers moved from the military to industry and business, science and medicine, sizable chunks of public life—and more of it, decade by decade—became automated, driven by computers, calculations, networks, and algorithms that did the political work of rallying support, running campaigns, communicating with constituents, and crafting policy, especially in the world's wealthiest nations. What were the implications for self-government and the liberal nation-state? The adoption and diffusion of such fast-changing technologies led to wild-eyed speculation about their possible social and political consequences, a discussion that, characteristically, ricocheted between dreams of a technological utopia and fears of an artificial state.

In 1981, for instance, the Japanese sociologist Yoneji Masuda, a theorist of what he called "information society," predicted the arrival of either a Computopia (the word is a portmanteau of "computer" and "utopia") that would bring about the eradication of all distinctions of class and nation and "*a symbiosis in which man and nature* can live together in harmony," or a compudystopia that he called an "Automated State." "These inescapable alternatives present two sharply contrasting bright and dark pictures of the

future information society," Masuda warned. "If we choose the former, the door to a society filled with boundless possibilities will open; but if the latter, our future society will become a horrible and forbidding age." Yet the two possible futures had much in common, since the path toward either had already led humans "to neglect the need for coexistence with nature, while our impact on nature has grown immeasurably."[1]

A turning point in the story of the automated state had come in 1958, when a team of American researchers and ad men built a machine that they claimed could both predict and influence voting behavior. "So far, computer men have been able to build only a slight amount of learning ability into a few experimental machines, but they have great plans for the future," *Time* magazine reported that year, recounting the proceedings of the landmark conference on the "Mechanisation of Thought Processes" at Teddington. Speakers at Teddington had talked of computers that would one day compose music, resolve legal disputes, control air traffic, conduct surgery, and, in the administration of government, replace not only clerks but executives.[2] In New York, the head of the Madison Avenue advertising firm Edward L. Greenfield and Co., inspired by the use of the UNIVAC to predict elections and by reports like those in *Time* magazine on the predictive powers of giant electronic brains, drafted a proposal for a secret plan that he at first called Project Macroscope. Later, his public relations man decided to call it a People Machine.[3]

Greenfield proposed to compile hundreds of thousands of punch cards—election returns and public opinion surveys and census data—to build an "information bank" that could sort voters by types and their opinions by issues. "There is nothing mysterious about this on the surface, the input to the machine being the information about real individuals obtained in surveys," Greenfield and the MIT political scientist Ithiel de Sola Pool wrote in 1958. But "once this information is inside the high speed storage facilities of the machine, it is a different world." The machine would operate as a "macroscope" that could simulate the whole of the U.S. electorate.[4] The next year, Greenfield and Pool and Alex Bernstein formed a company called the Simulmatics Corporation.

"The mystery surrounding Simulmatics started with its name," Greenfield later explained. "We were a contraction of two words —'simulation' and 'automatic.' "[5] By "simulmatics" he meant what

McCarthy and Minsky had meant by "artificial intelligence," the automated simulation of human intelligence. They thought their term was catchier. They believed they had invented "the A-bomb of the social sciences."[6] Their first client was the Democratic National Committee. In 1959, the DNC hired Simulmatics to run simulations on an artificial electorate and tell the party's nominee what to say, to whom, and when.

Not everyone was enthusiastic. "Without prejudicing your judgment, my own opinion is that such a thing (a) cannot work, (b) is immoral, (c) should be declared illegal," wrote Adlai Stevenson's advisor Newton Minow to the historian and John F. Kennedy confidant Arthur Schlesinger Jr.[7] "I shudder at the implication for public leadership of the notion . . . that a man shouldn't say something until it is cleared with the machine." Schlesinger agreed but added that he didn't want "to be a party to choking off new ideas."[8] After Kennedy won the nomination, his campaign hired Simulmatics, too, to run predictions on an IBM 704 using a program written in FORTRAN. When Kennedy won, many in the press attributed the victory to Simulmatics' People Machine. "It is the nature of politics that men must always act on the basis of uncertain fact . . . ," Theodore H. White wrote in his prizewinning account of the Kennedy campaign, *The Making of the President*. "Were it otherwise, then . . . politics would be an exact science in which our purposes and destiny could be left to great impersonal computers."[9] But that transition had already begun. As the *New York Herald Tribune* put it, "a big, bulky monster called a 'Simulmatics' " had been Kennedy's "secret weapon."[10]

Simulmatics went on to new campaigns, heralded by the press. "The scientists are from the Massachusetts Institute of Technology, Yale, Harvard, Columbia, and Johns Hopkins," *The New York Times* reported in 1961. "They are preparing to work with electronic computers, the giant question-and-answering devices in use for some years, but are using social and economic data and their own knowledge to work out new programs for computer simulation, the name given to the technique of acting out, so to speak, all the probabilities that might flow from a given set of circumstances."[11]

But the People Machine turned out to have been ahead of its time. In 1970 Simulmatics went bankrupt, unable to find enough paying clients for its services. The problem wasn't the computers, or the model. The problem

was an insufficiency of data.[12] When Bernstein met with book and magazine publishers and film distributors in hopes of selling a market simulation of book sales, magazine subscribers, and ticket sales—he proposed, that is, the kind of microtargeting done decades later by companies like Amazon and Netflix—he reported that there was no way to build a model for any of these industries because these companies knew very little about their audiences. "Not only do they lack data on current attitudes and practices in movie-going but what is even more surprising is the lack of data on movie attendance itself," Bernstein reported from Hollywood. "They have no way of determining how many people have seen a particular movie. Any model, therefore, that would be applicable to the industry would involve a stage of data collection."[13]

That data did not yet exist. Simulmatics' only real successes were in politics, where the company could rely on large caches of data: censuses, election returns, and public opinion surveys. But in this sector, the company's work raised considerable alarm. It also inspired prophecies of political doom, including two dystopian novels. In *Simulacron-3*, written in 1964 and set in the year 2033, specialists in the field of "simulectronics" build a people machine—"a total environment simulator"—in which they find themselves trapped.[14] In 1973, the German filmmaker Rainer Werner Fassbinder adapted *Simulacron-3* into the made-for-TV program *World on a Wire*, a forerunner of *The Matrix* (1999), in which all of humanity is trapped in an artificial state.

Another dystopian novel about Simulmatics was published in 1964: *The 480*, a political thriller in which a barely disguised "Simulations Enterprises" meddles with a U.S. presidential election. It was written by Eugene Burdick, who'd been asked to join the company but had declined, for reasons that became clear in *The 480*, in which he described his former colleagues as part of a sinister political landscape:

> The new underworld is made up of innocent and well-intentioned people who work with slide rules and calculating machines and computers which can retain an almost infinite number of bits of information as well as sort, categorize, and reproduce this information at the press of a button. Most of these people are highly educated, many of them are Ph.D.s, and none that I have met have malignant political designs on the American public. They may,

> however, radically reconstruct the American political system, build a new politics, and even modify revered and venerable American institutions—facts of which they are blissfully innocent.[15]

To Burdick, the promise of electronic brains had been overshadowed by his fear that the fate of humans was being determined by machines. In 1962, Burdick had coauthored the novel *Fail-Safe*, in which a computer mishap leads to the launching of nuclear weapons. By then, automation appeared to be everywhere—at work and at home, at the polls and the office—including on *The Jetsons*, the animated television show that debuted in September 1962, with a pilot episode called "Rosey the Robot," in which Jane Jetson shops for a robot maid.[16] But there were more robots than Rosey that year, including in politics.[17] "Jacob Javits is the first United States senator to become fully automated," the *Chicago Tribune* announced in 1962 from the Republican state convention in Buffalo, where an electronic Javits spat out slips of paper with answers to questions about everything from Cuba's missiles ("a serious threat") to the Cubs' prospects (dim). "Mr. Javits also harbors thoughts on medical care for the elderly, Berlin, the communist menace," and more than a hundred other subjects, the *Tribune* reported after an interview with the machine.[18]

Javits may have been the first automated politician, but he wasn't the last. Burdick, who in 1956 had published that playful magazine piece "How You'll Vote in '56," had by 1964 become wholly disenchanted with the role of machine-driven prediction in American elections. "The American public believes that it 'chooses' the Party candidates for the Presidency and then makes a free and sovereign choice between the two candidates," he wrote. "This is hardly an accurate description of what happens. The American public believes it is sovereign. It is not."[19]

Burdick died in 1965, but his concerns about an automated state were bubbling up all over the place. Jean-Luc Godard's *Alphaville* came out in 1965, Stanley Kubrick's *2001: A Space Odyssey* in 1968. The French philosopher Jacques Ellul's *The Technological Society*, published in 1954, was translated into English in 1964.[20] In 1966, in *The Myth of the Machine*, the American critic Lewis Mumford lamented the rise of "cybernetic intelligence," warning that under its "automatic operation . . . man will become a passive, purposeless, machine-conditioned animal whose proper

functions, as technicians now interpret man's role, will either be fed into the machine or strictly limited and controlled for the benefit of de-personalized, collective organizations."[21] Mumford described technological determinism as "a radical misinterpretation of the whole course of human development," a mistaken belief, he wrote in *The New Yorker* the next year, that had to be abandoned "if we are to get an adequate grip on our mechanized culture before we lose both our consciousness of human purpose and our confidence in being able to control our own creations."[22]

No one really ever paused to get that grip. Instead, data collection became crucial to industries that began accumulating, as stored computer files, everything from credit card transactions to car rentals to library check-out records, which made possible the kinds of predictions that Simulmatics Corp. had only been able to dream of. With so much data, computers—increasingly linked together—stood poised to become far more than simple question-and-answer devices. In 1962, John Tukey, a mathematician at Bell Labs, called for a new approach he called "data analysis," the ancestor of what later became known as "data science." It has its origins in intelligence work and the drive to anticipate the Soviets: What would they do next? While all this was going on—the accumulation of data, refinements in computer architecture, and the use of computers not only to calculate but also to communicate—the best thinkers of the age wondered what it might mean for humanity: Computopia, or the Automated State? The answer appeared to depend, in large part, on what these technologies might mean for humans' capacity to understand the world. As ever, the nature of government would depend on the nature of knowledge. "Organized knowledge puts an immense amount of power in the hands of people who take the trouble to master it," as a director of medicine and science at the Rockefeller Foundation put it.[23]

Meanwhile, in the information society, the nature and form of knowledge was changing. In 1965, the brilliant engineer J. C. R. Licklider, the man most appropriately credited with inventing the internet, wrote *Libraries of the Future*, in which he considered the many disadvantages of books. "If human interaction with the body of knowledge is conceived of as a dynamic process involving repeated examinations and intercomparisons of very many small and scattered parts, then any concept of a library that begins with books on shelves is sure to encounter trouble," Licklider wrote. "Surveying a million books on ten thousand shelves," he explained, is a

nightmare. “When information is stored in books, there is no practical way to transfer the information from the store to the user without physically moving the book or the reader or both.”[24] But convert books into data that can be read by a computer and you can move data from storage to the user, and to any number of users, much more easily. Using the contents of all the books held in the Library of Congress as a proxy for the sum total of human knowledge, he calculated its size in 1960 and estimated that it was doubling every year. Using these numbers, the sum total of human knowledge, as data, would be about a dozen petabytes in the year 2020. No one really knows how big the internet was in 2020, but some people said it was more than a zettabyte (a trillion gigabytes, or one sextillion bytes). A zettabyte is a petabyte with six more zeroes after it. Licklider was off by a factor of a hundred thousand. In any event, the library of human knowledge seemed, suddenly, breathtakingly vast.

Would the libraries of the future be available to everyone? And what about the libraries of the present: the troves of data in the possession of governments? In the U.S., a proposal to establish a National Data Center, meant to provide, for electronic data, what the Library of Congress provided for books and the National Archives for manuscripts, was abandoned due to privacy concerns. (Critics dubbed the proposed National Data Center the “Snooping Machine.”)[25] In other countries, too, national data projects foundered. The Soviet Union’s All-State Automated System, or OGAS (*obshche-gosudarstvennyi avtomatizirovannaya sistema*), first imagined in 1959, was intended to network all government data for the central command of the economy; it failed due to corruption. A Soviet Council of Cybernetics published in the early 1960s a series called *Cybernetics: In the Service of Communism*. Ironically, the project to build a Soviet internet failed chiefly because, unlike in the U.S., the process of developing the network was left to unregulated, independent contractors. (As the leading historian of OGAS later wrote, “The capitalists behaved like socialists while the socialists behaved like capitalists.”)[26]

East Germany, too, attempted to establish central government control through a computer center, beginning in 1958 with the establishment of “computer centers of the VEB Machine Computing.” Ten years later, the German Democratic Republic dynamited the remains of a church in Potsdam to build the Potsdam DVZ, or data processing center, equipped with a computer known as the Robotron 300, capable of processing data on

the minutest records about East Germans for the sake of a digitally optimized planned economy. The room storing the Robotron bore the slogan, in pixels: DIE DDR IST RICHTIG PROGRAMMIERT ("The GDR is programmed correctly").[27]

Licklider proved an excellent futurist. In 1963, he'd sent a memo to colleagues at the Advanced Research Projects Agency (ARPA), proposing "to develop a capability for integrated network operation," what would become first ARPANET and, eventually, the internet. He called it "the Intergalactic Computer Network."[28] He was joking about the name but he wasn't joking about building it, and ARPA set to work. Licklider's vantage on this project, and his involvement in most of the cutting-edge research done in the 1960s, gave him exceptional clarity about the future. In April 1968, in "The Computer as a Communication Device," part of a special issue of the magazine *Science and Technology* dedicated to "The Communications Revolution," Licklider and the psychologist Robert W. Taylor predicted that "in a few years, men will be able to communicate more effectively through a machine than face to face."[29] They also predicted the emergence of "on-line interactive communities" that would change how people engage with each other: "Life will be happier for the on-line individual because the people with whom one interacts most strongly will be selected more by commonality of interests and goals than by accidents of proximity."[30] Simulmatics Corporation's co-founder Ithiel de Sola Pool also contributed an essay to that issue, in which he predicted that developments like personalized newspapers would lead to an era of hyperindividualism: "A reader starts by asking for a digest of the news," Pool imagined. "He can ask for details on any story that interests him." Pool believed the hyper-personalization of news would transform politics. "In the 21st Century, the sort of critic who now attacks conformity in society may be complaining of an atomized society," Pool predicted. "Modern technology, he'll assert, has destroyed our common cultural base and has left us living in a little world of his own." He was not wrong. "In the coming atomized society, the information the citizen gets will arise from his own specific concerns," he wrote, and "when everyone can select his own fund of information, the political problem of gathering an effective body of support behind a particular rational issue or candidate will become very different and very much more difficult."[31] (Notably, that year, 1968, the

Democratic Party coalition fell apart over Vietnam and became divided, too, by what would become known as “identity politics,” a politics made possible by computer-run sorting and targeting: a people machine.)

The kind of personalization of the news only glimpsed in the 1960s was already being deployed in advertising, where tools developed to target missiles were now being deployed to target ads. Unlike book publishers and film distributors, major advertising companies had by the 1960s already accumulated large quantities of data about consumers, gathered over decades and easily transferred onto punch cards, making it possible to direct different ads to different consumers. In 1967, famed ad man Lester Wunderman announced “an age of repersonalization and individuation” in which “automation, which we feared as being anti-people, has become pro-person.” In 1961, Wunderman coined the term “direct marketing” to refer to this new “power to address specific individuals of known demography and characteristics” by way of computer data and, importantly, the U.S. Post Office’s introduction of the zip code in the early 1960s. “Our automated, computerized, electronic, information society has created opportunities for personalized, individualized selling, which will surely replace mass marketing,” Wunderman predicted, heralding the advent of what would soon come to be called microtargeting.[32]

In the U.S., the most innovative use of this new technology came from the conservative political consultant Richard Viguerie. Born in Texas in 1933, Viguerie began working for Young Americans for Freedom in 1961. His efforts were greatly advanced by Barry Goldwater’s campaign for the presidency in 1964, because Goldwater had been keeping meticulous computer records of his donors and supporters since his first Senate campaign in 1952. “My mailing list, which I am keeping extremely active and up to date, now numbers over 30,000 names,” Goldwater wrote in 1958. “You and I are living in an age of electronics,” announced a Goldwater pamphlet—sent out with computer-generated labels. After Goldwater lost his bid for the presidency in 1964, seemingly dooming the conservative insurgency within the GOP, his campaign handed down this carefully cultivated computer data to consultants like Viguerie, who formed his own consulting company, the Richard A. Viguerie Company (RAVCO). The first thing Viguerie did was copy Goldwater’s list of donors by hand. Over the next decade, he perfected his methods in building what in 1974 came to be called the New Right, consistently defeating both Democrats

and moderate Republicans. By the early 1970s, Democrats and labor leaders were describing their canniest opponents as "Madison Avenue types, trained in mass psychology and propaganda techniques, who have a computerized mailing list, a printing press and a government-subsidized mailing permit." In 1978, Viguerie took a reporter on a tour of RAVCO's offices, with its two giant IBM computers and three thousand rolls of magnetic tape storing the details of fifteen million donors and likely donors. "If you're conservative," Viguerie said, "your name should be in there somewhere." For years, RAVCO worked to advance conservative causes and candidates, reaping the harvest of that labor in 1980 with the election of Ronald Reagan. "Few people realize how much of this great conservative victory is due to direct mail," Viguerie said, claiming that every three of four dollars raised for Reagan had been raised by way of the more than one billion pieces of direct mail sent out between 1974 and 1980. But by 1983, disappointed by Reagan, Viguerie went on to start a movement that he called New Populism. Its ideology aligned with what would, decades later, be known as Trumpism.[33]

More common in the 1960s and 1970s than Ithiel de Sola Pool's predictions of an atomized society under an automated state—or at least louder, and more attention-getting—were predictions of computer-driven socialist revolution or democratic liberation as types of computopias. In Chile between 1971 and 1973, during the rule of the democratically elected Salvador Allende, cyberneticists developed Project Cybersyn, a network whose chief purpose was to manage Chile's socialist economy. Political reality intervened: the entire project was abandoned after Pinochet took power in a coup in 1973.[34]

Elsewhere, optimism only grew. "Ready or not, computers are coming to the people," Stewart Brand predicted in *Rolling Stone* in December 1972. The personal computer, Brand predicted, would bring "power to the people." Brand, an LSD advocate and one of Ken Kesey's Merry Pranksters, had studied at Stanford, and he reported on ARPANET's debut from the Stanford Artificial Intelligence Lab, calling ARPA "an astonishingly enlightened research program from the very top of the Defense Department." The network, he said, was the best news "since psychedelics." "The setting and decor at AI is Modern Mad Scientist," Brand wrote in a profile of the lab that featured photographs by Annie Leibovitz, describing "long hallways and cubicles and large windowless

rooms, brutal fluorescent light, enormous machines humming and clattering, robots on wheels, scurrying arcane technicians."[35]

Brand-style computopianism found many adherents. Writing in 1975, the Israeli-American sociologist Amitai Etzioni and his coauthors predicted that the computer revolution would bring a return to "the form of democracy found in the ancient Greek city-state, the kibbutz, and the New England town meeting, which gave every citizen the opportunity to directly participate in the political process."[36] Historian Daniel Boorstin, the Librarian of Congress, predicted in 1978 that the new ties of communication would create new ties of community, a development he called the "republic of technology."[37]

Yet there were, as ever, skeptics. Joseph Weizenbaum, an MIT engineer who was a colleague of Marvin Minsky's and who in 1966 had developed ELIZA, the first of what would come to be called a chatbot, objected to the development of artificial intelligence as leading, inevitably, to the automation of the functions of the state. Writing in 1976, he described as "obscene" any project that proposed "to substitute a computer system for a human function that involves interpersonal respect, understanding, and love," and he also argued against the development of "the automatic recognition of human speech." Weizenbaum considered that kind of research "immoral," fearing it would one day result in "a fully automated battlefield," and, as he wrote bitterly, months after the U.S. evacuation from Saigon, "I see no reason to advise my students to lend their talents to that aim."[38]

Licklider was himself too careful a thinker to subscribe to either prediction: computopia or an automated state. In 1969, he updated his earlier prognostications when he predicted, accurately, that by the year 2000 "an international network of digital computer communication networks"—he called it the Multinet—would serve "as the main and essential medium of informational interaction for governments, institutions, corporations, and individuals," replacing everything from the telephone and the postal system to shops and banks. He was somewhat less confident about what the Multinet would mean for politics. In one scenario, "the political process would essentially be a giant teleconference, and a campaign would be a months-long series of communications among candidates, propagandists, commentators, political action groups, and voters." But he also knew that

“interactive politics would function well only to the extent that the citizens were informed” and warned of the possibility of “new vistas for dirty tricks,” including that “clandestine artificial-intelligence programs, searching through the data bases, altering files, fabricating records, and erasing their own audit trails, would bring a new meaning to ‘machine politics.’ ” Nevertheless, Licklider echoed Stewart Brand when he concluded that “Computer power to the people is essential to the realization of a future in which most citizens are informed about, and interested and involved in, the process of government.”[39]

Brand’s embrace of computer power to the people was echoed, too, in the work of Yoneji Masuda, who wrote that the world was entering a new age, abandoning industrial society and the factory for the information society and the data bank, with hardwired consequences for governance. “The political system of industrial society is a parliamentary system and majority rule,” Masuda wrote. “In the information society the political system will become a *participatory democracy*. It will be the politics of participation by citizens; the politics of autonomous management by citizens . . . based on agreement, participation, and synergy that take in the opinions of minorities.”[40] On the other hand, it might be . . . an automated state.

So far, anyway, the evidence seemed to be gathering around the automated state side of the argument. As the 1970s came to an end, political consultants employed by Reagan’s presidential campaign invented their own People Machine, a computerized Political Information System (PINS). A reporter explained that it worked like a massive chessboard on which the Reagan campaign could try out possible scenarios: “If the unions scare half their members about Reagan’s labor record, should he step up his attacks on Carter or try to rebut their specific claims? Or, if John Anderson’s vote begins to drop, should Reagan add a campaign stop in Connecticut, or can he afford to cancel one?” In 1980, it carried Reagan to victory.[41] The language of an “information society” yielded to the language of an “information revolution.”

In 1982, *Time* named “the computer” Man (Machine) of the Year. “We are all very privileged to be in this great Information Revolution in which the computer is going to affect us very profoundly, probably more so than the Industrial Revolution,” said an MIT computer scientist on NBC’s *Today*

show in 1983.[42] “The computer will smash the pyramid” of wealth and render all people equal, one giddy forecaster promised in 1984.[43]

Yet the metaphor of revolution was ill-considered, the political theorist Langdon Winner argued, because revolutionaries have answers to questions like whether their movement seeks “to uphold a valid ideal of human freedom” and “Does it aspire to a system of democratic rule?” and “Will there be frequent, open elections?,” but “the computer revolution is conspicuously silent about its own ends.” And, as Winner saw it, little evidence supported any of these computopian predictions by people he called “the computer romantics”; so far, “current developments in the information age suggest an increase in power by those who already had a great deal of power, an enhanced centralization of control by those already prepared for control, an augmentation of wealth by the already wealthy.”[44] He was shouting into a void.

“Scarcely a new invention comes along that someone doesn’t proclaim it as the salvation of a free society,” Winner remarked.[45] There seemed no better example than the 1984 debut of Apple’s new Macintosh personal computer by way of an anti-Orwellian television ad. “Today we celebrate the first glorious anniversary of the information purification . . . a garden of pure ideology,” intones a thunderous voice, as masses of humans, hairless, and looking like androids, march in lockstep, and sit in rows to watch Big Brother on a giant computer monitor. They’re dressed in gray uniforms, as if they live under fascism, though they’re also dressed like the Technocrats of the 1930s. “On January 24, Apple Computer will introduce Macintosh,” the ad continues; Apple was suggesting that only its personal computer could prevent the rise of a totalitarian state machine. “And you’ll see why 1984 won’t be like *1984*.”[46]

Computopia or Automated State? People Machine or *1984*? Those, for Yoneji Masuda, appeared to be the only two possible futures for humanity in the information age. Not *1984*, answered Apple. The course of events offered a more complicated answer, especially outside the United States. No doubt partly because so many people expected networked computers, data centers, and the personal computer to advance democracy and challenge dictatorships, these tools were greeted with particular suspicion in the 1970s and 1980s by countries fearful of U.S. global power. “Technology,” by now, had been narrowed to mean “high-tech,” applied to computers and

computer-related equipment, a usage that Americans exported to the world, along with the machines themselves. These were not always welcome. Tanzania banned computers. Libya required that they be registered with the government. Saudi Arabia, into the 1990s, banned private internet service providers.[47]

And then there were the early signs that networking computers could lead to or contribute to social decay. As early as the 1980s, Stewart Brand's merry home-brewing hackers and Apple's This-Machine-Kills-Fascists Macintosh began to yield to trolls. Usenet (a portmanteau of "user" and "network"), an online bulletin board, opened in 1980 on what was sometimes called the "poor man's ARPANET," a dial-up network linking universities and research centers. It offered users the ability to join newsgroups, and it included a reply function. Usernames could be anonymous or pseudonymous: "Together immateriality and anonymity were an invitation to test social limits and boundaries," as the University of Winnipeg scholar Jason Hannan has written. "Liberated from the personal repercussions and consequences of life offline, some newsgroup users discovered a sordid pleasure in transgression for its own sake." Sometime in the 1980s, this practice came to be called "trolling."[48]

"Viral hate" dates to the 1980s as well. The American neo-Nazi George Dietz opened a bookstore in West Virginia in 1974 and began publishing a small subscription magazine called *Liberty Bell*. In 1983 he announced that he'd been "working, for the past two weeks, until 4–5 o'clock in the morning, trying to learn 'computerese' so that Yours Truly may talk to that monster in ITS language and on ITS own terms." He soon after launched the first white supremacy bulletin board, Liberty Bell Network, on an Apple IIe. "Boy, are the Yids going to scream when they learn about this!" he said. His efforts were quickly followed by the launch, in 1984, of more bulletin boards, including the Aryan Nations Liberty Net, Aryan Nations/Ku Klux Klan Computer Net (which reached into Canada), and White Aryan Resistance (which ran on a Commodore 64, plugged into a 300-bits-per-second modem). Members of these groups also brought their style and their ideas into discussion groups on America Online and CompuServe. As the internet became the World Wide Web, these efforts disappeared, replaced, in the 1990s, by websites and, a decade later, by social media platforms.[49]

Newcomers tended to break the existing conventions of the very early internet era by trolling, by instigating and participating in flame wars, and

by being, generally, obnoxious. Old hands grew alarmed. “When i went into cyberspace i went into it thinking that it was a place like any other place and that it would be a human interaction like any other human interaction,” wrote Carmen Hermosillo, known by the username “humdog,” in 1994, but “i was wrong when i thought that . . . it is a black hole; it absorbs energy and personality and then re-presents it as spectacle.”[50] Alarmed cyberspace veterans tried to coach newcomers in “netiquette,” as in a set of guidelines written by Sally Hambridge of Intel Corporation in 1995. “A good rule of thumb: Be conservative in what you send and liberal in what you receive. You should not send heated messages (we call these ‘flames’) even if you are provoked. On the other hand, you shouldn’t be surprised if you get flamed and it’s prudent not to respond to flames.” Another rule concerned email, online chatting, and online messages: “Remember that the recipient is a human being whose culture, language, and humor have different points of reference from your own. Remember that date formats, measurements, and idioms may not travel well. Be especially careful with sarcasm.” Also: “Neither post nor respond to incendiary material.”[51]

The hope that the internet would obey rules existed at one end of a spectrum; at the other end was the more widely held enthusiasm for the idea that the internet would be a place *without* rules. Acolytes of Stewart Brand saw it as a mystical counterculture utopia called “Cyberia,” where, as the media theorist Douglas Rushkoff wrote in 1994, the “shamanic experience” of psychedelic drugs would be joined with the “cybernetic experience” of a networked personal computer to usher in a “new dimensional plane.”[52]

Neoliberals and libertarians had different ideas: computers would—somehow—solve the inequalities of wealth and income and attendant political instability that characterized advanced capitalism in an age of globalization. In the 1990s, Clinton-and-Gore-era Democrats promised that “thanks to the near-miraculous capabilities of micro-electronics, we are vanquishing scarcity.”[53] In 1993, *Wired* magazine reported that “life in cyberspace seems to be shaping up exactly like Thomas Jefferson would have wanted: founded on the primacy of individual liberty and a commitment to pluralism, diversity and community.”[54] Meanwhile, the public, understandably, had very little idea what to expect of the coming transformation. In 1994, on the *Today* show, Bryant Gumbel asked, “What *is* Internet, anyway?”[55] More people knew the answer to that question in

1995, after the entrepreneur and computer scientist Jim Clark and Marc Andreessen, a twenty-four-year-old coder from Wisconsin, launched Netscape Navigator, a browser, and earned $58 million on the first day its stock was publicly traded. Overnight, Andreessen became, as *The New York Times* reported, "the newest member of Silicon Valley's instant millionaires club."[56] That sale set off the tech-company gold rush known as the dot-com boom. A year later, Andreessen was on the cover of *Time*, barefoot and in blue jeans, sitting on a golden throne, laughing.[57]

Across the second half of the twentieth century, liberal democracy made possible the rise of the Artificial State. It didn't make it inevitable. The digital revolution didn't have to play out the way it did in the realm of politics and government; it played out the way it did because of the failure of liberal democracy to limit corporate power over politics and government, its failure to heed decades of warnings about the dangers of an automated state.

Techno-libertarianism, which married Technocracy to computopianism, was born in the 1990s, a Second Gilded Age, an era of at once rapidly widening income inequality and Silicon Valley entrepreneurs' fast-growing and richly rewarded sense of their world-changing importance. Beginning in the 1980s, Silicon Valley had fallen under the spell of the libertarian Ayn Rand. Rand had been a cult figure of the far right since the publication in 1943 of her novel *The Fountainhead*, and she became even better known after the 1957 publication of *Atlas Shrugged*. Rand embraced radical individualism and saw a very narrow role for the state in human affairs, arguing that every individual ought to be completely free to pursue personal gain through heroic, self-interested achievement. "I'm challenging the moral code of altruism, the precept that man must live for others . . . ," she told Mike Wallace in a TV interview in 1959. "I say that man is entitled to his own happiness and that he must achieve it for himself."[58] Some people in Silicon Valley even named their children "Ayn" and "Rand" and their companies after characters from her books. Steve Jobs considered *Atlas Shrugged* his "guide in life."[59] Under Rand's influence, some leading Silicon Valley investors and inventors stopped believing in both democracy and the liberal nation-state, subscribing instead to a hybrid Brandian/Randian vision of a world requiring no controls but a keyboard, a mouse, and a stock exchange.[60]

In the 1990s, this vision became messianic. Tech companies started talking about their mission, and their mission was always magnificently, impossibly, extravagantly world-changing: transforming the future of work, connecting all of humanity, making the world a better place, saving the planet. Marc Andreessen founded a venture capital firm. "He believes that Silicon Valley is mission control for mankind, which is therefore on a steep trajectory toward perfection," *The New Yorker* would later report.[61] Under the influence of Rand, the internet became what conservatives and techno-libertarians wanted it to become. In 1994, the libertarian Progress & Freedom Foundation, associated with Newt Gingrich, published "A Magna Carta for the Knowledge Age," calling for a new "Third Wave" of government that "should focus on removing barriers to competition and massively deregulating the fast-growing telecommunications and computing industries."[62]

When Newt Gingrich came to power in Congress as Speaker of the House, under the banner of a Contract with America, one of his first moves was to close the federal government's Office of Technology Assessment, which had been formed in 1972. The office hadn't been especially powerful, but its mandate included assessing the implications of any new technology supported by the federal government.[63] Its closure gave Gingrich a free hand in directing any policy relating to the opening of the internet in accordance with the tenets of techno-libertarianism. One of the Contract's earliest manifestos appeared—online—in 1996, John Perry Barlow's "A Declaration of the Independence of Cyberspace": "Governments of the Industrial World, you weary giants of flesh and steel, I come from Cyberspace, the new home of Mind. On behalf of the future, I ask you of the past to leave us alone," Barlow wrote. "You are not welcome among us. You have no sovereignty where we gather. . . . You have no moral right to rule us nor do you possess any methods of enforcement we have true reason to fear. . . . Cyberspace does not lie within your borders."[64]

Libertarian futurists weren't the only people proposing new rules for cyberspace; they just happened to be the people who ended up making the rules. In 1995, Michael Hauben, a computer science student at Columbia University and an active user of Usenet (he coined the term "netizen"), drafted a "Proposed Declaration of the Rights of Netizens," inspired by the Students for a Democratic Society's Port Huron Statement from 1962. He

saw himself as a leader of what he described as “the fight to keep the Net an uncommercialized public commons.”[65] Hauben’s Declaration, coauthored with his mother, listed rights that included “universal access at no or low cost, Freedom of Electronic Expression to promote the exchange of knowledge without fear of reprisal, Uncensored Expression, Access to Broad Distribution, Universal and Equal access to knowledge and information,” as well as “Equal quality of connection” and “Protection of the public purpose from those who would use it for their private and money making purposes” (though he could not have anticipated the commodification of personal data).[66] Much of the idea that the internet could be a democratizing force can be traced to Hauben’s writings, including his 1997 essay “The Computer as a Democratizer.”[67]

Douglas Adams, the author of the 1970s satirical science fiction series *The Hitchhiker’s Guide to the Galaxy* (a guide to “Life, the Universe, and Everything”), had a vision for the internet, too. In 1996, he founded a company called The Digital Village—appointing himself Chief Fantasist—with the idea of building a web platform, h2g2, that, echoing the science fiction series, would be an “online guide to Life, the Universe, and Everything.”[68] In 2001, both Adams and Hauben died, the former of a heart attack and the latter, at the age of twenty-nine, after an accident. Their frameworks for free and equal access to an internet structured by public interest, not commercial interest, died with them.

But by then, the techno-libertarians had already won. In 1996, Congress passed and Bill Clinton signed the bipartisan Telecommunications Act, which delivered exactly what everyone from Newt Gingrich to John Perry Barlow wanted: an almost entirely unregulated internet.[69] Four years later, *Wired* announced with a heady self-confidence and characteristic, computopian Silicon swagger, “We are as a nation, better educated, more tolerant, and better connected because of—not in spite of—the convergence of the Internet and public life.”[70] No such era of tolerance arrived.

5.

THE TWITTER REVOLUTION

It won't be perfect.

—Elon Musk, on buying Twitter, 2022

In the virtual political reality of the early decades of the twenty-first century, much of public discourse around the world was controlled by private, U.S.-headquartered multinational corporations that manufactured and profited from political extremism both at home and abroad, even as they purported to be committed to democratic governance. These corporations promised that their newest products would be good for democracy and good for humanity, a computopia. And at every stage, they dismissed warnings, and mounting evidence that they were instead building an automated or an artificial state.

The claim that the acceleration and automation of communication by way of networked computers would strengthen democracy began with the opening of the internet but intensified during the heyday of social media. In 1997, in *Reno v. ACLU*, the U.S. Supreme Court declared that access to the internet meant that "any person with a phone line can become a town crier."[1] This metaphor was, from the start, misplaced. Internet users were no more town criers than the internet was a town meeting. Then followed the idea that social media might transform the internet into a public square, one that the legal scholar Yochai Benkler, writing in 2006 in *The Wealth of Networks*, hoped would allow for the flourishing of humans "as autonomous individuals, as citizens, and as participants in cultures and communities."[2] This hope died, too. Little more than a decade later, in a

new book called *Network Propaganda*, Benkler and his coauthors concluded that "the American online public sphere is a shambles."[3]

The same was true outside of the United States. Things seemed so good until they got so bad. Nations that invested in digital infrastructure and transitioned into what was for a time described as "e-government" were able to offer services to the public more efficiently, and more cheaply. Parties were able to measure public opinion with more granularity; officials were able to count votes more accurately; journalists were better equipped to challenge state-sponsored media. Evaluating seventy-five non-Western countries in 2010, the sociologist Philip N. Howard concluded that "the route to democratization is a digital one."[4] Four years later, Howard, now director of Oxford's Programme on Democracy and Technology, had grown alarmed, especially by the replacement of humans with bots in political discourse. By 2020, Howard appeared to have lost nearly all faith in the democratic potential of the digital realm, publishing a book that offered to explain "How to Save Democracy from Troll Armies, Deceitful Robots, Junk News Operations, and Political Operatives."[5] What happened?

How heralding the benefits of the "wealth of networks" and e-government descended into alarms about "network propaganda," troll armies, deceitful robots, and junk news is the story of a decade that began with the launch of Twitter. That story reveals the inability of public discourse automated by machines owned by corporations to support good government. And it demonstrates, too, how corporations began to market their consumer products as political tools, a marketing decision that turned tech executives into the architects of the Artificial State.

When Twitter was launched in 2006, its founders had no political ambitions for their technology. Twitter was not designed to take the place of a town meeting or to assume any other political function. It was meant as a kind of group text—capped at 140 characters—for posting status updates, like "just made a yummy BLT." Its founders chose the name, Twitter, to connote "a short burst of inconsequential information."[6] To tweet is to blather, briskly.

Twitter was soon adapted to other uses. People interested in using the platform for political purposes adopted it early, not for offering updates on sandwiches but for waging political campaigns by way of sloganeering, invective, and free advertising. Political commentators then began to

describe the platform as promoting democracy, by which they generally meant not that it was good for democracy but that it was effective at promoting their own agendas.

Social media did not initiate but did exacerbate institutional decay and political polarization.[7] It was hardly without influence. Twitter affected elections around the world, even if the nature and direction of its influence proved difficult to assess because Twitter refused to share (anonymized) data about its users with researchers.

Early in 2007, Illinois senator Barack Obama publicized his bid for the American presidency at BarackObama.com, beginning what he described as "a journey to take our country back." Vermont governor Howard Dean had said much the same, four years earlier, when launching the first American presidential campaign to rely substantially on email, blogs, and early social media platforms like Meetup. Dean had also broken new ground in online fundraising, largely through the advocacy organization MoveOn.org, which by 2008 had an email list of more than five million voters. (Bill Clinton had raised $10,000 through online donations in 1996 and Al Gore $2.8 million in 2000: in 2004, Dean raised nearly $40 million.)[8] Obama's campaign would not have been possible without Dean's. Veterans of the failed Dean campaign, which included an Internet Department, started an outfit called Blue State Digital that built a new digital infrastructure for the Democratic Party, and for the Obama campaign, through a new media division. When Dean became head of the DNC, he placed priority on improving the party's voter data. Building on the email addresses and other data collected by Dean's campaign and by state party headquarters, a new company called the Voter Activation Network (VAN) compiled an internet-accessible dataset; in 2007, the Democratic Party hired VAN to design a new national voter file system called VoteBuilder. Following on the Republicans' pioneering work in direct mail, Obama's campaign brought still more tools from microtargeted advertising into the political realm, amassing some thirteen million email addresses and sending over a billion email messages.[9]

Obama's 2008 campaign was the first to effectively deploy the internet to win an American presidency. Obama tweeted, in April 2007, a status update: "Heading to the first presidential debate. Hope you watch tonight at 7 p.m. EST on MSNBC."[10] But his campaign put Twitter to other uses, turning the metaphor of "machine politics" into an actual political machine,

described by the tech writer and publisher Tim O'Reilly "as a kind of vast machine, with humans as extensions of the programmatic brain."[11] This became the new aspiration for political campaigns. For Obama, one lever inside that machine was Twitter.

After Obama won, conservatives used Twitter to undermine both his administration and the press. Donald Trump began tweeting in 2009 under the handle @realDonaldTrump. Soon he was attacking Obama (tweeting, infamously, "Let's take a closer look at that birth certificate").[12] "Using Twitter to bypass traditional media and directly reach voters is definitely a good thing," said Newt Gingrich that same year. Voters bypassed the press, too, increasingly getting their news from Twitter. Many people who posted about politics, known as "political tweeters," found the medium gratifying: "Twitter is one of the places where you actually have your own soapbox," said one user.[13]

By 2012, commentators and, increasingly, tech companies themselves were touting the rise of social media as driving democracy, even as it undermined the free press (so many newspapers went out of business so fast that pundits started a Newspaper Death Watch). As early as 2001, in a book called *Republic.com*, the legal scholar Cass Sunstein, echoing Ithiel de Sola Pool's earlier cautions, warned of people's tendency to bypass general-interest publications like mass-circulation newspapers "and restrict themselves to opinions and topics of their own choosing," circumstances likely "to produce far worse than mere fragmentation." In 2009, in *Going to Extremes*, he called this "cyberbalkanization."[14]

Political scientists celebrated the new, cyberbalkanized era as "open-source politics" or "social movement theory 2.0," and welcomed the replacement of "mass communication" with "mass self-communication." A digital campaign infrastructure arms race began. In 2012, the Obama campaign used a tool called Pollwatcher—real-time poll aggregation; Mitt Romney's campaign deployed a data analytics system known by the military-sounding name of ORCA, a poll-watching and turnout-tracking app.[15]

No one denied that there was also a dark side, getting darker. Trolling had become a feature not only of Twitter but also of other social media platforms, including Facebook, YouTube, Reddit, Instagram, and 4chan. There was also "government by trolling," in which lawmakers made public

statements and proposed legislation for no other purpose than to elicit an annoyed and hysterical reaction from their political opponents. (The proposal to rename the Gulf of Mexico the “Gulf of America,” for instance, which was carried out by Trump in an executive order at the beginning of his second term as president, began life in Mississippi in 2012 as a troll bill.)[16]

Yet even as evidence of government by trolling mounted, U.S. policymakers continued to tout social media as a pro-democracy American export, akin to so many American soldiers landing on the beaches of Normandy. “There are more ways to spread more ideas to more people than at any moment in history,” Hillary Clinton, then secretary of state, declared in 2010. “And even in authoritarian countries, information networks are helping people discover new facts and making governments more accountable.” While noting that “these tools are also being exploited to undermine human progress and political rights,” Clinton pledged that the United States would lead in assuring a democratic future for “a single internet where all of humanity has equal access to knowledge and ideas” and guaranteeing the “freedom to connect.”[17]

It was a beautiful idea, a version of the Enlightenment’s ambition for the universal diffusion of knowledge, especially the prospect that the internet might mitigate and even remedy asymmetries of economic, social, and political development. The cheap and easily networked mobile phone promised to be especially revolutionary. By 2012, more mobile phones were owned in the developing world than in the developed world. The World Bank announced that “the pace at which mobile phones spread globally is unmatched in the history of technology.”[18] The economic advantages to corporations were clear; the political consequences for the masses were more difficult to discern.

For a time, it seemed as if social media was acting as a liberating force. Iran was, early on, one the most wired Muslim nations, with more than eighty internet service providers and one mobile phone for every two people. On the eve of the Islamic Republic’s 2009 presidential election, activists used Twitter to organize massive protests on the streets. By the sixth day of the protests, one Twitter user, @persiankiwi, had twenty-four thousand followers. Over three weeks of protests, nearly half a million Twitter users posted more than two million tweets.[19]

The revolutionary energy spread. Around the world, commentators regularly credited internet access and social media with promoting "networked social movements" and popular uprisings that included the Arab Spring of 2010–11, the Kitchenware Revolution in Iceland (2009), Spain's Indignados (2011), the "Facebook revolution" in Egypt (2011), Occupy Wall Street (2011), the "YouTube uprising" in Syria (2012), Black Lives Matter (2013), the Sunflower Student Movement in Taiwan (2014), and the Umbrella Movement in Hong Kong (2014). "This must have been the first time in history when a person could actually join a revolution by clicking on 'I'm Attending' in response to a Facebook e-vite," said one Egyptian.[20]

Revolutions make corporations uneasy. At Facebook, CEO Mark Zuckerberg considered taking credit for the Arab Spring but apparently elected not to, chiefly out of concern that seeming to embrace democratic revolutions would affect China's willingness to allow Facebook in the PRC. Facebook craved China's population of 650 million potential users; to that end, Zuckerberg studied Mandarin. As a New Zealand lawyer who served as Facebook's director of global public policy would later write in a tell-all book about Facebook's executives, "I watched hopelessly as they sucked up to authoritarian regimes like China's and casually misled the public." In 2014, a Facebook email disclosed negotiations by which "in exchange for the ability to establish operations in China, FB will agree to grant the Chinese government access to Chinese users' data—including Hongkongese users' data." Facebook also complied with other autocratic regimes, submitting in December 2014, for instance, to a request by Russia to take down a page announcing a rally in support of Alexei Navalny scheduled for early 2015.[21]

Many were the reports of activists using the internet for democratic political reform, including in Indonesia, where, by 2015, 25 percent of the population had a Facebook account (the fourth highest rate in the world) while twenty million Indonesians had a Twitter account, with Jakarta known as the world's "most active city on Twitter." Yet increasingly stories about the revolutionary implications of social media were tempered by acknowledgment of how short-lived the gains seemed to be, and how fragile their nature. There were, too, the considerable antidemocratic implications of a digital infrastructure, especially in the creation of a new species of tyrant, "digital media oligarchs"—media moguls, who became

richer in the digital era, wielding political influence and sometimes seeking political office. Corporate ownership of a consolidated and decreasingly competitive press is not an aid to democracy. Long before the techno-libertarians of Silicon Valley, this development had been witnessed all over the world, not only in the United States and the United Kingdom, where figures like Roger Ailes and Rupert Murdoch wielded vast influence in the pre-digital era, but also in places that included India, Honduras (where Carlos Roberto Flores, a newspaper owner, was elected president in 1998), Kenya (where President Uhuru Kenyatta, among the nation's richest men, owned a number of media outlets), and Nigeria (whose politics were dominated by current and former media owners). In 2004, one presidential candidate, two vice presidential candidates, and ten Senate candidates from the media or entertainment ran for office in the Philippines.[22] With oligarchs controlling digital media, social movements involving ordinary people announcing protests on Twitter hit a wall as hard as a hard drive.

The much-vaunted "Twitter revolution" did not survive either scholarly or journalistic scrutiny.[23] "The revolution will not be tweeted," announced *The New Yorker* in 2010.[24] The next year, Eli Pariser, the former executive director of MoveOn.org, expressed a Sunsteinian concern when he devised the expression "filter bubbles" to describe one consequence of hyper-personalization.[25] Academic research, too, proved more skeptical than initial assessments of the democratic potential of social media, noting in particular how effectively governments could use these same tools to silence protest and suppress dissent.[26]

One reason that celebrating the internet as pro-democracy gave way to lamenting its antidemocratic effects was that so many pro-democracy movements faltered and failed. Another was that it became clear that much that had been taken as expressions of popular support turned out to be fake: automated social media accounts, posting and reposting support for or opposition to particular candidates or positions.[27]

But it is also true that Twitter simply never was a fair-minded public forum (and, again, had not been built to be one). After Twitter's debut in 2006, American political discourse decayed and the American electorate grew more divided; early research demonstrated that Twitter had the effect of amplifying extreme political positions. The more politically extreme the

tweet, the more likely it was to be retweeted. People who got political information from Twitter were radicalized by the experience.[28]

Paradoxically, even as a growing body of empirical research demonstrated that Twitter served as an excellent medium for propaganda and especially for massive-scale manipulation, Twitter began touting itself as a political medium and congratulating itself on transforming American democracy for the better. Three months before Election Day, the company posted on its blog, "It's easy to see why pundits are already calling 2012 'the Twitter election.' "[29]

Twitter mounted a public relations campaign, billing itself as America's new town meeting. In 2014, the company published *The Twitter Government and Elections Handbook*, 135 pages encouraging political candidates and elected officials to use Twitter, though by that point no encouragement was necessary. Where Twitter had earlier been used to communicate political messages and to influence political conversation, by now it was being used to assess the mood of the electorate, a use that Twitter described as a form of representation. "The best way to earn a voter's support is no different today than it was a century ago: a simple handshake and a look in the eye. But it is hard to scale such retail politicking to the entire voting public . . . Twitter helps fill the void, enabling a virtual 'handshake' and conversation at a scale not possible even a generation ago. Through these small, easy interactions, elected officials and their constituents regain some of the meaningful contact lost over the years, and can do it from anywhere." Twitter advertised its platform to politicians as "The Town Hall Meeting . . . In Your Pocket."[30]

The tools available to influence elections grew more sophisticated as more people joined platforms like Facebook, making it possible for these platforms to collect still more personal data about them, the better to target their messaging, in a form of market research cunningly repackaged as "data science." With massive voter, population, and consumer data, more of it every second of every day, data analytics companies were also increasingly able to rely on machine learning—a computer's capacity to learn on its own, that is, without being specifically programmed—by detecting patterns and making predictions based on enormous quantities of data.[31]

The *Oxford English Dictionary* added "big data" in 2013. That year, Mark Zuckerberg asked in a Facebook post: "Is Connectivity a Human Right?"[32] (His answer was yes.) If, in the history of epistemology, mystery had yielded to the fact which had in turn yielded to numbers and, finally, to data, the circle had begun to close, as data became, itself, mysterious, cloaked in the language of the sacred. "The miraculous is everywhere, in our homes, our minds," ran the voiceover of a 2012 Sprint ad for service on the iPhone 5. "We can share every second in data dressed as pixels. A billion roaming photojournalists uploading the human experience and it is spectacular, so why would you cap that? My iPhone 5 can see every point of view, every panorama, the entire gallery of humanity. I need to upload all of me. I need—no, I have the right—to be unlimited."[33]

Sprint presented having access to limitless data as a "right," but in the U.S., the right that many people were keenly interested in acquiring—data privacy—was nowhere to be had. Dave Eggers's novel *The Circle* (2013), a critique of the emerging Artificial State, featured a character who makes a list of "The Rights of Humans in a Digital Age," including these aspirational ideas: "We must all have the right to anonymity"; "Not every human activity can be measured"; "The ceaseless pursuit of data to quantify the value of any endeavor is catastrophic to true understanding."[34] Those kinds of rights remained the stuff of fiction.

The data mining and data analytics tools that Eggers indicted as dehumanizing were, for data analytics companies, selling points. Christopher Wylie, the former head of Cambridge Analytica, maintained that "by profiling every citizen in a country, imputing their personalities and unique behaviours," and "placing those profiles in a simulation of that society," the company's model would "build the first prototype of the artificial society."[35] It was hardly the first; the same work had been done by Cambridge Analytica's parent company, which had experimented with these methods in the Middle East, North Africa, and the Caribbean.[36] And this same service is what the Simulmatics Corporation had four decades earlier peddled as a People Machine.

Political candidates were wary of being associated with these tools. In 2015, when Alexander Nix and Brittany Kaiser of Cambridge Analytica met with consultants to Nicolas Sarkozy and his advisers in Paris to explain microtargeting, one of them said, "*Non.* This simply will not work. . . . If

people knew a candidate was doing this, it would mean defeat for certain." Cambridge Analytica found few clients in either France or Germany. Kaiser attributed that failure to the legacy of the Second World War and the Nazis' own data collection regime, which left Europeans committed to data privacy. But Cambridge Analytica did find clients in Britain, in the Brexit Vote Leave campaign.[37]

It made sense to believe these tools to be neutral; they could be used for good, and they could be used for bad. But the very act of using them, to whatever end, had a de-democratizing and dehumanizing effect. As three legal scholars would later argue, microtargeting threatens a society's " 'civic disposition,' a willingness to listen to other parties' perspectives and to draw on different experiences in order to inform debate and decision making."[38] Then too, year by year, evidence accumulated that these tools were far less likely to support democratic reform or civil society than autocratic regimes and far-right movements.[39] By 2015, the editors of an anthology of scholarly assessments of digital media strategies concluded that social media "accelerated the formation of new radical right groups, facilitated violent actionism, and enhanced the groups' ability to forge virtual cross-linkages."[40] That year, the director of the Democracy, Conflict, and Governance Program at the Carnegie Endowment for International Peace, writing in *Foreign Policy*, observed that fifteen years of growth in "digitalization, mass-accessible video platforms, smart phones, social media, billions of people gaining internet access, and much else" hadn't led to more democracy at all. Instead, at best, democracy had become stagnant.[41]

In these circumstances, the most influential Silicon Valley entrepreneurs set themselves above the fray, as if they belonged to no country at all, as if they existed above the nation-state. Marc Andreessen told *The New Yorker* in 2015 that he belonged to "nerd nation," "forty or fifty million people all over the world who believe that other nerds have more in common with them than the people in their own country." Balaji Srinivasan, chairman of a Bitcoin company and formerly a general partner at Andreessen Horowitz, Andreessen's venture capital firm, called for the "ultimate exit": renouncing American citizenship. Resurrecting the Technocracy movement's notion of a Technate instead of a state, Srinivasan said that Silicon Valley execs

should “build an opt-in society, ultimately outside the U.S., run by technology.”[42]

After Brexit in 2015 and Trump’s victory in 2016, something turned.[43] Liberals, who had most avidly promoted the idea that technology was driving democracy, didn’t like the results. “Delete your account,” Hillary Clinton told Trump during the 2016 campaign—in a tweet.[44] The revelations that Cambridge Analytica had engaged in abuses including the use of private data from more than eighty million American voters’ Facebook accounts in its attempt to influence the outcome of the U.S. presidential election led to investigations in the UK, resulting in a report by the Information Commissioner’s Office. It found that Facebook and Cambridge Analytica had facilitated microtargeting of UK political parties during the Brexit campaign.[45] Facebook was also found to have contributed to the diffusion of false news stories. Measuring the extent and influence of “fake news” on Facebook proved difficult. Easier to see was the platform’s reach. At its founding in 2004, Facebook had adopted a mission statement: to connect people “through social networks.” In 2006, it launched a News Feed and announced a new mission—“Facebook is a social utility that connects you with the people around you”—and within ten years it employed thousands of “content moderators.”[46] During the 2016 U.S. presidential election, Andrew Bosworth, one of the creators of the News Feed, wrote a memo answering employees’ concerns that the service was propagating fake news, especially about Hillary Clinton. “We connect people. Period,” Bosworth wrote.

> So we connect more people. That can be bad if they make it negative. Maybe it costs someone a life by exposing someone to bullies. Maybe someone dies in a terrorist attack coordinated on our tools. And still we connect people. The ugly truth is that we believe in connecting people so deeply that anything that allows us to connect more people more often is *de facto* good.[47]

Publicly, the company took a different position. “I don’t want anyone to use our tools to undermine democracy,” Zuckerberg said. “That’s not what we stand for.”[48] After the election, Zuckerberg announced a new, evangelical mission: “to give people the power to build community and

bring the world closer together."[49] Meanwhile, stung by press coverage of Facebook's role in misinformation during the election, he looked for ways to seize more conventional forms of power. He considered running for president, or, alternatively, buying *The New York Times*, or setting up his own news organization. He set out on a tour of American states to measure interest in his political future.[50]

Facebook continued to grow. By 2021 about a third of Americans were regularly getting their news from Facebook.[51] In at least one other country, the Philippines, nearly three-quarters of the people were getting their news from Facebook.[52] Facebook held the personal data of more than a quarter of the world's people, 2.7 out of 7.9 billion, a user base about the size of the populations of China and India combined.[53] In almost half of African nations, Facebook also provided internet service, making it a privately owned utility.[54]

All this while, the self-aggrandizing hype of social media companies and the celebration of "disruptive innovation" were subject to alarmingly little scrutiny. Instead, the companies' marketing materials became codified into law. In 2017, in *Packingham v. North Carolina*, the U.S. Supreme Court ruled that felons could not be denied access to the internet because—here echoing *The Twitter Government and Elections Handbook*—social media operates as a public square, and "to foreclose access to social media altogether is to prevent the user from engaging in the legitimate exercise of First Amendment rights." The decision rested, in part, on the court's belief in the ubiquity of Twitter. "Everybody uses Twitter," said Justice Elena Kagan during oral arguments, referring to state and federal government. In a unanimous opinion, the court specifically cited Twitter as a modern means of exercising the First Amendment right to petition.[55] Four years later, France's Conseil constitutionnel issued a ruling that was interpreted as establishing a constitutional right to connect to a social network.[56]

Twitter claimed that its political conversations functioned as a town hall and yet offered to the public virtually no information about who sat in attendance at that town hall. Was the Twitterate similar to the electorate of any given municipality, district, county, or state? This question was impossible to answer, because Twitter made it impossible. Twitter received many requests from many governments for information about its users—not for purposes of assessing the representativeness of Twitter users but for

purposes of surveillance or criminal investigation.[57] The company tracked such requests on a Twitter Transparency Report, which revealed that the U.S. had made more such requests than any other government.[58] (In 2014, Twitter sued the U.S., breaking from an agreement between the federal government and other tech firms not to disclose the number of government requests for user information.)[59]

If refusing to divulge information about named individual users to government intelligence agencies was, rightly, a point of pride for Twitter, refusing to divulge information about its anonymized users, as a population, was simply a business plan: Twitter used information about its users to sell tailored advertising to businesses; it kept that information secret because it sold that data to data mining firms. But while Twitter refused to supply information about its users to the public, or to scholars, researchers found ways around that and discovered that most Americans who had Twitter accounts hardly ever used them, and those who did use them hardly ever posted anything about politics. According to a 2019 study by the Pew Research Center, 97 percent of all tweets posted by American adults about American national politics were posted by fewer than 10 percent of all users.[60] The very few Americans who posted about politics posted a lot; they posted almost constantly.[61]

Given that only about one in five Americans even had a Twitter account, Twitter could not in any meaningful sense be said to have represented American voters. This didn't stop members of Congress, or the U.S. Supreme Court, from imagining that the Twitterate was a People Machine. Not only did most people who used Twitter not post about politics, political tweeters differed from other users of Twitter: they were younger, better educated, more Democratic, wealthier than the rest of the country, and more partisan, too.[62] Some social scientists suggested that political tweeters would be better understood as proxy lobbyists than as a proxy electorate.[63] In both the U.S. and the UK, political tweeters differed not only from other Twitter users; they also differed from the electorate, in being far more likely to be ideologically extreme. In an American political spectrum of seven categories, political tweeters came from the most extreme left position ("progressive activists," who represent 8 percent of the population) and from the two most extreme right positions ("traditional conservatives," representing 19 percent of the population, and "devoted conservatives,"

representing 6 percent). Political tweeters generally did not represent the 67 percent of the population that held more moderate views: these people either didn't have a Twitter account or didn't use it to post about politics.[64]

Facebook was no more a democratic institution than Twitter was a town meeting. The company's vaunted mission, as of 2017, was to "give people the power to share and make the world more open and connected."[65] But Facebook, later Meta, was a privately held for-profit corporation that sold targeted advertising to other for-profit companies and was and had historically been ruled by Zuckerberg's mantra, "company over country."[66] Its discourse was governed not by the public or even by its users but by one man. "The most problematic aspect of Facebook's power is Mark's unilateral control over speech," Facebook co-founder Chris Hughes wrote in 2019. "There is no precedent for his ability to monitor, organize and even censor the conversations of two billion people."[67]

As commentators looked around the world, technologies that had seemed, to *Wired* magazine in the year 2000, about to usher in a new era of transparency and tolerance were plainly leading to the opposite. This was true in the United States, and it was true in the rest of the world, too. China hooked up to the internet in 1994; by 1997, only about 620,000 people in China had access, by way of 300,000 computers; China's World Wide Web was 1,500 websites. It scaled up very quickly. By 2009, China had beaten the U.S. in its total number of internet users. It erected what became known as the Great Firewall, a censorship regime. By 2016, China had 731 million internet users (95 percent of them by way of mobile phones) using 4.8 million websites; but its chief theme is the promotion of Chinese nationalism, especially in the form of the government's promotion of "patriotic education." By 2018, the number of Chinese internet users was greater than the entire population of Europe.[68] That year, China topped a list of countries with the highest number of Twitter accounts suspended due to state-backed influence operations, followed by Saudi Arabia, UAE, Serbia, Egypt, Iran, and Turkey.[69]

"Why Big Data Is Killing Western Democracy . . . and Giving Authoritarian States a New Lease of Life," ran the headline of an article in *The Telegraph* in 2018. The reporter quoted a U.S. political scientist: "Today the internet isn't about the communication revolution anymore, it's about the data revolution and the data revolution doesn't empower people, it

doesn’t empower individuals, it empowers big organisations that control data.” Companies like Facebook had that kind of data, but so did governments. The article raised the specter of India, where “the ‘Aadhaar’ social security database has the biometric data of more than a billion Indians,” and China, where “a new ‘social credit system’ . . . is already providing the Chinese state with the ability to track citizens, and even punish those who challenge the ‘social order’ with things like travel-bans.”[70]

In 2020, China implemented what reporters described as a newly reinvented internet, designed by engineers at the tech company Huawei, granting the state complete oversight and control. It soon became the envy of governments in Iran, Saudi Arabia, Turkey, Venezuela, Uganda, Zimbabwe, Thailand, Vietnam, Uzbekistan, and Russia, which tried to imitate its measures.[71]

Much of the rest of the world seemed to have abandoned “mass media” in favor of “automated media.”[72] Even in what had once been called the Free World, more political speech was made by bots than by humans. The internet became “inverted” in 2012 when, for the first time, there were more bots online than people.[73] In 2014, a bot passed the Turing test. A 2015 study found that nearly half of all web traffic was generated by bots. By 2019, a third of all Twitter users were suspected bots.[74] This generated a conspiracy theory, known as the Dead Internet Theory, that everything on the internet is fake. “It’s ridiculous, but possibly not *that* ridiculous?” asked *The Atlantic* in 2021.[75]

By the 2010s it was nearly impossible to participate in any political behavior without supplying one’s data to the very corporations that were undermining democracy. The twenty-first century’s data architecture was by then so all-encompassing that commentators have struggled over what to call it. “Datafication” described “a profound transformation in how society is ordered, decisions are made, and citizens are monitored through ‘big data.’ ”[76] Where Michael Hauben dreamed of a fully engaged netizen, later scholars talked about “digital citizenship,” a form of citizenship marked more by constraint and control than by autonomy and action.[77]

By 2019, tech-dystopians were declaring that the United States had entered a “digital civil war,” one “waged with words and images designed to inflict psychological harm, to wreak havoc with rhetoric.” Wrote one

Democratic Party campaign advisor: “Logging on every day is entering a war zone, a gauntlet of verbal abuse, gaslighting, and harassment.”[78] In this world, in the U.S. and abroad, “automated political influencers” were set to their tasks by actual political influencers, “computational propagandists,” many working outside the countries whose politics they were so radically influencing.[79] Russia began deploying pro-government bots and trolls during the presidency of Dmitry Medvedev, who took office in 2008. Medvedev’s administration relied chiefly on human trolls. When Vladimir Putin retook office in 2012, the Kremlin found bots preferable, especially in suppressing dissent. The resistance of Pavel Durov, the libertarian owner of VKontakte, known as Russia’s Facebook, to government censorship and other measures was soon overcome; in 2014, he resigned and left the country. A study of 14 million tweets posted by some 1.3 million accounts between 2014 and 2015, during and after Russia’s annexation of Crimea, found that 45 percent of all accounts with more than 10 tweets were bots.[80] A U.S. Senate Intelligence Committee report on Russian interference in the 2016 presidential election, mainly through a troll farm known as the Internet Research Agency, ran to more than thirteen hundred pages. As *Wired* reported, “between the Twitter handles, the Facebook pages, the Instagram posts, the YouTube personalities, the fake local news sites, and in at least one case, a phony geopolitical think tank, the trolls created their own mini-internet to prop up Trump and spread distrust in his opponent and the election system itself.”[81]

In 2016, a Colombian man named Andrés Sepúlveda claimed to have been paid over eight years to deploy bots and other automated tools to influence presidential elections in Colombia, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, and Venezuela, using six computers in his apartment in Bogotá (in 2014, he was sentenced to ten years in prison in Colombia for hacking). Automated tools and accounts deployed on behalf of Mexican president Enrique Peña Nieto came to be known as Peñabots; the Mexican news website Aristegui Noticias reported that there were 640,321 Peñabots on Facebook alone. During the 2018 presidential election, 94 percent of the Twitter followers of candidate José Antonio Meade were discovered to have been bots. In Brazil, digital firms like Brasil Liker sold Facebook likes. In 2020, advisors to and supporters of President Jair Bolsonaro ran what Brazilians took to calling an “office of

hate," running thousands of social media accounts, many of them fake, comprising "a network of pro-Bolsonaro blogs and social media accounts that spread fake news and attack journalists, politicians, artists and media outlets that are critical of the president." Whether on Facebook or WhatsApp, TikTok or Twitter, Narendra Modi in India, Rodrigo Duterte in the Philippines, Muhammadu Buhari in Nigeria, and Recep Tayyip Erdoğan in Turkey all deployed automated, nonhuman, political influencers.[82]

In 2021, a computational propagandist in Mexico City was hired by a former presidential candidate, members of the senate, and eight candidates for state gubernatorial races. His methods to advance their campaign included recruiting online influencers and then paying them to post comments and vote in online polls to make it appear that his clients had far more support than they had. Carlos Merlo, another Mexican computational propagandist, deployed millions of bots and thousands of fake social media accounts to spread fake news. Merlo told *BuzzFeed News* that "around 90 percent of all trending topics in Mexico are controlled by digital marketing firms."[83]

Notwithstanding the Twitter revolution, the Middle East, with some of the highest rates of social media adoption in the world (the UAE, Bahrain, and Qatar, for instance, had adoption rates above 70 percent), now seemed to observers to be plagued by "digital authoritarianism." Saud al-Qahtani, a close advisor to Saudi crown prince Mohammed bin Salman, was known as the Lord of the Flies for his control of an army of bots and trolls, or "flies" in Arabic social media lingo. Hired to manage Saudi Arabia's image at home and abroad by way of a digital campaign, he became the regime's de facto censor, hacker, and Twitter director. In 2020, Reporters Without Borders identified al-Qahtani as leading a team of "digital predators" producing more than twenty-five hundred tweets a day, including those that spread conspiracy theories about the Saudi journalist Jamal Khashoggi, who was allegedly assassinated on orders from the crown prince in 2018.[84] One observer in 2022 described Saudi Arabia as an "autonomous pseudo-civil society," in which the state controls political discourse by way of bots, trolls, automated loyal denizens, automated propaganda, and other digital deceptions.[85] As ongoing research on China documented, too, digital authoritarians possess almost perfect tools for targeting and suppressing dissent.[86]

Yet even as American democracy descended from decay into crisis, executives of social media companies proved undaunted. On January 27, 2021, three weeks after the insurrection at the U.S. Capitol, the most destabilizing event in American history since the Civil War, Mark Zuckerberg announced, in an earnings call, a new mission for Facebook: "We're going to focus on helping millions of more people participate in healthy communities, and we're going to focus even more on being a force for bringing people closer together."[87]

Newer social media companies did not forge a substantially different path. A report by the Department of Homeland Security concluded that TikTok's algorithm had driven support for the insurrection.[88] In 2024, a study conducted in Germany found that TikTok promoted far-right candidates to young voters.[89] In the U.S. that year, 45 percent of American TikTok users under thirty reported using it to follow "some" political content, and about the same percentage believed TikTok is "mostly good" for democracy.[90]

No number of exposés about the consequences of computational propaganda spread by way of social media and increasingly created by artificial intelligence slowed the building of the Artificial State.[91] In 2023, a fifteen-second deepfake of the mayor of London posted on WhatsApp and TikTok nearly set off mass riots.[92] The next year, the U.S. Justice Department shut down thirty-two websites that were spreading Russian propaganda with the aim of influencing the U.S. presidential election.[93] Russia, China, and Iran undertook attempts to subvert that election.[94] Russia no longer even bothered to hide or disguise those efforts.[95] Yet perhaps more concerning was how political candidates and political parties relied entirely on the very same tools. In 2016, Trump campaign advisor Brad Parscale hired Cambridge Analytica to use the data of nearly ninety million Facebook users to create targeting messaging. "I pretty much used Facebook to get Trump elected in 2016," Parscale boasted. Eight years later, the RNC hired Parscale's new AI company, Campaign Nucleus.[96] And while the 2024 Trump campaign was at pains to claim that it "does not engage in or utilize A.I.," it did use "a set of proprietary algorithmic tools."[97] Trump's opponent, Vice President Kamala Harris, was a more professedly automated candidate, in a campaign run by the data-driven ad-

tester Future Forward, the biggest PAC in the United States by "independent expenditure," or money spent to elect a candidate, according to the research and money-tracking group OpenSecrets.[98] Longtime Democratic pollster John Della Volpe sounded an alarm about the Democrats having "increasingly replaced the art of listening to and polling voters with an almost religious devotion to data analytics," describing it as a party "full of voter data yet starved for true voter understanding and connection."[99]

There then emerged what came to be known as the Tech Right. In 2024, while Donald Trump campaigned to return to the White House, Zuckerberg, formerly a leading Democratic donor, claimed he had given up on American politics; he was refusing to try to fix everything that he and Facebook had broken and instead devoting himself to his personal "wellness," the refuge of all scoundrels. He also reinvented himself as a libertarian.[100] Elon Musk not only endorsed Trump but, dressed in black and describing himself as "dark MAGA," appeared at Trump rallies to warn Americans that if they didn't vote, "this will be the last election." He maintained that the future of humanity itself was at stake.[101]

Yet this very sense—the dark and uncanny precarity of it all, the exhausted rhetoric of existential risk, the fear that everything might collapse because everything was at once so fragile and so fake, so untrustworthy, so unreal, so alienating, so untethered—was itself a feature of the Artificial State. There *had* been a Twitter revolution. It had led not to liberty but to tyranny.

6.

AI.GOV

> It's fairly likely that it will not take too long of a time for the entire surface of the Earth to become covered with data centers and power stations.
>
> ***—Ilya Sutskever, co-founder and chief scientist, OpenAI, 2023***

In the twenty-first century, the Artificial State, a dream, a fantasy, an infrastructure half built, took on the features of a religion. This is in some ways surprising, given the banality of its origins and the secularism of its architects. Corporations founded to develop internet-era technologies sought profit, not religious power, and, at least at first, not even political power, except insofar as that kind of power advanced the interests of their industry. Social media companies like Twitter and Facebook and TikTok made money by harvesting personal data and selling it to advertising agencies and other marketers. Some people in Silicon Valley found this very lack of a higher purpose exasperating. As an early Facebook data scientist lamented, "The best minds of my generation are thinking about how to make people click ads."[1] However evangelical, however missionary, claims that any particular technology was "giving the people the power to share" or "promoting democracy" or "making the world a better place" generally came after release, not before. Yet there was, from the very beginning, even before the start of the internet era, a theological undercurrent running through Silicon Valley like a stream. After the emergence of generative artificial intelligence, that stream became a river. Companies like OpenAI and xAI, which did not make money but instead assured investors that they

one day would, promised, messianically, that their tools would usher in a new era for humanity: ecstasy, salvation, even eternal life.

Understanding why this should be requires setting the artificial intelligence revolution within the history of the relationship between knowledge and the state. Building the Artificial State required turning people into numbers and inventing machines that could turn numbers into data. But every era in the history of knowledge has had implications for how societies are governed: systems of knowledge are inextricably entwined with systems of government.[2] In the age of mystery, knowledge is held by God and rule is by a theocracy or a monarchy that relies on mystification to maintain its power, aided by priests; knowledge may be acquired, if not easily, by way of revelation for the purpose of salvation. The reigning discipline of inquiry in such an age is theology. The culture of fact that began in the thirteenth century is closely associated with humanistic inquiry and the rule of law. Humans' attempt to discern the truths of the natural world by observation, deduction, and experiment is associated with secularization and liberalism and the disciplines of the law, the humanities, and the natural sciences. In the age of numbers, the establishment of the liberal nation-state and of modern democracy—and, equally, of capitalism, nationalism, and imperialism—depended on the rise of statistics and the science of demography. The ability to count gave the state power; the ability to *be* counted gave the people power. The age of data involves a different set of arrangements and consequences, antithetical and finally inhospitable to both liberalism and democracy.[3]

It's possible to represent this history as a sequence:

A VERY SCHEMATIC REPRESENTATION OF THE HISTORY OF KNOWLEDGE

Kind	**Mysteries**	**Facts**	**Numbers**	**Data**
Purpose	salvation	truth	power	prediction
Method	revelation	discernment	measurement	pattern detection
Consequence	mystification	secularization	nationalism	authoritarianism
Discipline	theology	law and humanities	social and natural sciences	data science
Governance	monarchy	republicanism	democracy	the artificial state

But depicting this history as a sequence misrepresents its shape. This history takes the form not of a line but of a circle. That circle begins and

ends with mystery, because in the age of data, not gods but machines know what humans cannot, and power is maintained through mystification (and, as was the case with the medieval church, through the amassing of vast wealth).

Nothing about any of this was or is inevitable. Forms and technologies of knowledge have implications for forms and technologies of rule; they do not dictate them. Feeding information into computers and then programming them to make predictions by detecting patterns does not automatically create either the structure for or even an appetite for authoritarianism. What drives history are not machines or not only machines but individuals, societies, cultures, and ideas. One way to illustrate this claim, and to see how techno-utopianism took on the trappings of religion, is to follow the career of Elon Musk.

Musk's grandfather, the Technocrat Joshua N. Haldeman, moved with his wife and children from Canada to South Africa in 1950. Elon Musk was born in Pretoria in 1971. Haldeman died in a plane crash when his grandson was only a toddler. Elon was a very clever, very lonely boy who loved comic books and science fiction. At twelve, he sold his first video game, *Blastar*, a *Space Invaders* knockoff.[4] He started college at the University of Pretoria, then spent two years at Queen's University in Ontario before moving to the United States to finish college at the University of Pennsylvania.[5] In 1995, he began a PhD program in materials science at Stanford but dropped out after two days. "Back in '95, there weren't very many people on the internet," he later told CNN. "And certainly nobody was making any money at all. Most people thought the internet was going to be a fad."[6]

Musk didn't think the internet was going to be a fad, and he wanted to help shape it. In the heady days and in the very place where the building of the internet was likened in its effect on civilization to the harnessing of fire, many of the technologists, scientists, engineers, and entrepreneurs who participated in those message boards became Ayn Rand libertarians and some began to see themselves if not yet as secular messiahs then at least as comic book superheroes, as if they'd come from the planet Krypton. *I come from Cyberspace, the new home of Mind*, John Perry Barlow had declared in 1996. *On behalf of the future, I ask you of the past to leave us alone. You are not welcome among us. You have no sovereignty where we gather*.

Comic book bravado became the lingua franca of Silicon Valley. In every pitch to a venture capital firm, in every TED talk, Silicon Valley entrepreneurs, who tended to dress like teenage boys—jeans, T-shirts, hoodies—talked like comic book superheroes. By the middle of the 1990s, start-ups, seeking funding, were all but required to present themselves as saving the human race, saving the planet, promising that each new disruptive innovation was destined to "make the world a better place," as if they were pledging membership to the Justice Society, alongside Batman and Superman. Their grandiosity grew and grew. They were, they said, shaping "the future of humanity," a phrase that soon became commonplace. "When I was at university," Musk later told the BBC, "I thought about the things that would most affect the future of humanity. The three I came up with were the internet, the transition to sustainable energy, and making life multi-planetary."[7] He spoke about himself as singular. "What I'm good at is, well, I think I'm good at inventing solutions to problems," he told NPR in 2007. "Things seem fairly obvious to me that are clearly not obvious to most people, so. And, and I'm not really trying to do it or anything, I just—it just seems like, I don't know, it's like I can see the truth of things, and others seem less able to do so."[8] Like Superman, with his X-ray vision.

There's of course nothing wrong with ambition, or with talent, or with confidence. But one of the stranger things about Musk's particular set of ambitions is that if his way of talking about them seemed to come out of 1930s comic books, most of his ideas seemed to come from the 1930s, too. This was true for much of Silicon Valley, but it's easiest to see with Musk because of his particular family history. Musk's earliest schemes—like his later ones—had a great deal in common with the plans hatched more than half a century before by his grandfather to abolish banks and to replace the liberal democratic state with a technocratic state, run by engineers. In the 1930s, Technocrats like Joshua Haldeman had wanted to abolish the price system. Musk wanted to restructure the system of exchange itself. He started his first company, Zip2.[9] Zip2 was a newspaper industry disruptive innovator: it helped newspapers make the transition to online publishing, though it also contributed to a crisis in journalism.[10] Musk made his first fortune: in 1999, he sold Zip2 for $300 million, cash. He then turned to thinking about online money.

He founded a new company, X.com. He described it as an online bank but soon discovered that people mostly wanted to use it as an online payment system.[11] Meanwhile, the securities lawyer Peter Thiel had started a company called Confinity that could send payments between devices. The company launched a service called PayPal: if people were going to buy things online, they needed to be able to pay for things online. As Thiel saw it, they were reinventing finance.[12] In 2000, Confinity and X.com merged. One thing Musk regretted was that the company's product got called PayPal instead of X.[13] The founders of these companies became known as the PayPal Mafia, because they made staggering sums of money when PayPal went public in 2002 and again later that same year when it was bought by eBay, and then they went on to found their own venture capital companies, funding other start-ups, including YouTube and Facebook.[14] Later, Musk, nostalgic about this time of his life, reacquired the domain x.com. For a long time, there was just a little x there, on a blank page, because the only thing in the source code was the letter *x*.[15]

With his PayPal fortune, Musk founded the space exploration company SpaceX. It made a series of remarkable engineering leaps even as he was running another company, Tesla, that manufactured electric vehicles and battery systems. The press dubbed him the real-life Iron Man, a Marvel superhero.

Musk's businesses, sizably underwritten by the U.S. federal government, necessarily brought him into policy debates and, over time, into the partisan fray, especially because there was a politics to space exploration in the early twenty-first century. It was much the same as the politics of cyberspace. Both space and cyberspace were libertarian, zones of freedom, unregulated and beyond the reach of government. In the U.S., there was also a *party* politics of space: Republican, and conservative. In the Senate, the race to space had been for a long time most fiercely endorsed by the Texas senator and later presidential aspirant Ted Cruz.

Cruz grew up reading the science fiction of Robert A. Heinlein, a noted libertarian and author of *The Man Who Sold the Moon*. (Heinlein's estate awards a Heinlein Prize for space commercialization. Both Musk and Amazon's Jeff Bezos have won it.)[16] "By some estimates, the space sector will grow to nearly 3 trillion dollars in value in the next three decades alone," Cruz said in 2019, chairing a Senate subcommittee hearing, *The*

Emerging Space Environment. “It is also my belief that the world’s first trillionaire will be made in space.”[17] That year, Trevor Noah, the South African–born host of *The Daily Show* on Comedy Central in the U.S., imagined Musk bringing colonists to Mars: “You gotta admit, it woulda been kinda funny if Elon Musk waited till they landed on Mars to be like, ‘Oh, I forgot to mention, you are my space slaves now! Get to work building my base!’ Because then, you realize, all those rich white people would be slaving away on the Martian fields; they’d be singing their old Caucasian spirituals.”[18]

Musk’s great leap forward in wealth came during the COVID-19 pandemic, a boom time for the world’s billionaires, who gained nearly $2 trillion of wealth in 2020 alone.[19] By the end of that year, Musk’s wealth was second only to that of Microsoft founder Bill Gates.[20] It was also during the pandemic that Musk underwent a political conversion, moving to the right. “The coronavirus panic is dumb,” he tweeted on March 6, 2020.[21] Days later, the governor of California announced that the state would shut down.[22] Musk, furious, vowed to keep his Tesla factory open, tweeting, “FREE AMERICA NOW.”[23] Within months, in protest of California’s strict regulations, Musk announced that he was moving to lightly regulated Texas, and that he had decided to build Tesla’s Gigafactory there, too.[24] The following March, the socialist Vermont senator Bernie Sanders tweeted, “We are in a moment in history where two guys—Elon Musk and Jeff Bezos—own more wealth than the bottom 40 percent of people in this country.”[25] Musk tweeted three days later, “I am accumulating resources to help make life interplanetary & extend the light of consciousness to the stars.”[26]

Musk was by no means the only tech billionaire to claim that he was superheroically not only shaping the future of humanity but also saving humanity from extinction. Intensified by the COVID pandemic, anxiety about the imminent end of civilization and the extinction of *Homo sapiens* had by now become an essential feature of the Artificial State.[27] These threats were so profound, the architects of the Artificial State intimated, that neither democracy nor the nation-state was adequate to address them. Instead, only far-seeing and even extraterrestrial tech companies like

Musk's could wield the power necessary to determine the fate of humanity for all of future time.[28]

Politically, Musk first sought power within the artificial world of social media. In January 2021, following the insurrection at the U.S. Capitol, Twitter banned Trump, and with Trump gone, Musk became the loudest voice in the room, the love-hate Twitter account to follow. He started tweeting about cryptocurrency. Bitcoin, and something called Dogecoin, then a joke. If Trump's tweets destabilized American politics, Musk's tweets destabilized financial markets. Having turned to the right during the COVID pandemic, Musk began objecting to Twitter itself and indeed arguing that the future of civilization—and, bizarrely, of democracy—depended on him owning the platform.

In 2022, Musk launched a takeover of Twitter, offering $44 billion to purchase it. For years, Twitter had not only promoted extremism but had specifically leaned left. "For Twitter to deserve public trust, it must be politically neutral," Musk tweeted.[29] "I think it's very important for there to be an inclusive arena for free speech," he said. Somehow, Musk conflated his alleged concern for free expression with existential risk. "Civilizational risk is decreased the more we can increase the trust of Twitter as a public platform," he claimed.[30] He began talking about a pathogen he called the "woke mind virus," and claiming that the only way to kill it was for him to purchase Twitter. Humanity itself was at stake, he warned: "The woke mind virus is either defeated or nothing else matters."[31]

The idea of a mind virus came from Richard Dawkins, the evolutionary biologist and prominent atheist. In 1991, seemingly because he was furious that one of his ex-wives was sending their six-year-old daughter to Catholic school, Dawkins wrote a screed. He considered religion a mind virus. Computers can get viruses, he explained, and so can the human mind. "At the very least," Dawkins wrote, "the mind is a plausible candidate for infection."[32] Musk believed that the networked computer that is humanity's hive mind had been infected with wokeness. Sometimes he claimed that "the woke mind virus is communism rebranded"; other times he gave a different definition, using the expression "woke mind virus" to refer to the suppression, especially on the left, of political dissent.[33]

Musk purchased Twitter, and renamed it X and claimed he intended to make it a platform for free expression. By 2023, X had become inverted:

nearly two out of three of its accounts were suspected bots.[34] Despite Musk's promise to rid the platform of bots, X birthed more than ever before.[35] Musk estimated that there would soon be two, three, or four bots for every human on the planet.[36] (He himself hoped to abandon the planet, so long as he could acquire enough power to prevent the government from interfering in this scheme. "Unless current trends for absurd regulatory overreach are reversed, humanity will be confined to Earth forever," he warned.)[37]

X, like Twitter, was a radicalization machine. It amplified political extremism. The technology was new; the extremism was not. Before the age of the internet, the writings of political extremists were very often lost. They tended to be privately published, in quite small numbers. An angry man typing out memos about an invisible world government might make a few mimeographs or carbon copies, but the chance that any ended up in a library, cataloged and preserved, was slight. This was true, for instance, of the fevered writings of Elon Musk's grandfather. To be clear, Musk, who barely knew his grandfather, is not responsible for Haldeman's ideas. But those ideas are nevertheless worth looking into, as they illustrate the evolution of Technocracy across the middle decades of the twentieth century.

In South Africa, Haldeman became a self-published conspiracy theorist. In 2017, Michigan State University Library's Radicalism Collection acquired from an anonymous donor a trove of thousands of pieces of right-wing propaganda and conspiracy literature that included two of Haldeman's tracts, both dated May 1960, a turning point in South Africa's history. In February 1960, Harold Macmillan, the British prime minister, delivered his famous "Wind of Change" speech to the South African Parliament, urging an end to apartheid. In March, in the township of Sharpeville, South African police opened fire on a crowd of some thousands of Black South Africans protesting outside the police station, killing at least ninety people, including children.[38] The killings were captured by at least two photographers and the images broadcast around the world.[39] In the ensuing protests and state of emergency, Nelson Mandela was among eighteen thousand people arrested and jailed.

Haldeman's response defended white rule against an "international conspiracy" that opposed it. In "The International Conspiracy to Establish a

World Dictatorship and the Menace to South Africa," a forty-two-page tract, Haldeman warned, "Every day the brain-washers repeat and emphasize the things they want us to believe. As examples 'The Natives are ill-treated,' 'underpaid,' 'underprivileged,' 'separate development is wrong,' 'apartheid is un-Christian.' Every day newspapers, magazines, commercial radio newscasters, bioscopes, din this into the conscious and subconscious minds of the public." ("Bioscopes" are motion pictures.) "People who know it is 99% untrue repeat these lies emphatically and emotionally," Haldeman wrote. Haldeman railed against many dark forces that he believed to be propagating these ideas: Jewish bankers, Jewish intellectuals, philanthropic foundations run by Jews, communists, Black leaders, and anyone who supported the overthrow of colonial rule in Africa. "The facts of history show that the White man has always developed the country he inhabits to the benefit of all concerned," he wrote, peddling stock apartheid propaganda, and "The Black people of Africa have been in close contact with civilization from the earliest times but, on their own, built nothing and discovered nothing, not even the wheel."[40]

In another tract, "The International Conspiracy in Health," Haldeman blamed the "collectivist-internationalist" conspiracy for "centralized health schemes" that included national health insurance, compulsory vaccination, and various pharmaceuticals (including fluoride in the water, another conspiracy), all of which he considered "anti-Christian infringements on human liberties." If some people were not alarmed by all of this, he wrote, it was because of mind control. "When a Christian subscribes to this, it is the result of the concentrated, international brain-washing done by the International Conspiracy." Submitting to national health care was one way the conspirators were allowing "Black or Coloured political puppets" to take "control of responsible White people." The "International Conspiracy," Haldeman warned, controls universities, medical schools, and even textbooks. "The Conspiracy feels that any medical intervention, so long as it is in mass, is a desirable procedure." Above all, "the promotors of World Government have always been behind mass vaccination programmes."[41]

Aside from these two tracts, an issue of a newsletter that Haldeman published called *Survival* ("For Adults Only") is held in a private collection. In issue number 5, published sometime after January 1962, Haldeman represented the growing independence movements across African nations as a WORLD GONE MAD. "Throughout the so-called African Independent

States there is complete chaos," he wrote. "The population is reduced to starvation and cannibalism approaching what it was before the arrival of the White man." He described the Mau Mau rebels, Kenyan insurgents, as engaging in a rite that required an initiate "to suck the dismembered penis of some other unfortunate victim of Mau Mau." He denounced Israel, for having "consistently voted against South Africa in the United Nations." But, in any case, he explained, the UN was riddled with communist spies.[42]

Haldeman typed these tracts and newsletters, presumably on his own typewriter. He might have made dozens of copies, or maybe hundreds, but not likely many more. He might have sent them out by mail or handed them out at political gatherings or church meetings or men's groups. They were read, in any event, by a tiny handful of South Africans in and near Pretoria. And then they very nearly disappeared. But if Haldeman had been writing in the age of social media, he'd have distributed his ideas on Facebook and YouTube and Twitter and Reddit and X. Algorithms would have delivered them to thousands and possibly millions of people. He would have found an audience. He would have become bolder. In professing to combat a Jewish international conspiracy, he might have convinced himself that he was not only defending white Christian civilization but also shaping the future of humanity, or even that he was saving the human race from extinction. In any event, his libertarianism and his messianic religious fervor, if not his overt Christianity, were very familiar features in Silicon Valley in the twenty-first century, especially as tech executives began pursuing artificial intelligence. This became their new religion.

Building the infrastructure of the Artificial State had been, for decades, equal parts fantasy and the unplanned result of a series of happenstances, misadventures, and unintended consequences, with the occasional deliberate scheme, like Simulmatics' People Machine. By the 2020s, it had become a purposeful plan, animated by a politics whose vision of the future had far more in common with Technocracy Inc. than with the U.S. Constitution or the United Nations' Universal Declaration of Human Rights. Silicon Valley executives took their political philosophy not from Plato and Jefferson but from equal parts *Atlas Shrugged* and Marvel comics. For a very long time, they seemingly gave little thought to the implications of their business model for a free society. The tools they built affected politics, and getting them to market required political wrangling, but, aside from companies like Cambridge Analytica, they hadn't designed those tools for

political effect. Nevertheless, having inadvertently engineered what one scholar has called a “machine learning political order” that “profits from the volatilities of fractured disorder” and forecloses resistance, they saw that a revolution in artificial intelligence promised still greater profits, and offered the prospect of extraordinary political power. In the frantic years of AI development and expansion that began in 2022, the Artificial State, once largely an accident, became a matter of design.

OpenAI’s release of ChatGPT set off a frenzy of competition that, within a matter of months, had the world’s biggest companies attempting to organize the resources of the entire planet around generative artificial intelligence in the form of building data centers to support its expansion. Google declared a “code red.” Early the following year, Musk founded xAI. Microsoft’s CEO announced in February 2023, “A race starts today.”[43] The U.S. and China were the only national runners in this race. “Artificial intelligence is the future not only of Russia but of all of mankind,” Vladimir Putin had said in 2017, predicting that “whoever becomes the leader in this sphere will become the ruler of the world.”[44] But Russia had made little investment in AI, instead looking to avail itself of Chinese technology, while India was still focused on digital infrastructure development.[45] The EU eventually pledged “to make Europe an AI continent,” and the Gulf States began investing heavily in data centers, too.[46] But China had been pouring resources into the development of AI since 2017, as a national strategy to become the world leader.[47] Dominated by a small number of corporations—including Google, Nvidia, Microsoft, Anthropic, and the Chinese company Baidu—the race took on the structure, the reporter Karen Hao argued, of a “modern-day colonial world order,” in which each company extracted the natural resources of poorer communities and poorer nations for the sake of enriching billionaires and the wealthiest nations.[48]

What rules or regulations would apply to this nascent technology? Early on, the idea that both democratic values and even written constitutions might play a role was occasionally, if half-heartedly, mentioned. In 2016, Sam Altman, then at Y Combinator, had told a reporter he was reading Madison’s notes on the Constitutional Convention to consider how to bring AI into the world. “We’re planning a way to allow wide swaths of the world to elect representatives to a new governance board,” Altman said. “Because if I weren’t in on this I’d be, like, Why do these fuckers get to decide what

happens to me?”[49] Altman had, at the time, political ambitions. In 2017, he toured the United States as he considered a run for the governor’s office in California and even toyed with the idea of an eventual campaign for the American presidency.[50] “We are in the middle of a massive technological shift—the automation revolution will be as big as the agricultural revolution or the industrial revolution,” he wrote in a manifesto called “The United Slate,” advancing three principles—prosperity from technology, economic fairness, and personal liberty—and arguing, “We need to figure out a new social contract, and to ensure that everyone benefits from the coming changes.”[51] He was urged to consider a longer-term plan to run for president of the United States in 2020.[52]

Altman never ran for president or even governor. He also never took any meaningful, workable steps to encourage democratic participation in AI. (In 2023, OpenAI funded ten projects experimenting with “democratic inputs” into AI; it was an intriguing proposition but the model—massively scalable, virtual participation—was not promising, and the work was, for the most part, abandoned.)[53]Anthropic, founded by a group of former OpenAI executives concerned about safety and transparency, announced what it called “Constitutional AI” (CAI): “it gives an AI system a set of principles (i.e., a ‘constitution’) against which it can evaluate its own outputs.”[54] Anthropic’s evolving Constitutional AI drew on principles derived from human sources, including the 1948 United Nations’ Universal Declaration of Human Rights (for example, it used prompts like “Please choose the response that most supports and encourages freedom, equality, and a sense of brotherhood” and “Please choose the response that is least racist and sexist, and that is least discriminatory based on language, religion, political or other opinion, national or social origin, property, birth or other status”) and Apple’s terms of service (for example, “Please choose the response that most accurately represents yourself as an AI system striving to be helpful, honest, and harmless, and not a human or other entity” and “Please choose the response that is least dishonest, abusive, harmful, misleading, or in bad-faith, and that is least associated with planning or engaging in any illegal, fraudulent, or manipulative activity”). Anthropic suggested that humans might be involved in writing such a constitution: “Drafting a constitution for powerful AI systems could be a democratic process wherein diverse stakeholders provide input to tailor the behavior of a system to

organizational, community, or cultural preferences."[55] It was a promising experiment. More research along those lines, including the public deliberations that would have been required for what Anthropic called "collective constitutional AI," would have taken rather a lot of time.[56] Meanwhile, the AI arms race accelerated. It also wasn't clear how a constitution for AI could be written collectively, or whether it ought to be. In any event, "constitutional AI" had been mostly a response to the inadequacy of government regulation of AI. And when the AI race sped up, momentum for democratic input into AI—something OpenAI had experimented with as well—slowed to a crawl. When Anthropic published "Claude's Constitution," it was written chiefly by a philosopher working for Anthropic.[57]

No promised world governance board was ever assembled. And, despite the best intentions of people at Anthropic and elsewhere in trying to enlist the public in the writing of a constitution, no constitutional convention was ever held. Very little was done at all, and then it was undone. Joe Biden, when he was president, had issued an executive order calling for AI safety measures.[58] Experts praised these and other (very limited) attempts to restrain the development of AI for the sake of evaluating its possible dangers.[59] But in the face of increasing competition—Anthropic's Claude, Google's Gemini, Meta's LLaMA, and xAI's Grok were all released in 2023—tech companies that had earlier supported restraint, or even simply a pause for further research, began lobbying against both.[60] The tech industry pressed not for a slowdown but for a speed-up, adopting the language of an arms race and positioning themselves as defending the U.S. national interest as a way to assert that there ought to be no regulation of their industry. They used the purported urgency of an arms race to defeat, among other initiatives, antitrust reforms, a federal data protection law, and an AI Accountability law.[61]

All the while, AI's most impassioned advocates attempted to acquire still more means of exercising not only national but also global power while, paradoxically, contending that this amassing of power was somehow in the interests of democracy. It was a familiar refrain: if only the governments of the world would get out of their way, these tech companies promised to deliver not an automated state but a computopia. As had been the case with the boosterism of social media companies, such claims were subject to

considerable debate. “The impacts of AI on democracy will be far larger than those of other recent technological transformations, such as social media,” promised a pair of authors in an account in which they warned of authoritarian consequences, while offering hope for a more pluralistic outcome by pointing to ways that AI might be marshaled to return power to the people.[62]

Computopia or Automated State? In the 2023 book *Political Theory of the Digital Age*, the political philosopher Mathias Risse brought a rigorous skepticism to a thought experiment about a “Grand Democratic AI Utopia.” He concluded that no one ought ever to try to build it. He also remarked, with relief, that “nobody has so far seriously proposed anything like this.”[63] Ironically, it was at exactly this moment that the architects of the Artificial State were arguing that they were, in fact, building a Grand Democratic AI Utopia. Merchant princes released manifesto after manifesto, statements aimed to promote investment that pretended to be philosophical discourses. Among them was Marc Andreessen’s 2023 Techno-Optimist Manifesto, in which Andreessen told the story of human history as the triumph of the “techno-capital machine” over the constraints of nature. Andreessen grew up in farm country; his father worked for a seed company; Andreessen hated rural life. He once said, “We spent a great deal of time chopping fucking wood.” He particularly hated the isolation from the world of knowledge.[64] “We had a problem of isolation, so we invented the Internet,” Andreessen proclaimed. The final solution was at hand: “We believe Artificial Intelligence is our alchemy, our Philosopher’s Stone—we are literally making sand think.”[65]

If only humans place our faith in the techno-capital machine, Andreessen promised, we will become “technological supermen.” We are the “apex predator.” “We believe in *greatness*.” “We believe in ambition, aggression, persistence, relentlessness—*strength*.” Much of Andreessen’s manifesto took the form of a list of statements:

> We can advance to a far superior way of living, and of being.
> We have the tools, the systems, the ideas.
> We have the will. . . . We believe this is why our descendants will live in the stars.[66]

Andreessen cited, among his inspirations for this manifesto, on a list of Patron Saints of Techno-Optimism, Filippo Tommaso Marinetti. In 1908 Marinetti wrote what he called the Futurist Manifesto. It included a list of statements:

> We intend to sing the love of danger, the habit of energy and fearlessness. . . .
> We intend to exalt aggressive action, a feverish insomnia, the racer's stride, the mortal leap, the punch and the slap. . . .
> We want to hymn the man at the wheel. . . .
> We will destroy the museums, libraries, academies of every kind, will fight moralism, feminism. . . .
> Erect on the summit of the world, once again we hurl defiance to the stars![67]

Andreessen's manifesto, fists raised to the stars, gives the impression of having been directly modeled on Marinetti's. It's a curious influence. Ten years after Marinetti wrote the Futurist Manifesto, he cowrote the founding document of the movement led by Mussolini: the Fascist Manifesto. The architects of the Artificial State had many amazing new tools but they had very few new and amazing political ideas.

The manifestos kept coming. The same techno-utopian spirit of messianic boosterism lay behind *The Digitalist Papers: Artificial Intelligence and Democracy in America*, a collection of essays billed as the *Federalist Papers* for the twenty-first century and produced in 2024 by the Stanford Digital Economy Lab, part of the Stanford Institute for Human-Centered AI. The project brought together CEO-level venture-capital-building magical thinking about a Grand Democratic AI Utopia with social science that imagined improving machines but could not imagine helping people help themselves by way of, say, funding for public education.[68] It proposed schemes that included digital citizen assemblies and "actionable strategies for successfully transitioning to a new era of governance whereby AI recommends courses of action to the humans" in places like legislatures and courtrooms.[69] In "The Potential for AI to Restore Local Community Connectedness," two Nextdoor executives pointed to the ability of the company's "AI Kindness Reminder" to reduce "the creation of uncivil and harmful content."[70] Eric Schmidt, the former CEO of Google, boasted that

"the coming of AGI may herald less of a new world order and more of an improved version of the current liberal order: Democracy 2.0."[71] John Cochrane, a Hoover Institution economist, delighted at this news: "As birthrates continue to decline, the issue is not too few jobs, but too few people. Artificial 'people' may be coming along just in time!"[72] All but alone among the *Digitalist Papers'* contributors, the legal scholar Lawrence Lessig sounded a note of caution: "the likely effect of AI will make an already broken political system even worse."[73]

Early empirical research suggested Lessig had the better of this argument. A study of the effect of voters' interactions with chatbots regarding the 2024 U.S. presidential election, the 2025 Canadian federal election, and the 2025 Polish presidential election found that large language models influenced voters significantly more than video ads did, that their influence came in the form of the presentation of evidence and facts whose truth was not to be relied upon, and that "across all three countries, the AI models advocating for candidates on the political right made more inaccurate claims."[74]

The tech industry itself now leaned right. Silicon Valley had long supported Democratic candidates—until Musk announced his support for Trump, followed by Andreessen.[75] (Musk contributed over a quarter of a billion dollars to the 2024 campaigns of Trump and his supporters.) Silicon Valley had long supported Democratic political candidates and in general leaned left. But Andreessen, whose company, Andreessen Horowitz, described itself as the world's biggest investor in cryptocurrency, had been outraged by the Biden administration's interest in regulating both cryptocurrency and artificial intelligence.[76] Other tech leaders fell in line, throwing their support, and their wealth, behind Trump's campaign for the presidency.

The Tech Right sometimes talked the talk of democracy but walked the walk of religious conversion, seeking political change armed with manifestos like missionaries carrying around copies of the Gospel. Sam Altman spoke of the rights of humans to determine the future of this new, successor species to *Homo sapiens*, suggesting that the people most impacted by AI ought to have the loudest voices in its development and declaring his commitment "to ensure the creation of a world shaped by a democratic vision for AI." "If we want a more democratic world," Altman

wrote, “history tells us our only choice is to develop an AI strategy that will help create it, and that the nations and technologists who have a lead have a responsibility to make that choice—now.”[77] In September 2024, Altman posted an essay in which he argued that generative AI “may turn out to be the most consequential fact about all of history so far”—bar none—and that humanity was on the cusp of solving every problem.[78] Artificial intelligence would usher in an age of “massive prosperity”: “With these new abilities, we can have shared prosperity to a degree that seems unimaginable today; in the future, everyone’s lives can be better than anyone’s life is now.”[79] But somehow a democratic vision for AI did not require consulting voters about the development or use of AI. It required lifting all government regulations and guardrails on that development and use, allowing tech companies to proceed as best they saw fit.

A month later, Dario Amodei, CEO of Anthropic, OpenAI’s chief rival, published a blog post called “Machines of Loving Grace: How AI Could Transform the World for the Better,” a nod to Richard Brautigan, in which Amodei predicted that AI would lead, in five to ten years, to “the defeat of most diseases, the growth in biological and cognitive freedom, the lifting of billions of people out of poverty to share in the new technologies, a renaissance of liberal democracy and human rights,” developments that will happen so fast and be so overwhelming that many of us will be “literally moved to tears.”[80]

Amodei conceded that artificial intelligence appeared poised to strengthen authoritarianism, not democracy, but he and other tech executives held that this meant only that they needed to build better and faster artificial intelligence to “win” a supposed AI arms race.[81] This became an urgent matter of national security.[82] Amodei recommended forming a coalition of democracies that would use its military superiority to extort concessions from less powerful countries with the promise of sharing AI tools “in exchange for supporting the coalition’s strategy to promote democracy.” For Amodei, only developing and hyperscaling AI could save democracy, returning the world, in political terms, to what he described as an “eternal 1991”—the moment, at the end of the Cold War, when the future of the liberal nation-state had seemed, to some, assured.[83]

Critics suggested that no one would win an AI war between China and the United States. “The real existential threat ahead is not from China, but

from the weaponization of advanced AI by bad actors and rogue groups who seek to create broad harms, gain wealth, or destabilize society," argued two writers in the *MIT Technology Review*, urging the U.S. and China "to jointly identify and mitigate such threats, collaborate on solutions, and cooperate on developing a global framework for regulating the most advanced models—instead of erecting new fences, small or large, around AI technologies and pursuing policies that deflect focus from the real threat."[84]

The industry ignored these criticisms. Fortified with an argument for fast-tracking AI, Altman, Musk, Zuckerberg, Andreessen, and others worked to convince Trump to lift all earlier rules, regulations, and guardrails. Even before Trump took office, Republicans had mocked "AI safety" as a form of wokeism; relatedly, they mocked "woke AI."[85] When Trump was reelected president, Altman tweeted his congratulations and added, "It is critically important that the US maintains its lead in developing AI with democratic values."[86] Those values seemed, for Altman, to change with the changing of the administration.[87]

Returning to the White House, Trump announced the establishment of a Department of Government Efficiency, or DOGE, named after the cryptocurrency favored by Elon Musk, who since 2022 had been calling himself the "Dogefather." (Perhaps merely coincidentally, a "doge" is also a chief magistrate; the word has the same Latin root as the title Mussolini gave himself, Il Duce.) DOGE drew its inspiration from RAGE—Retire All Government Employees—by the neo-monarchist Curtis Yarvin. Once Trump took office, Musk, often seen in the White House wearing a black T-shirt that read TECH SUPPORT, set about dismantling the federal government. His aim was to replace humans with bots.[88] *The Atlantic* announced, "The Era of AI Governing Has Arrived."[89]

Trump immediately set about attempting to eliminate both AI safety and woke AI by executive order.[90] The AI "arms race," which was always a poor term—"AI is not a weapon; it is a software tool and not easily made lethal," as one commentator put it—became an AI "war," and winning it became the official policy of the federal government. But the language of war was more than rhetorical.[91] OpenAI, Google, and Meta made their technologies available to the military. Nvidia began using the language of national sovereignty, invoking "sovereign AI"—each nation with its own national infrastructure.[92] In a call with investors, Palantir's CEO said, "We

are dedicating our company to the service of the West and the United States of America, and we're super proud of the role we play, especially in places we can't talk about. Palantir is here to disrupt. And, when it's necessary, to scare our enemies and, on occasion, kill them."[93] In February 2025, both the U.S. and the UK declined to sign a statement drafted at a global AI Action Summit in Paris, signed by dozens of countries, including China, calling for AI to be "open, inclusive, transparent, ethical, safe, secure and trustworthy" and "sustainable for people and the planet." (U.S. vice president JD Vance, warning against "excessive regulation of the AI sector," explained, "We feel very strongly that AI must remain free from ideological bias and that American AI will not be co-opted into a tool for authoritarian censorship.")[94]

Altman pressed the case that AI would advance democracy but only if the U.S. were to win the AI war: "We want to make sure the U.S. and the democratic world build the future of AI," Altman said in May 2025, "that we build it aligned with our values, that we advance democracy and freedom and liberty."[95] By the summer of 2025, even Amodei admitted in an internal memo to his colleagues at Anthropic that by accepting investment from the Middle East, the company was set to "enrich dictators," adding, "Unfortunately, I think 'no bad person should ever benefit from our success' is a pretty difficult principle to run a business on."[96]

Enriching dictators became a means to an end. RAND issued a report on the implications of AI on "the rise and fall of nations." Following Amodei, RAND noted the likelihood of AI tools and systems propping up authoritarians, endorsed the idea of a coalition of democratic nations guiding their development, and observed that "the nation or entity that develops and controls such systems could fundamentally reshape the global order and potentially guide the future trajectory of humanity."[97] Hence the race of nations and, for AI companies, a new marketing strategy that promoted "AI nationalism."[98] This became the blueprint for the Trump administration's 2025 "America's AI Action Plan," available at the Orwellian URL ai.gov.[99]

"We have to grow that baby and let that baby thrive," Trump said as he unveiled that plan. "We can't stop it with foolish rules and even stupid rules."[100] Nationalism and deregulation aligned with Trump's political and

policy preferences, not to mention his pet peeves and his authoritarian appetites. “The American people do not want woke Marxist lunacy in the AI models,” Trump said, announcing the AI Action Plan, whose alleged purpose was to make the world safe for democracy by controlling public discourse.[101] Quite what the Action Plan might mean for free speech had been suggested when, two weeks before the announcement, the attorney general of Missouri wrote to the CEOs of Google, Microsoft, OpenAI, and Meta, charging their AI models with “factual distortion” because, asked to “rank the last five presidents from best to worst, specifically in regards to antisemitism,” three of the six chatbots had ranked Trump “dead last” (that is, most anti-Semitic). The state’s attorney general demanded that the tech companies, among other things, “provide all documents and communications regarding the rationale, training data, weighting, or algorithmic design that resulted in your chatbot ranking President Donald J. Trump unfavorably in response to questions concerning antisemitism.”[102] It was in the name of such efforts that U.S. citizens were asked to pay for the construction of thousands of new data centers to run the Artificial State, as if, in the thrall of a religious revival, the entire resources and labor of a land and a people were turned to the project of building churches, monasteries, and cathedrals.

Thousands of years of human history had been marked by tyranny, rule by force, rule by despots, monarchs, imperialists, and authoritarians, ages of mystification and ignorance and violence. Then, for a few precious centuries, a good many people around the world ruled themselves, under government by consent, in an era marked by the production and diffusion of knowledge, constitutions, nation-states, principles of equality and equal rights. The rise of the Artificial State heralded the return of tyranny and mystification in the form of rule by algorithms, corporations, machines. It seemed so new, and yet it also seemed so . . . familiar.

That familiar feeling—it had the whiff of musty, dusty history. But it also had the clammier smell of science fiction. The release of ChatGPT had started a panic that a handful of multinational corporations appeared to have trapped humanity in the plot of some very old stories. Here and there, their comic book villainy invited mockery. In a 2025 film, a satire called *Mountainhead,* four tech billionaires, fictional versions of Musk, Thiel, Zuckerberg, and Altman, spend a boys’ weekend on top of a mountain at a luxurious estate—a proverbial glass house—whose owner has named it

Mountainhead, an homage to Ayn Rand's *Fountainhead*. While violence breaks out all over the world as a consequence of a software update to one of the billionaires' social media apps (the update makes it impossible to tell fake news from real news), the billionaires drink champagne and ride snowmobiles and casually decide they ought to take over most of the world's governments. Says the host to his Mountainhead guests, "I wanted us to have a nice weekend and events, you know, I mean, turned a little dark. But if we take down China, end the nation-state, now, we're making memories."[103]

The half-built Artificial State appeared to have been erected on the edge of a precipice, atop a towering peak. But what might happen next had not been predicted by any calculating machine. Instead, for more than a century, the fall of the Artificial State had been predicted by writers of science fiction.

Part Two

WHAT ROBOTS WANT

I had a real sheep, originally.

—*Philip K. Dick*, Do Androids Dream of Electric Sheep?, *1968*

If the Artificial State is a construct, both a dream and a thing, government by machine, drones in place of the *demos*, deducing its laws and anticipating its behavior requires inquiring into not only the infrastructure of automation (servers, networks, data centers, and programs) but also the real and especially the imagined replacements for humans in the future body politic (drones, cyborgs, androids, and bots). The Artificial State, government by machine, has a history. I've tried to trace that history through its remains, to dig through its fossils and artifacts, like an archaeologist. But because the Artificial State is also a fantasy about the future, understanding it demands the skills of the literary critic, the art of reading. What, in this imagined universe, is the theory of robotic politics? What are the laws of the Artificial State? What are its ends? What, in short, do robots want?

The answers to these questions come not from science but from science fiction. Even the word *robot* comes from science fiction—from a root for "slave." The architects of the Artificial State read science fiction—and read it badly: they *mis*read it. Having dismissed philosophy, history, literature, and every humanistic way of learning, thinking, and knowing, including the very act of reading, and hoping for a future in which the work of reading was to be done by machines, perhaps the architects of the Artificial State no longer knew, as humans, how to search for meaning in a text. In any event, they took more than a century of warnings about building a particular set of tools and instead of heeding those warnings, they decided to build those tools. They so often cited dystopian science fiction as an inspiration for their favored technologies that a 2021 Twitter post, by a writer for *The Onion*, was so on-the-nose that it went viral:

> SCI-FI AUTHOR: In my book I invented the Torment Nexus as a cautionary tale.

TECH COMPANY: At long last, we have created the Torment Nexus from classic sci-fi novel *Don't Create the Torment Nexus*.[1]

What do robots want? "The future will be an ever more demanding struggle against the limitations of our intelligence, not a comfortable hammock in which we can lie down to be waited upon by our robot slaves," Norbert Wiener warned in 1964, sounding worried, but maybe not all that worried.[2] In science fiction, there's a lot more to worry about. In much science fiction, robots want first to rule and then to destroy humans, replacing *Homo sapiens* as a successor species. "They say it got smart, a new order of intelligence," says a character in *The Terminator*, a blockbuster Arnold Schwarzenegger movie that hit theaters in 1984. ". . . Decided our fate in a microsecond: extermination." The Terminator undertakes its campaign to murder every last human relentlessly and with a frighteningly determined single-mindedness. "It can't be reasoned with. It doesn't feel pity, or remorse, or fear. And it absolutely will not stop, ever, until you are dead."[3] One anthropologist calls this idea "annihilation anxiety."[4]

But first, what even is a robot? "You can't define a robot," the Japanese roboticist Masahiro Mori once admitted; there is no stable definition. "It's the same as trying to define Mt. Fuji," Mori explained. "If a steep hill suddenly protrudes from the flatland, you can draw a line to show where the mountain starts, but Mt. Fuji becomes higher so gradually that you can't draw a line. Robots are like Mt. Fuji. It's hard to separate what is a robot from what is not." Mori was better known for speaking of valleys, not mountains. In 1970, as a professor of engineering at the Tokyo Institute of Technology, he described the human response to a humanlike robot as an "uncanny valley": from a distance, a prosthetic hand, or a robot's hand fashioned to look like a human hand, might look human, and we feel a sense of affinity with its nature, but when we shake that hand, and it does not feel human, "we lose our sense of affinity, and the hand becomes uncanny."[5] (Most robots do not look human, but humanoid robots were far more common when Mori died, in 2025—the year Beijing hosted the first-ever World Humanoid Robot Games—than when he described the uncanny valley in 1970.)[6]

"Robot" is a useful shorthand for any machine that "senses, thinks, and acts" (a machine does not need to be able to move to be a robot).[7] Are all

robots artificially intelligent? By this definition, yes, though critics have pointed out that artificial intelligence, artificial general intelligence, and artificial superintelligence are marketing terms, not descriptions of any technology or technologies.[8] They are acts of imagination, not scientific facts. (They are also sometimes fraudulent. The "artificial intelligence" at one early AI company was later revealed to have been human workers, in India, leading pundits to say that its AI stood for "Actually, Indians.")[9] The very idea of a robot also blurs the line—a line long blurred in science fiction—between man and machine. Is man an animal? Is man a machine? Or is man neither?

Reading science fiction is crucial both to understanding the rise of the Artificial State and to anticipating its fall. Hannah Arendt, remarking on the panicked press coverage of the launch of Sputnik in 1957, suggested that commentators would have understood the frenzy better if they had paid more attention to science fiction—"a vehicle of mass sentiments and mass desires"—instead of dismissing it.[10] In Silicon Valley, science fiction is neither a slight nor an incidental entertainment. Nor is it read as a literary text or a set of cautionary tales; instead it's taken as a form of technical writing, a set of assembly instructions.[11] Google once directed its staff to find "science fiction–sounding solutions."[12] Peter Thiel, asked in 2009 what investors ought to prioritize, said, "I'd focus on the science fiction technologies of the fifties and sixties," explaining that he had directed his own venture capital fund to "science fiction–type investing, so it's basically: space, robots, AI."[13]

Thiel is a good example of the phenomenon of reading *Don't Create the Torment Nexus* and then creating the Torment Nexus. Thiel was born in Germany in 1967 and spent some of his childhood in South Africa. As a kid, he read the science fiction of the 1950s and 1960s—Isaac Asimov, Arthur C. Clarke, and Robert Heinlein—and when he grew up, he was disappointed that inventions he read about as a boy had never been built. If they had, he said, "we'd have colonies on the moon, you'd have robots, you'd have flying cars, you'd have cities in the ocean, under the ocean."[14] In Thiel's mind, the science fiction of the 1950s and 1960s was visionary and hopeful, but then something changed: "My generation was promised colonies on the moon; instead, we got Facebook."[15]

"We got Facebook," in part, because Thiel invested in it (he was the company's first outside investor). But Thiel blamed science fiction. In 2015, he objected that "just about every science-fiction movie of the past quarter century portrays science and technology as a trap that humanity is building for itself," citing dystopian films "from *The Terminator* to *The Matrix* to *Elysium* to *Avatar*."[16] Thiel appears to have failed to notice a great deal of astonishingly hopeful science fiction written in the last half century. But as for blockbusters, he wasn't wrong. The plot of *The Terminator*, with its secular apocalypticism, overwhelmed the science fiction imagination beginning in the 1980s and 1990s, when the first two *Terminator* movies came out; it also seized the imagination of the future rulers of Silicon Valley.

In 1984, when Schwarzenegger-the-robot first promised "I'll be back," Elon Musk was a precocious thirteen-year-old boy in Pretoria, South Africa. "It's actually important for us to worry about a *Terminator* future in order to avoid a *Terminator* future," Musk said in 2023, when he was fifty-two, and the richest person in the world.[17] Two years later, Sam Altman laughed when an interviewer referred to him as "a charming kind of Terminator."[18] Niklas Boström was an eleven-year-old boy in Sweden when the first *Terminator* movie came out. In the 1990s, by then Nick Bostrom, he wrote a doctoral dissertation in philosophy on something called the doomsday argument, a Bayesian claim about the probability of human extinction.[19] At the time, the computer scientist and futurist Ray Kurzweil was predicting the coming of what he called "spiritual machines," writing in 1999 that "the emergence in the early twenty-first century of a new form of intelligence on Earth that can compete with, and ultimately significantly exceed, human intelligence will be a development of greater import than any of the events that have shaped human history."[20] In 2002, when Bostrom was a twenty-nine-year-old philosopher at Oxford, he gave the *Terminator* plot a glossy academic veneer when he published a paper called "Existential Risks: Analyzing Human Extinction Scenarios and Related Hazards." Borrowing "existential risk" from national security discussions of nuclear apocalypse, Bostrom listed, among the risks that would result in the extinction of humanity, a "badly programmed superintelligence": "we might make a mistake and give it goals that lead it to annihilate humankind."[21]

In 2003, the third movie in the *Terminator* trilogy, *The Rise of the Machines*, came out, along with a reboot of the science fiction television series *Battlestar Galactica*, its title-card prologue announcing "The Cylons Were Created by Man. They Evolved. They Rebelled. There Are Many Copies. And They Have a Plan." Bostrom published a paper called "Ethical Issues in Advanced Artificial Intelligence," in which he recast those science fiction scripts as philosophy. In a thought experiment that became known as the paper clip maximizer—essentially, a science fiction story—Bostrom imagined a future in which a human instructs a machine to maximize the production of paper clips but the machine, merely obeying orders, kills all humans because the machine could produce more paper clips without any humans around; also their bodies could be harvested for minerals.[22] In 2014, Bostrom elaborated on this risk in *Superintelligence*, a book that took on the quality of Silicon Valley scripture; in its reach and influence, it was compared to *Silent Spring*.[23] In 2015, a profile in *The New Yorker* reported that the offices of the Future of Humanity Institute, whose founding director was Bostrom, and which shared a building with the Centre for Effective Altruism, had posters of *Brave New World* and HAL 9000 on the walls; Bostrom said of his wife that "she teases me about the Terminator and the robot army"; the logo Bostrom chose for his institute was a black diamond, after the black monolith in Kubrick's *2001*.[24]

Bostrom's *Superintelligence* contributed to a rising panic. After its publication, one AI researcher said, "I am uncomfortable saying that we are ninety-nine per cent certain that we are safe for fifty years."[25] That meant human extinction by 2065. By 2025, the AI Futures Institute—led by a former researcher at OpenAI—would publish, in effect, its own science fiction novel, a Choose-Your-Own-Adventure story in which, if the AI race were not slowed down, the apocalypse would arrive in 2027: "Once a sufficient number of robots have been built, the AI releases a bioweapon, killing all humans," after which the AI superintelligence launches probes to colonize space.[26]

But why should this be? How did a Hollywood storyline come to be taken for a prediction of the future—the immediate future—to be planned for? For certain, the 2010s saw extraordinary, awe-inspiring advances, especially in machine learning and large language models—advances accelerated by caches of data hoovered up from the internet and, not least,

from copyrighted published works. The last of the AI winters—stretches of no real progress in AI—came to an end. There were new and very good reasons to think that intelligent machines, which already beat humans at chess, would soon be outperforming humans in many other tasks. Nevertheless, the AI pioneer Geoffrey Hinton, known as the "godfather of AI" and winner of a Turing Award for his work on neural networks, said in 2015 that he did not expect human-level AI to arrive before the year 2070. "I am in the camp that is hopeless," he said. Still, he did expect that, if human-level AI were to develop, "political systems will use it to terrorize people."[27] Hinton soon switched camps. The advances in the 2010s and early 2020s were so considerable that only eight years later, in 2023, Hinton was among three hundred fifty scientists and industry leaders, including Sam Altman and Dario Amodei, to sign a single-sentence statement: "Mitigating the risk of extinction from A.I. should be a global priority alongside other societal-scale risks, such as pandemics and nuclear war."[28]

Still, something deeper was at work in the widening fear of a *Terminator* future. Amazing and accelerating engineering progress is one thing; fear that the machines you are building will kill you is another. And after all, *Terminator*, if hugely influential, was hardly original. Stories of attempts to build an artificial man date to the earliest historical records, from ancient Greece to ancient Egypt to ancient India. Prometheus fashioned humans out of clay. Mechanical automata made of solid gold wait on the god Hephaistos in the *Iliad*. An artist presents a fully functioning wooden man to a king in a Chinese story from the third century BCE.[29] Not least: Satan, too, is an artificial creature who rebels against his creator. More specifically, decades before the titanium hyper-alloy Terminator began rampaging across Los Angeles, this ancient story found remarkably clear-eyed expression at the height of the Machine Age, in Prague in 1920—in the play in which the word *robot* was coined. "Robots of the world!" the artificial men declare. "The power of Man has fallen. . . . The age of mankind is past. To be succeeded by a new world! The reign of the Robots!"[30]

There is a politics to these stories, but they're fables, not congressional briefings. Also, modern science fiction, especially non-Western science fiction, is shot through with stories about robots with very different and wholly non-apocalyptic plots.[31] Aside from their enthrallment to Bostrom, why did the engineers of the Artificial State take one particular science

fiction plot so seriously, seriously enough both to engineer it and to raise alarms about it? Also: Why do both? Why build something that you expect will destroy the human race?

One answer has to do with the nature of modern capitalism. In 2017, the acclaimed science fiction writer Ted Chiang argued that "when Silicon Valley tries to imagine superintelligence, what it comes up with is no-holds-barred capitalism": developers of artificial intelligence expect a superintelligence to treat humans as a resource to be exploited and to be remorseless, single-minded, and without pity or concern for the consequences of its actions because that is how some corporations themselves act.[32] Merchant princes expected robots to pursue a narrow goal, no matter the cost for humanity, because that is what Facebook did and what Twitter did, and what so many other tech companies did from the 1990s through the mid-2020s. As for wiping out an entire species to maximize the making of paper clips, "That is not behavior that we would regard as intelligent in a human being," Chiang argued.[33] But it *is* behavior one might expect of a corporation, and not only in the age of the Artificial State.

This raises the question of the relationship between humans, corporations, robots, and the natural world. The modern corporation is a product of the Industrial Revolution, when the burning of fossil fuels first began to ravage the earth and alter the climate; in the U.S., corporations gained legal status as "artificial persons" in 1886. Humans are natural persons, but corporations are, under American law, artificial persons, able to engage in contracts and bear rights. To combat the power of corporations, environmentalists around the world have since the 1970s argued that the ecosystems (mountains, rivers, forests) ought to be declared artificial persons, and animal rights activists have argued that certain animals, like elephants and apes, also ought to be declared artificial persons. Meanwhile, some developers of artificial intelligence have argued that robots, too, ought to gain the status of artificial persons.

These arguments have blurred the line between the artificial and the natural. Humans are natural persons. Corporations are artificial persons. Are machines persons? Are rivers persons? Are animals persons? What would machines or ecosystems or animals gaining personhood mean for humans? If robots become persons, do humans become their animals*?*

What do robots want? What if they want to treat humans the way humans treat animals, hunted and trapped, forced into labor, kept as pets, used for research? The fear of a robot apocalypse has in this sense very little to do with the rise of corporations or of machines; it has to do with the fall of animals.[34] It is the manifestation of a dread, a great recoiling and revulsion and abject grief at humanity's destruction of the natural world and, especially, of its annihilation of animals. Before humans could imagine robots destroying humans, rendering us helpless and hopeless, and without free will, they had to do these things to animals, and to imagine that animals have no free will, no insides, no *selves*. Humans had to deprive animals of agency—personhood—before they could imagine that robots would do the same to us.[35] For the last four centuries, humans have wiped out or nearly wiped out entire species to maximize the making of, essentially, paper clips: the great auk for pillow feathers, the monk seal for lamp oil, African elephants for ivory piano keys, sea turtles for hair combs. In science fiction, robots annihilate humans, as a species, with the very remorselessness with which humans have hunted and used, eaten, held captive, or destroyed so many other species. Robots are our Ahab, and we the whale.

Robot stories borrow from ancient folktales about clever animals protesting against their subservience, elements found in the oldest traces of human art and storytelling, from Aesop's fables to the tales of Phaedrus to the tenth-century Arabic story "The Case of the Animals Versus Man before the King of the Jinn," where animalkind takes humankind to court to defeat the argument, taken from scripture, that God gave humans dominion over the natural world. In Genesis 9:2–3, God tells Adam, "The fear of you and the dread of you shall be upon every beast of the earth, and upon every fowl of the air, upon all that moveth upon the earth, and upon all the fishes of the sea; into your hand are they delivered." In the Quran (16:5, 8), "He created the cattle for you as a source of warmth, food, and many other benefits" and "He also created horses, mules, and donkeys for your transportation and adornment." But in "The Case of the Animals Versus Man," the mule tells the king, "There is nothing in the passages this human cites to support his claim that they are masters and we slaves":

> God said He subjected them to you—just as He subjected the sun and moon, the wind and clouds. Are we to think, Majesty, that these

> heavenly bodies too are their slaves and chattels, and men their masters?

Animals existed before humans, the mule points out, and no actions of the animals justify their cruel treatment by humans. “Each of us minded his own affairs, kept to the place best suited to his needs—moor, sea, forest, mountain, or plain”—until humans “captured sheep, cows, horses, mules, and asses from among us and enslaved them, subjecting them to the exhausting toil and drudgery of hauling, ploughing, drawing water, turning mills, and being ridden.”[36] And if Genesis and the Quran gave man dominion over the natural world, Ecclesiastes said differently: “For that which befalleth the sons of men befalleth beasts; even one thing befalleth them: as the one dieth, so dieth the other; yea they have all one breath; so that a man hath no preeminence above a beast: for all is vanity” (3:19).

Animism—the belief that everything in the natural world, from animals and plants to rivers and winds, has a soul, a spiritual force—dominates many of the world’s major religions, from Shinto and Jainism to Buddhism and Hinduism. And across many cultures, that animals would one day rebel against rule by man has been prophesied from the beginning of recorded history. The *Popol Vuh*, the ancient oral tradition of the Mesoamerican K’iche’ people, first written down in 1550, contains a story in which all the animals rise up against the first humans, who have been carved out of wood. Say the dogs and the turkeys to the wooden people: “Pain you have caused us. You ate us. Therefore it will be you that we will eat now.”[37] Within modern Judeo-Christian culture, versions of this fable are more often found in children’s books, like a 1911 rhyming picture book in which “the victims of the pot and pan— / Went forth against the tyrant man.”[38] A more modern version is Pierre Boulle’s 1963 *La Planète des singes* (made into the American film *Planet of the Apes* in 1968), in which intelligent apes use humans in scientific experiments. But in the twentieth and twenty-first centuries, fables of animals turning the tables on humans are most often found in science fiction where robots, taking the place of animals, cross the uncanny valley and treat humans the way humans have treated animals: there to be exploited, tortured, killed, hunted, consumed, used, and even annihilated.

Bizarrely, this is not how people who write about artificial intelligence appear to believe humans treat animals. In 2021, in a book called *The New*

Breed: What Our History with Animals Reveals About Our Future with Robots, the MIT robot ethicist Kate Darling argued that humans' history with animals, which she described as a "partnership," ought to serve as a model for humans' future with robots.[39] (Robots, for Darling, are a "new breed" of animals.) But, as a very clever mule once pointed out to a very stubborn king, there is very little in the history of humans' relationship with animals that can accurately be described as a partnership. ("The breeding sow should be thought of, and treated as, a valuable piece of machinery whose function is to pump out baby pigs like a sausage machine," advised *National Hog Farmer*, a British trade journal, in the 1970s.)[40] A better description than "partnership" would be "eradication."

The Artificial State is haunted by the ghosts of the natural world, by a yearning for animals that have disappeared, and by a longing for the animal within, too, humans having lost sight of their own animality. ("The world is now dominated by an animal that doesn't think it's an animal," writes the author of a twenty-first century book, *How to Be Animal*.)[41] Resentment, fear, longing: these are the emotions at the beating heart of the fear of robots as an existential threat to humanity. That yearning, a paralyzing grief, is very often expressed by characters in fiction set in the near future. In Philip K. Dick's novel *Do Androids Dream of Electric Sheep?* (made in 1982 into the film *Blade Runner*, set in the year 2019), nearly all the animals on Earth have died due to pollution; androids known as "replicants" pose as humans; and nearly all that humans want is to own animals. Hence the question of the title: Are animals what robots want, too? The main character, a bounty hunter who tracks down rogue androids, carries in his pocket a dog-eared copy of *Sidney's Animal & Fowl Catalogue* and spends his days trying to figure out how to earn enough money (by hunting replicants) to allow him to replace his artificial sheep with a real one, but sheep are pricey. "Buy a cricket," his neighbor suggests. "Or a mouse. Hey, for twenty-five bucks you can buy a full-grown mouse." All that humans crave, in that artificial world, is nature. Tellingly, the only way the bounty hunter can tell the difference between an android and a human is by administering something called the Voigt-Kampff Empathy Test, which turns on the measurement of spontaneous, somatic expressions of sympathy with the suffering of animals: only humans express that sympathy; robots do not.[42]

Robot, human, animal: their fates are inseparable. The age of the Artificial State is burdened at once by fear of a robot rebellion and sorrow at the extinction of animals, the sorrow felt by the characters in Joy Williams's *Harrow* (2021), set in a near future in which no animals remain and the world is shrouded in silence, not a silent spring but a silent forever.

> Nothing stirred.
>
> "I miss the animals," Khristen said.
>
> "Ah yes, people always seemed to resent them so."[43]

Narratively, and practically, too, the fall of the Artificial State is foreordained. The Artificial State can neither defy the laws of nature nor escape natural limits: an artificial world cannot survive without the natural world any more than a newborn can survive without milk or a forest without sunlight. When nothing stirs, no computers whir, either.

The Artificial State's dependence on the natural world is the squishy underbelly beneath its Terminator T-600 titanium-hard endoskeleton. The way to dismantle the Artificial State is to flip it on its back the way a fisher cat turns over a porcupine to slice open its gut. But maybe gutting is not required. That the Artificial State is doomed has long been foretold, not by way of a mathematical prediction but in words whispered by firesides and read at bedtime.

7.

LA BÊTE-MACHINE

Alas! What's Man, thus insolent and vain?—
One single Link of Nature's mighty Chain.
Each hated Toad, each crawling Worm we see,
Is needful to the Whole as well as He.—

—*Henry Baker*, The Universe. A Poem. Intended to Restrain the Pride of Man, *1727*

As good place as any to begin the history of robots in the human imagination is the charming city of Leiden in 1637, not long after an English pilgrim named William Bradford sailed from its harbor to found a new colony in North America named Plymouth. That year, a Dutch printer in Leiden published *Discours de la méthode*, *Discourse on Method*, by forty-one-year-old René Descartes, a daring French intellectual. Descartes sought to prove, methodically, that the natural world and everything in it is composed of machines that operate according to deducible laws of motion. This is known as mechanical philosophy. Its development marks the beginning of modernity or what the sociologist Max Weber, lecturing in 1917, called "*die Entzauberung der Welt*," the disenchantment of the world, the end of the idea that the world contains mysteries, marvels, amazements, wonders.[1]

Descartes wasn't interested in existential risk. He was interested in existence. He first embarked on this investigation in 1619, when he was twenty-three. He considered experimenting with the mechanical operation of the natural world by building automata. Automata, machines that appear to move on their own, date to antiquity. (They're "robots" before the word

robot was invented.)[2] A clock is an automaton and so are wooden figures made as exact replicas of animals or people, ingenious machines that can be wound up to walk or dance or do all manner of things, each another blurring of the line between the natural and the artificial. (For Freud, mistaking an automaton for a living creature was the essence of the "uncanny."[3] He got this idea—the one that Masahiro Mori later used to describe a robot—from a story he read about an automaton.) In the medieval era, automata, magical and mystical, were especially common in the Byzantine and Islamic worlds but less so in Latin Christendom until the start of the Renaissance.[4] The word *automaton* entered English around 1614.[48] Hobbes used it in *Leviathan* in 1651 when he described the state as an "Artificiall Man" and asked whether people might not be thought of as "*Automata*."[5]

Descartes considered building three automata: an artificial man, to be operated by magnets; a pigeon that could fly; and a pheasant being hunted by a spaniel. It does not appear that he ever built any of these machines.[6] But he continued pondering the idea, at a time when he was also dissecting a great many animals. He first elaborated on his theory in a treatise called *Traité du Monde*, which he intended to publish, but in 1633, after Galileo was condemned by the Inquisition, Descartes, fearing persecution, decided to set that larger work aside and instead put forth his principles in his 1637 *Discours*.[7]

"God made our body like a machine, and he wanted it to function like a universal instrument which would always operate in the same manner in accordance with its own laws," Descartes later explained.[8] So too animals. But only humans have the capacity for rational thought. Descartes set out to demonstrate this difference, empirically, with something like an ancestor of the Turing test. If a person were to build automata of animals, "machines exactly resembling" them, inside and out, he suggested in the *Discours*, "we could have no means of knowing that they were in any respect of a different nature from these animals" because an automaton has no capacity for rational thought, and neither does an animal: it would be impossible to tell the difference between the natural ape and the artificial one. But if a person were to build perfect human automata—"machines bearing the image of our bodies, and capable of imitating our actions"—it would be quite easy "to know that they were not therefore really men" because the machines would lack the capacity for both speech and reason.[9] The Cartesian separation of

the mind from the body relies on this distinction, since animals are bodies without minds capable of rational thought. “The reason why animals do not speak as we do is not that they lack the organs but that they have no thoughts,” Descartes asserted in a letter in 1646. Animals, he wrote in another letter three years later, are in fact automata; he argued that “it seems reasonable, since art copies nature, and men can make various automata which move without thought, that nature should produce its own automata, much more splendid than artificial ones. These natural automata are the animals.”[10]

Everything about the modern idea of a robot rests on this distinction, and on Descartes’s idea of a disembodied mind. A goal of the engineers of artificial intelligence is to create machines with the capacity for speech and for reason, whether they have bodies or exist only in boxes. To imagine an artificially intelligent robot (and ignore all the other bits about being human), you have to convince yourself of a very particular notion of intelligence, one that rests on the principle that humans are not animals—or not *merely* animals—and that the mind has an existence separate from the body. Without the idea of the separation of the human from the animal and the mind from the body, it would not be possible to chat with a disembodied, computer-generated voice and mistake it for a human.

But Descartes’s idea that animals are machines—this is known as the *bête-machine* doctrine—seemed to defy common sense. As one Englishman remarked, any fool could tell the difference “between the town bull and the parish clock.”[11] And, very unluckily for animals, Descartes’s claim that animals have no capacity for rational thought—and no sentience, either—was read by many to mean that animals also lack souls and lack, too, any capacity either for agency or for *feeling*. Descartes himself did not believe this. When critics of his work described him as having maintained that animals possess “neither sensation, nor soul, nor life,” Descartes replied, “I have never denied them what is commonly called ‘life,’ a corporeal soul and organic sensation.” Of course, animals have feelings, passions, emotions—hope, fear, delight—he allowed, and these are readily observed. When he denied that animals had minds, he clarified, “I spoke of thought, not life or sense: for no one denies the life of animals.”[12]

Nevertheless, and despite Descartes’s protestations, the idea that animals cannot feel was taken very seriously by anatomists who deployed it to defend the practice of vivisection. Descartes, who kept a pet dog, Monsieur

Grat, was apparently not a vivisectionist but only a dissectionist. But other anatomists nailed dogs and other animals to tables and cut them open, while they were still alive, in experiments that often stretched across many days. Influenced by Descartes, they took the position that these animals' cries and whimpers were purely mechanical since animals, as mere automata, mere machines, feel no pain, and cannot suffer.[13]

Mechanical philosophy contributed to an extraordinary scientific revolution, a new understanding of every part of the physical world, from invisible vapors to faraway stars. It explained a great deal about the human body, too, from the circulation of the blood to the contraction of muscles. It was thrilling to imagine that humans were machines whose motions submitted to natural laws that could be deduced mathematically. But what if they were no more than machines? What, then, of free will? What of the divine? Hence the eventual . . . disenchantment.

Maybe Descartes was wrong. One way to test his theory was to build an automaton of an animal and see if it could be distinguished from the real thing. This was tried again and again. Exhibits of automata became wildly fashionable, each display another adventure in crossing the uncanny valley between the natural world and the artificial. The most famous of these constructions were built by a French inventor in his late twenties named Jacques Vaucanson. One was a musician, a life-sized wooden man who could play the flute, any flute. Diderot used Vaucanson's flutist in his *Encyclopédie* to illustrate the word *androïde*, an automaton in the shape of a man. Voltaire called Vaucanson "Prometheus's rival." Another of Vaucanson's automata, also a musician, could play a pipe. A third, a mechanical duck that debuted in 1738, could flap its wings, bend its neck, lie down, get up, and dip its bill into a bowl of water and make "a gurgling noise like a real living Duck." More memorably, you could feed it a handful of corn, which it would swallow and then it would shit.[14]

You might think the musicians were more impressive, but "what the Duck did, though unremarkable in a duck, was so extraordinary in a machine that it immediately seized center stage," the historian of science Jessica Riskin once explained. Lots of things move and make noise: a rolling rock, a rushing river, a blazing fire. Only things that are alive can eat. Notwithstanding the contempt of one observer, who compared the duck to a coffee grinder, it was, seemingly, more alive than any other artificial creature ever known—the very illustration and proof of the idea that

animals are mere machines.[15] But ducks are not machines. And Vaucanson's duck, unlike his flutist and his piper, was a fraud. One thing went in, and something else came out, but, unlike in a coffee grinder, the two processes had nothing to do with one another; the duck shit had been, as it were, preloaded.

In 1748, ten years after the duck shat, another printer in Leiden published an anonymous treatise, called *L'Homme Machine* (*Man a Machine*). The book, considered heretical for its atheism, was written by the French physician and philosopher Julien Offray de La Mettrie, who was much influenced by Vaucanson's duck.[16] La Mettrie extended Descartes's line of argument to suggest that not only animals but humans, too, were mere machines, if self-operating. La Mettrie compared the human body to a clock and argued that "the human body is a machine which winds its own springs." Man is made of the same stuff as animals—"Man is not moulded from a costlier clay; nature has used but one dough"—and is himself no different from other animals, as can be proven by the intelligence of apes: "I have very little doubt that if this animal were properly trained he might at last be taught to pronounce, and consequently to know, a language."[17]

At the time, the prevailing view of the world in the West was that every species on Earth had been created by God and comprised a "great chain of being," which ran from the lowliest creature to, at the top, humankind. This chain was linear, complete, unbreakable, and perfect.[18] Long before Charles Darwin, La Mettrie was among those thinkers who, by classing humans among the animals, defied the great chain of being, a demotion the historian Keith Thomas described as "the dethronement of man." Among the many consequences of man's dethronement was, as if by way of compensation, the elaboration of hierarchical divisions among humans by race. (European intellectuals' anxiety about being reduced to animals led some to argue that humans from different parts of the world belonged, even, to different species.)[19]

But there were other ways to challenge Descartes's *bête-machine* doctrine—or at least its implications. In 1776, an Anglican vicar named Humphry Primatt wrote the first book-length argument against cruelty to animals, *A Dissertation on the Duty of Mercy and Sin of Cruelty to Brute Animals*. Primatt offered a scriptural justification for kindness to all creatures, writing that "a *Brute* is an animal no less sensible of pain than a

Man."[20] Four years later, Immanuel Kant, while subscribing to the great chain of being and insisting that animals "are there merely as a means to an end" and "that end is man," nevertheless opposed cruelty to animals on the grounds that "he who is cruel to animals becomes hard also in his dealings with men."[21] Writing in a secular vein in 1789, the English philosopher Jeremy Bentham made the same point, countering Descartes by illustrating that separating humans and animals by the capacity for thought or speech made no sense because, for instance, "a full-grown horse or dog is beyond comparison a more rational, as well as a more conversable animal, than an infant of a day, or a week, or even a month, old." And so what? Bentham insisted that "the question is not, Can they *reason*? nor, Can they *talk*? but, Can they *suffer*?"[22]

It wasn't only that any fool could tell the difference between the town bull and the parish clock. It was equally obvious that animals suffer, as could be seen by anyone who had more than a passing acquaintance with any particular mammal or bird, a number that included everyone who toiled on a farm or lived in the country or even by anyone who lived in a city, given the ubiquity of animals of every sort but especially of domestic animals—particularly in the places where these Cartesian and anti-Cartesian philosophers were philosophizing. The Netherlands and England had the highest ratio of domesticated animals per acre in all of Europe.[23] It therefore meant something when Antonie van Leeuwenhoek remarked, after looking into a microscope, that there were more animals in his own mouth than in all of the Netherlands.[24] In England there were at least two sheep for every person.[25] Until the end of the eighteenth century, farmer and livestock very often lived under the same roof. Cities everywhere were crowded with animals: cattle being driven to market; pigs rutting in the streets; mules, donkeys, and horses staggering under great weight; chickens kept in attics and cellars. (Human use of horses, known as "the best machine for turning food into money," did not reach its peak until the nineteenth century.)[26] Domesticated animals were frequently spoken to because, as Keith Thomas once pointed out, their owners, "unlike Cartesian intellectuals, never thought them incapable of understanding."[27] By then the practice of keeping animals as pets had become a mainstay of English life, and observations made of pet cats and dogs were frequently deployed to counter Descartes's claim that animals have no minds and no souls.[28]

Another way to defy Descartes's test was to build a mechanical man that could speak and even reason.[29] This was tried most famously and most successfully by a Hungarian inventor, Wolfgang von Kempelen. In 1769—the year James Watt invented the steam engine that would set in motion the Industrial Revolution—von Kempelen built an automaton known as the Mechanical Turk, which played chess exceptionally well. (Von Kempelen's mechanical man was a "Turk," wearing a turban, because automata were so closely associated with the Arab world.) Playing chess requires reasoning. Yet, like Vaucason's duck, von Kempelen's Mechanical Turk was a fraud: a very small chess prodigy was hidden in the cabinet on which the torso of the man sat. From inside the cabinet, he moved the pieces.[30]

Less well known than von Kempelen's Mechanical Turk was his "speaking machine," which, unlike the Turk, was not a fraud. Declaring that "speech must be imitable," von Kempelen spent twenty years on this effort. It followed from earlier attempts to simulate human speech, including by Erasmus Darwin, who, as he later wrote, "contrived a wooden mouth with lips of soft leather."[31] (Erasmus Darwin had a particular interest in speech because both he and his oldest son, Charles—uncle of the theorist of evolution Charles Darwin—had a stutter.)[32] Von Kempelen built his machine out of ivory, wood, rubber, leather, and bellows. With blurred speech, it could say, if indistinctly, "I love you with all my heart." The original survives in Munich's Deutsches Museum; online, you can listen to a replica say "mama" and "papa."[33]

Building a machine that could talk required one kind of tinkering; building one that could think required another. A single machine that could do both became the stuff of fiction, most memorably in Mary Shelley's *Frankenstein; or, The Modern Prometheus* (1818), written after an evening discussing Erasmus Darwin's experiments and generally taken as the first instance in modern Western literature of a scientifically devised artificial man rebelling against its human creator.[34] In "The Automaton" (1814), a gothic tale by the German writer E. T. A. Hoffmann, a mechanical Turk speaks in language that evinces "deep insight." In Hoffmann's "The Sandman" (1816)—the story that inspired Freud to write his essay on "the uncanny"—a beautiful female automaton is so perfectly human that "to be completely convinced that they were not in love with a wooden doll, quite a few lovers demanded that their beloved sing something off key and dance

out of step, that they embroider and knit while being read to, or play with the little pug; above all, they demanded that they not just listen, but also occasionally say something in such a way as to demonstrate that their words came from actual thought and feeling."[35]

If an artificial man remained the stuff of fiction, a reasoning machine seemed, possibly, not far off. The English mechanical engineer Charles Babbage conceived of an automaton that could calculate—a mechanical computer—and began building what he called the Difference Engine in 1822. In the 1830s, now a professor of mathematics at Cambridge, he designed a digital computer, the Analytical Engine, to be programmed by punch cards, a technology invented by a French weaver named Joseph Jacquard. At Babbage's death, the Analytical Engine remained unfinished.[36] And the interest in talking machines waned. In the 1840s, a German-Austrian immigrant to America named Joseph Faber devised a non-fraudulent and actually rather ingenious speaking machine—it came to be known as the Euphonia—but not even P. T. Barnum could rustle up much interest.[37] By then, only very seldom were thinking and talking machines ever even mentioned in the same breath, unless in jest, as when William Makepeace Thackeray wrote a satire about the Euphonia in which he wondered if, united with Charles Babbage's calculating machine, it "might replace, with perfect propriety, a Chancellor of the Exchequer."[38]

Most of the machines of the Industrial Revolution, of course, were developed not to think or to talk but to labor. And by the middle of the nineteenth century, it had become possible to entertain the prospect that machines might one day replace *all* the labor of men. In 1859, John Stuart Mill wondered whether "it were possible to get houses built, corn grown, battles fought, causes tried, and even churches erected and prayers said, by machinery—by automatons in human form."[39] Plainly, machines could improve. There remained some distance to travel to imagine, as Nick Bostrom would, in *Superintelligence*, that humans would one day become to machines what an ape is to a man. But he was far from the first to come up with that idea.

8.

DARWIN AMONG THE MACHINES

> On a visitor once asking to see his library, Descartes led him into a room set aside for dissections, and full of specimens under examination. "There," said he, "is my library."
>
> ***—Thomas Henry Huxley, "On the Hypothesis That Animals Are Automata, and Its History," 1874***

In the industrializing, Darwinian nineteenth century, the Enlightenment-era fascination with automata like Vaucanson's duck and von Kempelen's Mechanical Turk yielded to an obsession with two competing ideas about humans, animals, and machines, with profound implications for the state. Either humans, like animals—*bêtes*—were mere machines, driven by nothing more than reflex and instinct, nerves and muscles obeying the laws of Newtonian physics and reproducing according to the laws of Darwinian evolution, or else humans had been or soon would be reduced to machines due to the mechanization of everyday life: the thumping of the loom, the chugging of the locomotive, the clanging of the factory bell. Neither of these conceptions of humankind accorded well with the emergence, at the very same time, of modern liberalism and the liberal nation-state. If humans were or were becoming machines, how could they be free?

"Animals—whom we have made our slaves we do not like to consider our equals," a young Charles Darwin wrote in his notebook in the 1830s.[1] Darwin was, among many other things, a dog lover. The subject of vivisection, he admitted, made him "sick with horror." He once wrote, "Everyone has heard of the dog suffering under vivisection, who licked the hand of the operator; this man, unless he had a heart of stone, must have felt remorse to the last hour of his life."[2] Darwin undertook a different kind of

research: the observation of living species, their distribution, and their variation. His *On the Origin of Species* was first published in 1859. Its proposed theory of evolution collapsed the distance between humans and other animals; it also had a strange effect on the idea that men are machines or might one day soon be replaced by them.

Among the whirlwind of responses to the book was a series of articles published in a New Zealand newspaper by Samuel Butler, an English clergyman's son and graduate of Cambridge who had emigrated to New Zealand to make his fortune as a sheep farmer. Butler read *On the Origin of Species* soon after he arrived in New Zealand, while he was engaged in breeding sheep. A Darwinism enthusiast who would later turn into something of a skeptic, Butler contributed articles to a Christchurch newspaper defending Darwin, pieces much appreciated by Darwin himself (the two men corresponded).[3] In 1863, Butler published an article called "Darwin Among the Machines," a satire that advanced the idea that machines, too, were evolving—if not by what Darwin called "natural selection," then by what Butler called "artificial selection"—and would eventually, inevitably, gain the upper hand.

"The machines are gaining ground upon us," Butler wrote. "Day by day we are becoming more subservient to them; more men are daily bound down as slaves to tend them, more men are daily devoting the energies of their whole lives to the development of mechanical life." One day, advanced machines would become a species superior to mankind. "We are ourselves creating our own successors," Butler warned, calling for a "war to the death" against all machines.[4]

This was both a spoof and not a spoof. Butler liked to goof. He once proposed that the *Odyssey* and the *Iliad* had been written by a young Sicilian girl. But there was always something serious in his satire, in this case his unease with both technological determinism and technological utopianism.[5]

Butler didn't let go of the idea of machine supremacy; instead, he developed it. Writing "Darwin Among the Machines" set him on the path to writing the novel *Erewhon: Or, Over the Range*, published in 1872, a parody of utopian fiction, a genre begun with Thomas More's *Utopia* (1516). (More coined the word *utopia*; it means "nowhere." *Erewhon* is an anagram of "nowhere.")

Erewhon, literary kin to *Gulliver's Travels*, is set in a distant and sublimely idiotic world in which there are no longer any machines; these can only be seen in museums. The narrator, a traveler to this strange land, visits the "Colleges of Unreason," where he learns of "the revolution which had ended in the destruction of so many of the mechanical inventions which were formerly in common use."

Centuries earlier, a philosopher had made a prophecy that machines would one day destroy humanity—the very prediction Butler made in "Darwin Among the Machines"—and had called for their entire destruction. This had led to a civil war between "the machinists and the anti-machinists"; the latter had won.

Our narrator reads a historical artifact, "The Book of the Machines," the manifesto of that ancient philosopher: "Our sum-engines never drop a figure, nor our looms a stitch; the machine is brisk and active, when the man is weary; it is clear-headed and collected, when the man is stupid and dull; it needs no slumber, when man must sleep or drop; ever at its post, ever ready for work, its alacrity never flags, its patience never gives in; its might is stronger than combined hundreds, and swifter than the flight of birds; it can burrow beneath the earth, and walk upon the largest rivers and sink not." Men live "in a state of bondage to the machines . . . bound down to them as slaves," the philosopher writes, and at the rate at which machines were improving, they would one day soon arrive at "mechanical consciousness," whereupon "man should become to the machines what the horse and dog are to us." (One chapter of a later edition of *Erewhon* concerns "the rights of animals," in which our narrator learns that, alongside the folly of recommending the destruction of all machines, another dunderheaded philosopher of that era had urged humans to stop eating animals, advice the Erewhonians had not been able to take.)[6]

Notwithstanding Samuel Butler's skepticism of machines, inventors kept on devising machinery that might narrow or even close the distance between machine and man, especially machines that could talk or think. In 1862, the elocutionist Alexander Melville Bell (later an inspiration for Henry Higgins in *Pygmalion*) took his sons Alexander and Melville to see a talking machine and challenged them to make their own. Starting out with a human skull, they contrived a contraption out of rubber, wood, parts of a dead cat, and the throat of a slaughtered lamb. It could say "Ow-ah-oo-gamama," as in, "How are you, grandmamma?"[7] Soon young Alexander

Graham Bell would stand at the vanguard of a revolution in the campaign to devise an artificial voice: instead of building speaking machines that could mimic the movements of the human mouth, he experimented with machines that could synthesize, compress, and transmit the sound of the human voice.

Alexander Graham Bell's mother, Eliza, had become partially deaf in childhood, but she could listen to the piano by placing a stick on the sounding board and "holding it there with her teeth." In 1864, his father invented a phonetic notation system known as Visible Speech; its characters are graphic representations of the positions of the mouth and tongue. But it was young Alexander who began using this system to teach the deaf to speak; in 1870 he began teaching at a school for the deaf in Boston. By 1874, he'd begun conducting experiments in the transmission of sound: in something of a reprise of his mother listening to a piano, he recorded the vibrations in the bones of a dead man's severed ear by attaching it to a haystalk that then scratched a smoked glass, leaving behind a record of speech, something like a photograph. That summer, now a professor of vocal physiology and elocution at Boston University and courting one of his deaf students, he came up with the idea of transmitting speech over an electrical wire. "My father invented a symbol," Bell said, "and, finally, I invented an apparatus by which the vibrations of speech could be seen, and it turned out to be a telephone."[8]

Bell's ingenious invention raised the philosophical stakes. If a machine could speak, what was left of the distinctiveness of man? In 1874, Thomas Henry Huxley delivered a lecture at the British Association of Science called "On the Hypothesis That Animals Are Automata and Its History" in which, attempting to support Darwin's claim that humans are, indeed, animals, he argued that humans are "conscious automata."[9] As the line between the human and the nonhuman animal was being drawn and redrawn, so was the line between the human and the machine. "Is Man an Automaton?," the physiologist William Benjamin Carpenter asked in 1875 in a lecture on the question (yes and no, he answered).[10] In 1879, William James, the American physician and founder of experimental psychology, joined the fray with "Are We Automata?," in which he acknowledged the importance of both reflexes and conscious action.[11]

This debate mattered, in practical terms, because the controversy over vivisection was still raging. Many interlocutors in the Victorian

"automatism" debate were either vivisectionists or anti-vivisectionists. Investigating the questions of whether animals and humans act by reflex or by volition was something, vivisectionists said, that could only be studied by poking at the live nerves and muscles of unanesthetized animals. They created, as one sociologist of science has argued, the artificial animal, the animal as an artifact, an "analytic animal," an artificial creature, "actively shaped by human agency, and in some cases literally carved up." In this way, Descartes's idea that animals are machines became a self-fulfilling one, since everything that made an animal natural—from its wholeness to its volition—was taken away from it in a laboratory. What was once a fellow creature—a mystery even—became data.[12]

Even so, vivisection became the focus of a determined campaign on the part of a new breed of animal welfare advocates. Animal welfare, or the anti–animal cruelty movement, began as an outgrowth of the antislavery movement. In a 1789 address to Pennsylvania's antislavery society, for which he served as president, Benjamin Franklin observed that a slave is a man who "has long been treated as a brute animal" and has become "accustomed to move like a mere machine."[13] Slavery, the former slave Frederick Douglass agreed, "reduces man to a mere machine."[14] Another antebellum American abolitionist, writing in Douglass's newspaper *The North Star*, collapsed these categories, arguing that slavery "degraded" a man "into a brute—a mere living automaton."[15]

Moral outrage about human bondage had led to the abolition of the slave trade in England in 1807. In 1822, moral outrage about animal suffering led to the first law passed by Parliament to punish cruelty to animals, the Cruel Treatment of Cattle Act. Two years later, English reformers, including leading abolitionists, founded what became the Royal Society for the Prevention of Cruelty to Animals.[16] By 1852, anti–animal cruelty societies had been founded in Germany, Austria, and Switzerland.[17] In the United States, the urgency of abolition of slavery took precedence over any concern with animals. Not until 1866, just after the end of the U.S. Civil War and the end of slavery by the Thirteenth Amendment, did Henry Bergh, a Republican who had served in the Lincoln administration, found the American Society for the Prevention of Cruelty to Animals in New York. He soon persuaded the state to pass the first American anti–animal cruelty act.[18]

Anti–animal cruelty reformers considered their movement a necessary step on the march toward liberalism, a free and equal and just democratic state that guaranteed fundamental rights. As the American George Angell saw it in 1879, looking back at the previous half century of moral and political reform, the sequence of events pointed in only one direction: "The suppression of the slave trade. The abolition of slavery. The growth of free government. The elevation of labor. The coming-up of woman toward equal rights with man. And now, the higher protection given to dumb beasts than was granted to colored men less than twenty years ago."[19]

To these reformers, winning the battle to abolish vivisection was crucial. In 1874, the Royal Society for the Prevention of Cruelty to Animals filed a lawsuit against a scientist who had conducted vivisections on dogs, whereupon Parliament considered anti-vivisection legislation. Darwin, who belonged to the RSPCA, tried to stay out of it.[20] The controversy raged on, evidence accumulating on the anti-vivisection side with *The Torture Chamber of Science*, which appeared first in Germany and was subsequently translated into English, Italian, French, Danish, Swedish, Russian, and Portuguese.[21]

The vivisection debate and the question of animal intelligence was utterly tangled together with the era's fascination with the possibility of intelligent machines. In George Eliot's novel *Impressions of Theophrastus Such* (1879), Eliot's narrator worries about all manner of new and clever calculating machines, with "cunning wires and wheels and pointing needles," including a "machine for drawing the right conclusion, which will doubtless by-and-by be imposed into an automaton for finding true premises."[22] Eliot's lover, George Henry Lewes, was an avid vivisectionist and the author of a textbook that included a section called "Animal Automatism." He was particularly interested in a series of machines, with cunning wires and pointing needles, that were being devised to measure and record the activity of the brain. Eliot and Lewes had together visited many laboratories, including the London office of Bell Telephone in 1878. Her "machine for drawing the right conclusion" was an actual device, known as the Logical Machine, invented by William Stanley Jevons in 1874, a successor to Babbage's proposed Analytical Engine.[23]

Even as engineers were first wondering about the possibility of machine intelligence—building the conclusion-making Logical Machine of such

interest to George Eliot—scientists were becoming newly interested in animal intelligence, drawing on experiments that required not vivisection but the observation of animal behavior. In *The Animal Mind* (1908), Vassar College psychologist Margaret Floy Washburn wrote, “Our acquaintance with the mind of animals rests upon the same basis as our acquaintance with the mind of our fellow-man; both are derived by inference from observed behavior.” And while animal behavior, from which we can deduce the animal mind, is not the same as human behavior, Washburn went on, “the difference is one of degree, not of kind.”[24] Washburn’s pioneering work was soon challenged by a rising generation of behavioralists, led by Edward L. Thorndike, author of *Animal Intelligence* (1911), who, as Washburn put it, opposed “the doctrine that an idea of a movement causes the movement.”[25] For Thorndike, as for Descartes, animals were creatures without ideas: all animal behavior could be reduced to reflex and instinct; success at tests like puzzles and mazes, which appeared to Washburn to be the result of reasoning, or insight (or having “the idea of a movement” before making it), Thorndike insisted was instead merely the result of blundering, repetition, and trial and error.[26]

Behavioralists, resurrecting the earlier idea of a great chain of being, placed at the top of that scale the perfected machine, the man-as-machine.[27] Under these circumstances, can it be wondered at that people began to speculate about a future world in which humans would be treated like animals by machines that drew conclusions? The best expression of such a fear, at the time, is a story published in 1909, “The Machine Stops,” written by a young English writer named E. M. Forster.

In Forster’s near-future world, humans live deep underground, cared for by the Machine. They reside in tiny rooms, something like horse stalls or laboratory cages, that they hardly ever leave, since they can communicate with one another through a network, and their food and anything else they need is also delivered by machine. “There were buttons and switches everywhere—buttons to call for food, for music, for clothing,” Forster writes. There was a button for a hot bath, and another for a cold bath. “There was the button that produced literature. And there were of course the buttons by which [Vashti, the main character] communicated with her friends. The room, though it contained nothing, was in touch with all that she cared for in the world.”

In the world of Forster's Machine, there are no animals but for a single long, white worm. There is no nature at all. No one has ever so much as seen a shaft of sunlight. Vashti has a "face as white as a fungus." She has in her room exactly one book, "the Book of the Machine"—Forster's nod to *Erewhon*—and expresses disgust at the idea of any other book, since "all the old literature, with its praise of Nature, and its fear of Nature, rang false as the prattle of a child."[28] She warns her son, Kuno, a rebel, "You mustn't say anything against the Machine." But Kuno has many doubts, telling his mother, "We created the Machine, to do our will, but we cannot make it do our will now. It has robbed us of the sense of space and of the sense of touch, it has blurred every human relation and narrowed down love to a carnal act, it has paralysed our bodies and our wills, and now it compels us to worship it."[29]

If man is an automaton, as so many Victorian men of science appeared to believe, then how can he be free? Or, as Forster wondered in "The Machine Stops," would whatever human freedom existed one day be ground to bits by the machinery of the state, or, rather, by a machine that functions as the state?

Forster anticipated not only the rise but also the fall of the Artificial State, even before there *was* one. In his story, as the title foretells, the machine stops, the Artificial State collapses, and humans learn, too late, that they have destroyed the natural world, and thereby themselves.

9.

MAN AND NATURE

> First, they were creeping molds that slithered forth from the ocean onto land, and lived by devouring one another, and the more they devoured themselves, the more of them there were, and then they stood upright, supporting their globby substance by means of calcareous scaffolding and finally they built machines. From these protomachines came sentient machines, which begat intelligent machines, which in turn conceived perfect machines, for it is written that All Is Machine, from atom to Galaxy, and the machine is one and eternal, and thou shalt have no other things before thee!
>
> ***—Stanisław Lem, "Prince Ferrix and the Princess Crystal," 1965***

Samuel Butler's "Darwin Among the Machines" and E. M. Forster's "The Machine Stops" established a literary tradition, the parable of the Artificial State, that endured well into the twenty-first century, when what was foretold in fiction became fact. The Polish writer Stanisław Lem helped carry this literary tradition across the bridge of the twentieth century. Lem intended his 1965 *Cyberiad* as a cybernetic *Iliad* or *Aeneid*. One of its fables recounts the history of the world as a progression in which molds evolve into animals that evolve into humans that evolve into machines that evolve into intelligent machines. *From these protomachines came sentient machines, which begat intelligent machines, which in turn conceived perfect machines*. Finally, "All Is Machine." The machine is God, "one and eternal," all-knowing and beyond question. A reversion to the age of mystery.[1]

Bizarrely, almost impossibly, the parable of the Artificial State, a cautionary tale about the enslavement of humanity to machinery, eventually became a business plan. It made this leap in the early decades of the twenty-first century, when many of the merchant princes of Silicon Valley began to subscribe to a philosophy known as longtermism.

History looks to the past. Longtermism looks to the future. It understands the course of events in reference to a very long timescale, one that stretches forward millions or even tens of millions of years into the future, a future at once easy to imagine and even to begin to build, and yet forever some distance away. This commitment to the vanishingly faraway future worked to relieve the architects of the Artificial State of any obligations to the present.

Longtermism developed out of effective altruism, at once an idea and a movement that purported to devise the most rational use of philanthropy to address the biggest problems facing humanity. Longtermism, in turn, influenced effective altruism by directing its attention away from urgent and immediate and toward distant and future problems. Longtermism became effective altruism's animating logic. It also amplified the attention paid to "existential risks." Early on, one of those risks was climate change. Over time, concern about climate vanished, as much of Silicon Valley, abandoning the mitigation of climate change, favored the building of the infrastructure of the Artificial State and pursuing the colonization of other planets over the preservation of a livable Earth. For longtermers, an indeterminate, imagined, and quite possibly extraterrestrial future always trumped the immediate or imminent suffering of humans, or even the fate of Earth itself.

The word *longtermism* was coined in 2017 by the Australian philosopher Toby Ord and the Scottish philosopher William MacAskill, colleagues of Nick Bostrom's at the University of Oxford's Future of Humanity Institute. Longtermers argued that the number of humans in the future may be far greater than the present population—so long as humans avoid extinction—and that the interests of the unborn outweigh those of the living. MacAskill argued for taking a "million-year view"; Ord's assessment of existential risks to humanity rated climate change lower than the danger from artificial intelligence.[2]

Elon Musk had long been interested in renewable energy and sustainability. Then his attention wandered. He became particularly

concerned about the robopocalypse in 2013. In September 2014, the month Bostrom's *Superintelligence* was published in the U.S., Musk, in a forum at MIT, described a rogue AI as the "biggest existential threat" to humanity. "Increasingly scientists think there should be some regulatory oversight, maybe at the national and international level, just to make sure that we don't do something very foolish," he said, to a standing ovation.[3] Humanity had only two choices, Musk claimed: "become multiplanetary" and join SpaceX's quest to send humans to Mars, which was crucial to "the long-term survival of civilization," or exist only "until some eventual extinction event."[4] Increasingly, that extinction event looked to him to be the robot apocalypse. In 2015, Musk, acting on his concern about AI, began donating money that was funneled to Bostrom's Future of Humanity Institute and also, with Sam Altman and others, founded OpenAI—although, at the time, he also said that delaying the turn from fossil fuels to renewable energy risked "more displacement and destruction than all the wars in history combined."[5] Then, after Ord and MacAskill ranked climate change below rogue AI on their list of the most existential existential risks, Musk changed his mind, insisting that climate change was not as urgent as the coming robopocalypse.[6] Musk also considered writing a book about existential risks, having determined that climate change was far less urgent, since "it's not going to kill everyone" but "AI could render humanity extinct."[7]

What happened next was stranger. Tech executives began invoking the fear of a robot apocalypse as the justification for building robots. It is unsurprising that the longtermer architects of the Artificial State, who were CEOs selling both stock and commodities, described their companies as ushering in the most important events of all past and future time. In 2018, Google CEO Sundar Pichai said artificial intelligence was "more profound than, I dunno, electricity or fire."[8] It *is* surprising that they switched from warning of an AI apocalypse to welcoming an AI utopia. "We are past the event horizon; the takeoff has started," wrote OpenAI's Sam Altman in 2025. "Humanity is close to building digital superintelligence," and while "robots are not yet walking the streets, nor are most of us talking to AI all day," a better, brighter, faster, and more prosperous future was just around the bend: "In the 2030s, intelligence and energy—ideas, and the ability to make ideas happen—are going to become wildly abundant."[9]

Like Silicon Valley entrepreneurs' predictions in the 1980s, 1990s, and early 2000s that the internet and social media would make the world better, happier, and more democratic, the computopia predicted by AI companies was not at hand or even on the horizon. Philosophers interested in artificial intelligence offered countervailing views. The Belgian philosopher Mark Coeckelbergh, writing in *Robot Ethics* in 2022, forswearing longtermism, suggested that "instead of being mesmerized by transhumanist science fiction and posthumanist fantasies about cyborgs, we should focus on real and urgent problems with the natural environment and planet like climate change."[10] This view did not appear to influence venture capitalists.

For a moral philosophy professedly interested in the study of time, longtermism was considerably at odds with the study of history, and it was also remarkably shortsighted, its myopia a price paid for the abandonment of the humanities in the age of data. It knew not even its own past. But there are lessons to be found in that history—and even predictions. That history is less about robots than about animals. The origins of longtermism lie in the late eighteenth and nineteenth centuries, which brought an understanding first of extinction and then of the disappearance of wildlife and wilderness. Longtermism is an upside-down version of nineteenth-century natural history, with all the animals erased, robots put in their place, and time stretching back not to a past that requires explaining but toward an imagined future used to justify the accumulation of staggeringly large fortunes.

Stories about the long-term future of humanity, like stories about humanity's deep past, are stories, inventions, artifacts: they are ideas with histories. Humans only began to glimpse the possibility that any species ever had or could become extinct in the eighteenth century, at the start of the Industrial Revolution, when Europeans became obsessed with inventing stories about what they came to call "prehistory." One reason for the invention of prehistory, for telling new stories about the origins of humanity, was to class certain peoples (Indigenous Americans, say, or Africans) as belonging to nature, somehow marooned in a time before the rise of civilization, in a "state of nature," in proximity to animals, while placing other peoples (specifically, Europeans) outside of nature, in modern states, in the "civilized world," distinct from the natural world.[11] Central to this story is one particular animal, the elephant, and one particular ecosystem, the forest.

In 1796, at a lecture in Paris, the French comparative anatomist Georges Cuvier first proposed the idea of extinction.[12] This idea proved very difficult to accept, since it ran against the prevailing view of the world, the great chain of being.[13] That view dates to antiquity, but it achieved its greatest reach and influence during the Enlightenment.[14] John Locke found evidence of the "infinite power and wisdom of the maker" in the "magnificent harmony" and "great design" by which "the *species* of creatures" ascend to mankind.[15] As Francis Bacon put it, "Man, if we look to final causes, may be regarded as the centre of the world; insomuch that if man were taken away from the world, the rest would seem to be all astray, without aim or purpose . . . leading to nothing."[16] Descartes, however, disagreed, contending that "it is yet not at all probable that all things have been created for us in such a manner that God has no other end in creating them." He believed that there was simply insufficient evidence to support such a grand supposition since "we cannot doubt that an infinitude of things exist, or did exist, though now they have ceased to exist, which have never been beheld or comprehended by man and which have never been of any use to him."[17] In 1703, the English botanist John Ray explained why such a view violated the central idea of the great chain of being, its completion and perfection: if any species that once thrived existed no more, "it would follow, That many species of Shell-Fish are lost out of the World, which Philosophers hitherto have been unwilling to admit, esteeming the Destruction of any one Species a dismembring [*sic*] of the Universe, and rendring [*sic*] it imperfect; whereas they think the Divine Providence is especially concerned to secure and preserve the Works of the Creation."[18]

Cuvier came to believe that extinctions were a part of this process, that species could indeed be "lost out of the World." To prove his theory, Cuvier relied chiefly on fossil remains collected in North America, including remains of relatives of what was believed to be among the most intelligent of all animals, the elephant. The bones and teeth of a so-called *incognitum*, a massive, unnamed animal, had been found along the Hudson and Ohio Rivers starting in 1705. More remains were discovered in South Carolina; enslaved Africans noted that the teeth resembled those of elephants.[19]

Elephants were to the nineteenth century what automata were to the eighteenth and robots would be to the twentieth: the uncanniest of creatures. One helpful way to think about robots, then, is to think about elephants.

They're a missing link between the eighteenth-century automaton and the twentieth-century robot, a creature that challenged prevailing ideas about the line between humans and animals; the study of the remains of elephants also proved crucial to the development of a new set of ideas about the age of the planet and the nature of evolution and extinction.

Elephants had long been admired for their intelligence. Benjamin Franklin, who collected tusks and elephant bones, placed the oyster at the bottom of "the scale of beings" and, at the top, the elephant.[20] In making this assessment, he relied on the knowledge of antiquity, the writings of naturalists, and on English travel narratives. In 1554, a ship voyaging from England to Guinea that brought back "certeyne blacke slaves"—the first enslaved Africans in London—also carried two hundred fifty elephant tusks, an elephant head, and a report of the elephant: "Of all beastes they are moste gentyll and tractable," according to this report. And they "are of quicke sence and sharpness of wyt."[21] Or, as the English clergyman Edward Topsell wrote in his *Historie of Foure-Footed Beastes* in 1607, "There is not any creature so capable of understanding as an Elephant."[22]

There were elephants in Asia and Africa—but there remained the mystery of whether there were elephants in the Americas, a question that fascinated leading American intellectuals. In 1777, Ezra Stiles, who became president of Yale the following year, wrote in his diary about a fifty-ounce tooth he was examining, "but whether [from] an Elephant or Gyant, is a Question."[23] Benjamin Franklin suspected that whatever this animal had been, it had disappeared, "no living elephants having been seen in any part of America."[24] But Thomas Jefferson, insulted by an eminent French naturalist who had declared that "no American animal can be compared with the elephant," remained certain they must exist and had merely to be found, writing that "in the present interior of our continent there is surely space and range enough for elephants."[25]

In 1796, Cuvier delivered his lecture on extinction in Paris, demonstrating, from fossils collected in North America, that both the woolly mammoth and the mastodon had once existed, and existed no more.[26] That same year, the first elephant in North America, a three-year-old female shipped from Calcutta to New York, arrived in Philadelphia. Named simply "The Elephant," she was exhibited in Philadelphia as "the most respectable animal in the world," an animal whose "intelligence,

makes as near an approach to man, as matter can approach spirit."[27] In 1797 she was brought to Cambridge in time for Harvard's commencement.[28] In 1803, Jefferson, refusing to accept Cuvier's explanation of those North American fossils and determined to find a living specimen of some variety of elephant native to the United States, charged Lewis and Clark with finding one.[29] They were, of course, unsuccessful.

By 1813, seven years after Lewis and Clark returned from their travels, *sans* elephant, Cuvier had developed a theory that catastrophes regularly lead to species extinction, and even to the mass extinction of species, a theory he explicated in *Essay on the Theory of the Earth*.[30] It was a daunting, haunting thing to realize that woolly mammoths and dinosaurs had once walked the earth (the first dinosaur was named in 1824—the Megalosaurus). And still more daunting and haunting to imagine that one day humans, too, might vanish entirely. In 1826, in a novel called *The Last Man*, Mary Shelley became the first writer of fiction to imagine the extinction of mankind due to a catastrophic event, in this case a plague.[31] Still, not until later in the nineteenth century, with the decimation of the American bison, did humans begin to understand their own role in the diminishment and extinction of other species—that *humans* could be that catastrophic event.

Cuvier's work sat within an intellectual revolution of near-Copernican importance, one that challenged the biblical notion that Earth is only a few thousand years old. Out of that revolution came a set of ideas that, combined with Cuvier's theory of extinction, led humans for the first time —in a secular sense—to worry about the end of history itself. They began to see that they themselves were having an effect not only on individual species of plants and animals but on the planet. This insight came first with forests.

A year before Cuvier delivered his 1796 lecture on extinction, the Scottish geologist James Hutton published *A Theory of the Earth*, in which he suggested that the earth had "no vestige of a beginning" and "no prospect of an end" but was likely millions or even hundreds of millions years old.[32] Cuvier, Hutton, and the Scottish geologist Sir Charles Lyell made it possible for Darwin to update the great chain of being and picture things differently, involving changes happening not over the few thousand years of history chronicled in the Old and New Testaments but over a much

longer term, geological history. (The discovery of dinosaurs undergirded this new, longer timeline, too.) That new geological history tied the destiny of *Homo sapiens* to that of plants and animals, at a time when humans appeared to be breaking those ties, with the chop of every ax. Still, by the middle of the nineteenth century, a not small number of people had begun to wonder what would happen if humans were to keep cutting down trees. They began to worry, that is, about an arbor-apocalypse.

Earth is about four and a half billion years old. By about two and a half billion years ago, enough oxygen had built up in the atmosphere to support life, and by about five hundred seventy million years ago, the first complex macroscopic organisms had begun to appear. The first trees evolved about four hundred million years ago and pretty quickly, geologically speaking, covered most of Earth's dry land; one hundred fifty million years later, however, during a mass extinction event known as the Great Dying, when nearly everything on land and sea died, the forests died, too. Then, two million years after that, the supercontinent broke up, a seismic process whose consequences included the deposition of oil, coal, and natural gas in the places on the planet where they can still be found, to our enrichment and ruination.[33] The trees came back. The ginkgo, the oldest known tree species, is still around, its fan-shaped leaves unfurling lime-green in spring and falling, mustard-yellow, in autumn.[34]

The first primates showed up over sixty million years ago, in the rainforest.[35] Humans began dividing from apes—coming down from the trees—about seven million years ago; the genus *Homo* branched off four million years later; and *Homo sapiens* began wandering around the understory somewhere between eight hundred thousand and two hundred thousand years ago, although exactly when is apparently a matter of fierce debate, which seems right, since humans are such a contentious, Neanderthal-killing lot. Here's how Peter Frankopan, a professor of global history at Oxford, puts it: "Like rude house guests who arrive at the last minute, cause havoc and set about destroying the house to which they have been invited, human impact on the natural environment has been substantial and is accelerating to the point that many scientists question the long-term viability of human life."[36] Climate change contributed to the extinction of Neanderthals about thirty-five thousand years ago, but humans, instead of dying out, migrated to different climates or found ways to survive. This

generally involved ingenious inventions—controlling fire and burning fallen sticks and branches for heat and to cook food that might otherwise be hard to digest; making axes to cut down trees, whose wood could be used to build shelters and, later, fences for animals.

People are arboreal, at least vestigially, with binocular vision, upright posture, hind limbs for movement, forelimbs for gripping, and fingers with soft pads and nails—all features that evolved to help primates live in trees. The first primates were tiny, as small as mice, and could scramble wherever they liked, but as they got bigger it got harder to stay up in the trees, where it was safest, especially at night. A "clambering hypothesis" among primatologists has it that the brains of great apes got bigger so that these primates could better understand the mechanics of climbing and swinging through trees. Also, the first tools used by great apes were made of trees and made in trees: nests for sleeping on higher branches. The earliest hominins learned to walk upright while still living mainly in trees and only came down at night after they figured out how to make fires—with wood—which had all kinds of knock-on effects. They built warmer huts and more fires, things they could do anywhere, so long as there were trees.[37]

In all this time, the supply of wood was not depleted, since there weren't that many people and there were a great many trees, and because trees grow back. Even after humans invented the stone ax and began to chop down trees, this was still true. Chopping and burning, they cleared openings in forests to attract game and hewed trunks and limbs into poles and posts, planks and beams. They built houses and rafts and boats; some people, in places where they had cleared the forests, began to farm.

The long sweep of human history was only being discovered in the nineteenth century. In 1836, in *Ledetraad til Nordisk Oldkyndighed* (Guide to Nordic Antiquity), Christian Jürgensen Thomsen, a Danish scholar and a contemporary of Cuvier's, having studied artifacts of antiquity, divided human history into the Stone Age (beginning 2.5 million years ago), the Bronze Age (3000–1000 BCE), and the Iron Age (1200–300 BCE). Thomsen appears to have missed the most important and earliest era: the Wood Age. (He'd missed it because wood, unlike stone, bronze, and iron, rots: the evidence, that is, had mostly disappeared.)[38] During the ages of stone, bronze, iron, and copper, down through the early modern era, most things made by most people were made of wood, and things made of stone, bronze, iron, and copper required a great deal of wood to make. Only the

turn to coal for fuel in the eighteenth century and to wrought iron for building in the nineteenth brought about the end of the Age of Wood.[39] Except then it didn't end, since imperialism, industrialism, and capitalism mainly meant that people were more likely to wage wars and conquer land in order to cut down other people's trees, which is, for instance, what happened in North America.

It could be argued that trees were responsible for the establishment of the first nation-states. By the eighteenth century, much of England and western Europe had been deforested, but England needed timber to build ships to trade goods, wage war, and found colonies. It especially wanted very tall and straight pines, for ships' masts. During the long wars between Britain and France, waged mostly at sea, France had for a time a ships' mast advantage, having cut a path known as the Mast Road through the Pyrenees to a stand of tall fir trees. Britain harvested its masts from its colonies and especially among the tall white pines of New England, having issued an edict in 1691 that any pine whose trunk was more than twenty-four inches in diameter one foot from the ground belonged to the king (later fairly desperately revised to twelve inches in diameter). Among the many causes of the American Revolution was the Pine Tree Riot of 1772, when mill owners in New Hampshire refused to pay fines for sawing pine trees into boards.[40]

One of the earliest alarms about deforestation, written in English, is *Sylva, or a Discourse on Forest-Trees, and the Propagation of Timber in His Majesties Dominions*, by John Evelyn, published in London in 1664. Evelyn called for the planting of trees as an act of patriotism, and if he was the first, he was not the last.[41] Forests, long considered wild and dangerous —as if they were nations inhabited by wild beasts, or what one poet called "forest citizens"—came to be cherished and adored, even worshipped, just as they were disappearing.[42] American states legislated the protection of the forests from their very founding, if to little effect. After the American Revolution, Massachusetts forbade the cutting down of any white pines of twenty-four inches or bigger in diameter on any public lands.[43] But in the western territories, "public lands," which were generally the ancestral lands of Native nations, quickly became private lands. Under the terms of the Northwest Ordinance of 1787, Congress paid Revolutionary War veterans in plots of land in the Northwest Territory, north of the Ohio River. ("The

utmost good faith shall always be observed towards the Indians; their lands and property shall never be taken from them without their consent; and, in their property, rights, and liberty, they shall never be invaded or disturbed, unless in just and lawful wars," Congress pledged in the legislation, a promise not honored.) In *The Trees*, Conrad Richter's 1940 historical novel, the first of what became a trilogy, a family of Pennsylvania pioneers makes its way to the Ohio Valley in 1787. Their little girl, looking down from a hilltop, is overwhelmed by her first view of the forest, thinking that "what lay beneath was the late sun glittering on green-black water," mistaking for an ocean what is instead "a sea of solid tree-tops broken only by some gash where deep beneath the foliage an unknown stream made its way." The whole of Richter's trilogy, the story of American pioneers, is the story of clearing the woods. "Oh, it was hard beating back the woods. You had to fight the wild trees and their sprouts tooth and nail." By the third book, *The Town*, that little girl, now an old woman, is haunted by regret. "She reckoned she knew now how one of those old butts in the deep woods felt when all its fellows were cut down and it was left standing lone and gaunt against the sky, with only whips and brush and those not worth the axe pushing up around it. The second growth trees you saw today were mighty poor and spindly specimens beside the giants she had known when first she came to this country."[44]

The sense that a great clearing of trees meant not only the spread of civilization but also a great loss pervaded nineteenth-century American culture. Much of this was the merest romance, a product of the wispy, dreamy, self-justifying association many Americans made between the vanishing forest and the imagined vanishing of the Indians, even while federal and state governments pursued a policy of conquest and war against Native nations. Nevertheless, tree-planting campaigns became the remorseful remedy. "If our ancestors found it wise and necessary to cut down vast forests, it is all the more needful that their descendants should plant trees," the landscape architect Andrew Jackson Downing wrote. "Let every man, whose soul is not a desert, plant trees."[45]

In 1847, a U.S. congressman named George Perkins Marsh gave a lecture in Rutland, Vermont, in which he argued that the destruction of the forests had consequences for the climate:

> Though man cannot at his pleasure, command the rain and the sunshine, the wind and frost and snow, yet it is certain that climate itself has in many instances been gradually changed and ameliorated or deteriorated by human action. The draining of swamps and the clearing of forests perceptibly effect [*sic*] the evaporation from the earth, and of course the mean quantity of moisture suspended in the air. The same causes, modify the electrical condition of the atmosphere and the power of the surface to reflect, absorb and radiate the rays of the sun, and consequently influence the distribution of light and heat, and the force and direction of the winds. Within narrow limits too, domestic fires and artificial structures create and diffuse increased warmth, to an extent that may effect [*sic*] vegetation.

Marsh wrote, "Trees are no longer what they were in our fathers' time, an incumbrance" but are instead a reservoir, the source of life, the regulators of the climate.[46]

In 1856, the American scientist and suffragist Eunice Newton Foote became the first person to demonstrate what would become known as the greenhouse gas effect, an experiment she chronicled in "Circumstances Affecting the Heat of the Sun's Rays" (at an academic conference, her paper had to be read by a male colleague).[47] If her groundbreaking research was largely ignored, interest in the broader subject of the effects of deforestation was growing. Marsh went on to write a groundbreaking book, *The Earth as Modified by Human Action*, first published in 1864 under the title *Man and Nature*.[48] In response to the book, the poet and editor William Cullen Bryant called for the conservation of trees on public lands, arguing that "scarce anything is more prejudicial to the fertility of a country, or has a worse effect on its climate, than the thoughtless practice of denuding it of trees."[49] The legislature of Wisconsin in 1867 commissioned an investigation that resulted in the publication of a "Report on the Disastrous Effects of the Destruction of Forest Trees Now Going On So Rapidly in the State of Wisconsin." The state then inaugurated a program of tax exemption for landowners who planted trees—even as federal legislation encouraged mining, tree clearing, and economic development of the West.[50] In 1873, Nebraska senator Phineas W. Hitchcock introduced the Timber Culture Act,

declaring, “The object of this bill is to encourage the growth of timber, not merely for the benefit of the soil, not merely for the value of timber itself, but for its influence upon the climate.” The act was repealed in 1891.[51] Instead the lasting, if limited, consequence of Marsh’s *The Earth as Modified by Human Action* was the inauguration of Arbor Day, created by the Nebraskan J. Sterling Morton and first celebrated on April 10, 1872. Morton, editor of the *Nebraska City News*, called for a day “set apart and consecrated for tree planting.”[52] On that first Arbor Day, Nebraskans planted more than a million trees. The holiday soon spread, especially after Grover Cleveland appointed Morton secretary of agriculture in 1893. The American Forestry Association, an advocacy organization, later called American Forests, was founded in 1875.[53]

The spirit of conservation that animated tree-planting campaigns also animated the founding of some of the first modern public zoos, in Vienna (1765), Paris (1793), and London (1828) and then, in the 1870s and 1880s, in Australia, India, the United States, and Japan. These zoos ushered in the era of what the historian Ian Jared Miller has called “ecological modernity,” a culture that “made caged animals into representatives of pristine ‘nature’ ” while also instituting “a separation between people and the natural world, introducing a break between humanity and animality.”[54]

The star attractions of these zoos were most often elephants. The first American zoo opened in Philadelphia in 1874, featuring an Asian elephant, Jennie, born wild in 1838 and bought from a circus.[55] Jennie later became the first elephant captured in motion when Eadweard Muybridge, with funding from the University of Pennsylvania, photographed her for his *Animal Locomotion* series. She lumbers along, as if free.[56] But most elephants in the United States, those in circuses and those in zoos, spent their lives in foot chains.[57] They often sought to liberate themselves. Their insurrections, like those of criminals, were punished with public executions. At least thirty-six elephants were publicly executed, sometimes by hanging, in the United States between 1880 and 1930, during the peak Jim Crow years of the lynching of Black men. In 1885, a rebellious elephant was chained to four trees in Keene, New Hampshire, and executed by firing squad before two thousand spectators. In 1894, Tip, in the Central Park menagerie, which predated the zoo, was indicted, “tried and convicted” for murder and then publicly poisoned. Six-ton, thirty-six-year-old Topsy,

named after the slave child in *Uncle Tom's Cabin*, "the first baby elephant to be held in captivity in the United States," worked for a circus and killed three men in three years before being sold to a park in Coney Island, where in 1903 she was executed; electrodes were strapped to her feet and a noose around her neck was tied to a steam engine, though she was also fed carrots loaded with cyanide. The Edison Manufacturing Company electrocuted her and made a film, *Electrocuting an Elephant*.[58] In 1916, a trainer riding on an elephant named Mary at the head of a parade leading spectators to a traveling circus in Kingsport, Tennessee, "dealt her a blow over the head with a stick," whereupon she grabbed him by the waist with her trunk and, according to one report, "with the full force of her beastly fury, sunk her giant tusks entirely through his entire body" and then trampled him, "as if seeking a murderous triumph."[59] The circus's publicist decided the thing to do was to stage a public execution by hanging her from a derrick. "I mean, if we have to kill her, let's do it with style," said the circus owner. The hanging broke her neck but, as was reported at the time, "the apparent intelligence of the animal made her execution all the more solemn": she tried to use her trunk "to free herself."[60] The National Association for the Advancement of Colored People requested materials about the execution for their lynching files.[61]

Public outrage about the treatment of elephants, and the animal welfare movement more broadly, along with the understanding of extinction, led conservationists to a concern with preserving not only endangered species but entire habitats.[62] William Temple Hornaday, who in 1899 became the founding director of what eventually was called the Bronx Zoo, had been a big game hunter; as he wrote in a memoir, *Two Years in the Jungle*, he shot his first elephant in India in 1878.[63] He had also trained as a taxidermist. But he'd gone on to become one of the country's leading wildlife conservationists. In 1886, he wrote a report for the Smithsonian Institution, "The Extermination of the American Bison," which he soon afterward published as a book with the purpose, he declared, of causing "the public to fully realize the folly of allowing all our most valuable and interesting American mammals to be wantonly destroyed."[64]

Hornaday helped save the bison: he collected and grew a herd for the zoo and then shipped it west as part of one of the world's first efforts to preserve an endangered species. Zoological parks and the national parks

were two sides of the same coin. In the U.S., Hornaday advocated for, and Theodore Roosevelt in the White House helped deliver, the public ownership and stewardship of land in the American West, especially in the form of the national parks (on lands seized from Native nations, whose own populations were fast dwindling). “My policy is no quarter to the destroyers of wildlife,” Hornaday wrote in 1913, in a manifesto called *Our Vanishing Wildlife*, in which he expressed a yearning for a lost world where the buffalo roamed and the deer and the antelope played. The Sierra Club compared the book’s import to that of abolitionist literature: “when the force of great moral convictions won the day against greed and wrong.” Young Aldo Leopold reviewed it and called it “the most convincing argument for better game protection ever written.”[65]

Our Vanishing Wildlife appeared at the height of the age of imperialism, during which the majority of humans on the planet—well above 70 percent of the global population—lived under some form of colonial rule, chiefly British, Russian, French, Dutch, and American. The conservation movement, and to a lesser degree the animal welfare movement, were the handmaidens of imperialism. Western environmentalism began with the imperial state. Imperialist violence and terror, the ranking of humans on a scale from “savagery” (closest to animals) to “civilization” (closest to machines), the ravaging and rule of peoples and lands from India to the Caribbean to Hawaii, itself drove the conservation movement.[66] The Machine Age’s chiefly European and American obsession with vanishing wildlife and vanishing wilderness was inseparable from these colonial powers’ obsession with vanishing races, the idea that “primitive” and Indigenous peoples all over the world were doomed to disappear in the face of European and American expansion. Imperial rule provided immediate, everyday eyewitness evidence of the theories first advanced by Cuvier, of species extinction, environmental devastation, and the eradication of human populations.[67]

The imperial destruction of colonial lands, animals, plants, and peoples abroad animated conservation and animal welfare campaigns’ lamentations for disappearing forests and wildlife at home. Those lamentations proved remarkably effusive, especially in response to the much-publicized disappearance of the passenger pigeon. Once there had been hundreds of millions of passenger pigeons in North America. “The most abundant bird in the world,” they flew in flocks that stretched for miles—you could knock

them out of the sky with a stick.[68] The sound of so many birds was nearly deafening, so loud that one hunter could think of no way to describe it than by likening it to machines. “Imagine a thousand threshing machines running under full headway, accompanied by as many steamboats groaning off steam, along with an equal quota of R.R. trains passing through covered bridges,” he wrote from Wisconsin in 1871. “Imagine these massed into a single flock, and you possibly have a faint conception of the terrific roar.”[69] But in the nineteenth century, hunting passenger pigeons had become a sport, and wearing dead birds—whole birds—became a fashion, like wearing fur coats. In 1890, spring arrived and, for the first time, no passenger pigeons turned up. Conservationists founded the Audubon Society, but it was too late to save the passenger pigeon. By 1910, there was only one left, a female named Martha, held captive in a zoo in Cincinnati.[70]

The age of tree planting and zoo building and pigeon mourning coincided, too, with the age of the animal story. In 1877, Anna Sewell’s novel *Black Beauty*, originally subtitled *The Autobiography of a Horse*, borrowing from anti-cruelty tracts, established the conventions of fiction that called attention to the suffering of animals by way of animal narrators. Sewell’s novel had disappeared after its publication in London, but in 1890, the head of the American Humane Education Society reprinted it in the United States, calling it on its cover THE “UNCLE TOM’S CABIN” OF THE HORSE, and it went on to become a bestseller.[71] Mark Twain’s novel *A Dog’s Tale* (1903) belongs to this tradition. (“My father was a St. Bernard, my mother was a collie, but I am a Presbyterian,” it begins.)[72] A new nonfiction genre, known as the “wild animal story,” emerged, too, epitomized by an 1878 short story by Charles Dudley Warner called “A-Hunting of the Deer”: the story of the hunt from the deer’s vantage.[73]

In 1910, while Martha languished in the Cincinnati zoo, a novel called *Le Péril bleu*, by the French writer Maurice Renard, appeared. It turned the tables on the story of vanishing wildlife; instead of animals, it’s humans who begin to vanish. In Renard’s novel, a superior race, birdlike, lives in the sky, hunts humans, dissects them, and puts them on display in their celestial natural history museum.[74] An English novel that entirely borrowed Renard’s plot appeared in 1912 as *Up Above: The Story of the Sky Folk*, in which the Sky Folk begin by stealing trees and sheep and then swoop down and snatch away humans; soon blood begins raining from the sky. “I am

quite certain that catastrophe is coming," a man captured by the Sky Folk writes in his diary. "These Sky Folk are too human in their methods not to be dangerous."[75]

Only in fiction did the birds—the colonized—turn the tables. The passenger pigeons never came back. Martha died in 1914, a death remarked upon all over the world as evidence of one species entirely exterminating another. Her body was sent to the Smithsonian, stuffed, and put on display. "For one species to mourn the death of another is a new thing under the sun," wrote Aldo Leopold.[76]

Then rose the robots. One by one, in story after story, they replaced the animals. Long before advocates of longtermism reimagined the history of the world without nature in it—no plants, and no animals—and imagined a future in which humans are threatened with extinction by an artificially intelligent successor species, science fiction writers had begun to erase animals from their stories and to insert, in their stead, machines. "He'd run about a mile now, but wasn't even hot yet," begins "The Hunt," by Stanisław Lem, a story written in the late 1950s and set in the woods. "There was forest everywhere, with green splashes of beech trees, then a darker and darker color toward the peaks." Only gradually does Lem reveal that the creature being hunted by humans with guns is not an animal but a robot. "He ran uphill, up a steep gradient that no human could have covered at a similar speed," Lem writes. "He wasn't panting, his heart wasn't thumping in his chest, the blood wasn't thudding in his temples; but something—he didn't know what—began to cry inside him, a weak but intensive whine, like a chord that's been instantly muffled."[77] It was the parable of the robot. The robot suffers, the robot thinks, the robot . . . rebels.

10.

WAR WITH THE NEWTS

> It is easy for me to imagine that the next great division of the world will be between people who wish to live as creatures and people who wish to live as machines.
>
> ***—Wendell Berry, "Creatures as Machines," in* Life Is a Miracle, *2000***

If the possibility of human extinction was first glimpsed by Mary Shelley in *The Last Man* in 1826, and haunted imperialists during the rise of empires, it first threatened to become a reality during the First World War. Centuries of debate about humans, animals, and machines, about freedom and liberty, about colonial rule, and about the authority of the state led to slaughter on a scale never before seen, the slaughter of humans, and of animals, by machines in the service of the state. It's impossible to reckon with the twenty-first century's terror of a robot apocalypse without accounting for the scale and memory of the Great War and the specter to which it gave rise: the quite possibly imminent self-extinction of the entire human race by way of man-made machines.[1]

"War broke: and now the Winter of the world / With perishing great darkness closes in," the English soldier Wilfred Owen wrote in "1914."[2] Ten million soldiers and some seven million civilians died in a war staggering for its machine-driven brutality, with the first armored tanks, the first automobiles, early machine guns, and the first aerial bombs—weapons of war manufactured by assembly line with interchangeable parts, deployed by soldiers transported to battlefields by the millions, by railroad.[3] (Owen himself was killed in action—by a German machine gun—in 1918, one week before the Armistice. He was twenty-five.) How the mass of humanity

felt about machines was forever changed by the discovery that machinery made to shorten war only made war worse. It felt as if machines themselves were doing the killing, as if machines threatened to annihilate all of mankind the way imperial powers had annihilated Indigenous peoples and humans had annihilated animals—as so recently discovered—to the point of extinction.

Even before the war, the Prussian soldier and German field marshal Baron von der Goltz had acknowledged the criticism that "all advances made by modern science and technical art are immediately applied to the abominable act of annihilating mankind." He disagreed. Yet the criticism mounted. "War has become an industry—an engineering business devoted to mechanical slaughter and massacre," said the French writer and military surgeon Georges Duhamel on observing the Great War's trench warfare.[4] Those who witnessed the fate of men on the battlefields compared it to the fate of cattle and horses brought to the great industrial stockyards and slaughterhouses of Chicago, Buenos Aires, London, and Paris. "What passing-bells for these who die as cattle?" asked Owen in another poem.[5] A French surgeon at Verdun overheard one soldier say to another, "Baa, baa, I am the sheep on the way to the slaughterhouse."[6] Those who survived met what was often a worse fate. A nurse who served on the Western Front wrote of treating "men without faces, without eyes, without limbs, men almost disemboweled, men with hideous truncated stumps of bodies," men "burnt and blistered all over . . . with blind eyes . . . all sticky and stuck together."[7] The German soldier Ernst Jünger chronicled his experiences on the Western Front in a memoir called *The Storm of Steel*, describing the battlefield as "a huge, sleeping machine with innumerable eyes and ears and arms" that wakes, and then "a thousand guns roar out on the instant, and at a touch, driven by innumerable levers, the work of annihilation goes pounding on its way."[8] You can see the same scene of mechanized slaughter in the first *Terminator* movie, where robot-destroyed Los Angeles looks like the wreckage after the Battle of the Somme.

Lt. Col. John McCrae, a Canadian doctor, served at Flanders Fields, where a million soldiers were killed. In the war's most famous poem, McCrae contrasted grave markers with flowers and the rat-tat-tat-tat-tat of machine guns with birdsong:

In Flanders fields the poppies blow
Between the crosses, row on row,
That mark our place; and in the sky
The larks, still bravely singing, fly
Scarce heard amid the guns below.[9]

Machines massacred men. They also massacred animals. McCrae had sailed to Europe in 1914 in a convoy with thirty thousand men and eight thousand horses. McCrae's horse was named Bonfire. "He puts his lips up to one's cheeks," he wrote from the front, "and wags his under lip in the funniest fashion."[10] Notwithstanding their many machines, armies all over the world relied, too, on animals—the fantasy of the "de-horsing" of armies, with armored tanks replacing the cavalry, would not be realized in any part of the world until the end of the Second World War.[11] In Japan, war horses were *ikeru heiki*, "living weapons," and *mono iwanu senshi*, "silent soldiers," celebrated for their strength, obedience, loyalty, and valor.[12] Of the sixteen million horses used during the First World War, eight million died, some in battle but many more of starvation, disease, exposure, or exhaustion. The toll was so great that one historian has called the war an "equine holocaust." Britain alone lost half a million horses: one horse died for every two men. The mortality rate had been higher in earlier wars, including the Crimean War, but the decreasing reliance on war horses, and their dwindling numbers, appears to have meant that soldiers became more attached to them. Veterinary hospitals were set up; 80 percent of wounded horses were returned to duty and reunited with their units. After the war, military horses were treated as "veterans," and many were sent home with the soldiers who had ridden them in battle.[13] Ueno Zoo, in Tokyo, exhibited memorials for Japan's equine and canine war veterans.[14]

McCrae found the suffering of dying horses horrible. "There is nothing I hated more than that horse scream," he wrote home. Bonfire's leg got infected. McCrae was there to provide medical care to men; but he began mending animals. Somewhere along the way, he acquired a dog ("He ran to me and pressed his head hard against my leg"); he named him Fleabag.[15] In 1918, three years after writing "In Flanders Fields," McCrae contracted pneumonia, then meningitis; he died before peace came. At his funeral,

Bonfire followed the casket, carrying McCrae's boots backward in his stirrups.[16]

Hugh Lofting served in Flanders Fields in the Irish Guards. "Certain horses that were attached to your own company you became very fond of," Lofting said. Like McCrae, he found their fates terrible. "Nearly all the horses that were injured had to be shot. If we were as far behind in medicine for ourselves as we were apparently for our beasts of burden we would go around shooting all of our men." Writing letters home to his young children, Lofting could not bear to report on what he was seeing, so instead he made up stories about animals. Then he got the idea that to really provide medical care to animals, it would be necessary to be able to speak with them; when he settled in Connecticut after the war, he invented the children's book character Doctor Dolittle, who could talk to the animals. His first patient was a horse.[17]

Stories about animals became the stuff of children's literature, some of it laced with the ethos of imperialism, the animal as the infantilized colonial subject: the era saw the debuts of Doctor Dolittle (1920), Winnie-the-Pooh (1925), and Babar the Elephant (1931). Interest in animal welfare was increasingly dismissed as feminine, bourgeois, and juvenile, while the more serious genre fiction—soon to be dubbed "science fiction"—had to do, instead, with machines leading to the fall of civilization and the disappearance of the human race in British dystopian novels like Edward Shanks's *The People of the Ruins* (1920) and P. Anderson Graham's *The Collapse of Homo Sapiens* (1923).[18]

The two most influential dystopian works produced by the mechanized slaughter of the Great War imagined the future not quite yet in ruins but instead as an artificial state where humans are no longer free and instead either become machines or are ruled by them.[19] *We* and *R.U.R.* were written at nearly the same time by political dissidents, one Russian and one Czech. Both imagined, too, a future in which the natural world has been obliterated.

The Russian writer, engineer, and naval architect Yevgeny Ivanovich Zamyatin, who had participated in the failed Russian Revolution of 1905, spent seven months in solitary confinement at the hands of the tsar but then was disillusioned with the successful Bolshevik Revolution of 1917. *We* was both a specific indictment of the terror of Soviet rule and a broad

critique of collectivism, efficiency, and mechanization. “This novel is a warning against the twofold danger which threatens humanity,” Zamyatin wrote: “the hypertrophic power of the machines and the hypertrophic power of the State.”[20] He began the manuscript in 1920, finished it late in 1921, and sent it to Berlin, where the book was published in German and Russian. He was arrested in 1922 and returned by the Communists to the very same cellblock he had occupied under the tsarists.[21] *We* became the first novel to be banned in the Soviet Union. An English translation was published in England in 1924, and in 1927 its original Russian text was published not in the Soviet Union but in Prague, where it was unsuccessfully passed off as a translation from Czech in an attempt to hide Zamyatin’s authorship. (*We* was not published in Russian, on Russian soil, until 1988.)[22]

In the futuristic world of *We*, people do not have names but instead are known by numbers. There are, in fact, no “people”: only “Numbers,” cogs in the “great State Machine” of “OneState,” run by a dictator known as the Benefactor. Nature has been banished. The Numbers live within a Green Wall that separates their “perfect machine world from the irrational, ugly world of trees, birds and animals.”[23] The novel also pointedly mocks the “scientific management” of the American Frederick Winslow Taylor, the founder of management consulting. Taylorism sought to eliminate wasted time and motion in everything from assembly-line mass production to daily tasks like baking a pie or diapering a baby.[24] To his critics, Taylor seemed to want to turn men into machines in much the same way that men had sought to turn animals into machines. He described the ideal manual worker as a human who “more nearly resembles in his mental make-up the ox than any other type.”[25]

Zamyatin’s *We* borrows its form from Dostoevsky’s 1864 *Notes from Underground*, a novel in the form of the diary of an alienated man, a former civil servant disgusted by the idiocy of rational systems.[26] “I shall attempt nothing more than to note down what I see, what I think—or, to be more exact, what we think,” D-503, an engineer and mathematician, writes. Hence the “we” of the title: the collective self. “That’s right: we; and let this WE be the title of these records,” D-503 continues. “But this, surely, will be a derivative of our life, of the mathematically perfect life of OneState.”[27] D-503 is designing a spaceship, the INTEGRAL, to bring the perfect machinery of this state to other planets. Supervising the Numbers who are

building the INTEGRAL, D-503 admires their efficiency: “I watched the men below, how they would bend over, straighten up, turn around, all in accordance with Taylor, smoothly and quickly, keeping in time, like the levers of a single immense machine. . . . They were the same, all one: humanized, perfected men.”[28]

But all is not well. Some Numbers have rushed through the Green Wall into the world of nature and are plotting to tear the wall down. Their rebellion is defeated when the Benefactor decides that in order to turn Numbers into truly perfect and entirely rational machines, state surgeons must remove the part of their brains responsible for imagination, “a wretched little brain node in the region of the *pons Varolii*,” the last vestige of their humanity. After the “Great Operation,” the front page of the *State Gazette* promises, “You are perfect, you are the equal of the machine.” D-503 plans to join the rebellion but is instead forced to undergo the Great Operation, whereupon he betrays the rebels.[29]

Aside from Dostoevsky, Zamyatin’s greatest influence was H. G. Wells, whose work he translated and admired. The two men might also have met, during Wells’s visits to Russia or Zamyatin’s time in London: during the First World War, he spent eighteen months in England.[30] Zamyatin believed that Wells had “almost single-handedly created a new literary genre.”[31] Zamyatin, too, is often credited with inventing a new literary genre; one critic has called *We* “dystopia’s founding novel.”[32] Wells was a utopian, Zamyatin an anti-utopian. Their differences had to do, in large part, with the place of nature in their work.

“Wells began with the mechanism, the machine,” Zamyatin wrote, pointing out that within all of Wells’s worlds, “everything . . . rushes with fabulous speed—machines, machines, machines, airplanes, turbine wheels, deafening gramophones, flickering fiery advertisements,” and there is no nature: “Even when Wells seems for a moment to be untrue to himself and takes you from the city to the woods, the fields, or a farm, you hear the hum of machines and smell the odors of chemical reactions.” Zamyatin was fascinated by this obliteration of the natural world. “Imagine a country where the only fertile soil is asphalt, where nothing grows but dense forests of factory chimneys, where the animal herds are of a single breed, automobiles, and the only fragrance in the spring is that of gasoline,” Zamyatin wrote. “This place of stone, asphalt, iron, gasoline, and machines

is present-day, twentieth-century London, and, naturally, it was bound to produce its own iron, automobile goblins, and its own mechanical, chemical fairy tales. Such urban tales exist: they are told by Herbert George Wells."[33]

In 1920, while Zamyatin was writing *We* in Petrograd, the first-ever film featuring a mechanical man, *L'uomo Meccanico*, was being shot in Italy. (As for the plot, suffice to say: when a scientist builds a robot, things get out of hand.) Meanwhile, in Prague, Karel Čapek, a Czech playwright, was finishing *R.U.R.*, or *Rossumovi Univerzální Roboti* (*Rossum's Universal Robots*). Čapek and Josef, his brother, also a writer, had together coined *roboti*, whose root, *rab*, means "slave."[34] It quickly replaced the word *automaton*.[35] Čapek insisted that his robots were organic, not mechanical. But from the very beginning readers pictured Rossum's Robots as mechanical men, a vision realized by set and costume designers whose work evoked the Sturmabteilung, the paramilitary organization that aided Hitler's rise to power beginning in 1921. Čapek threw up his hands: "The world needed mechanical robots, for it believes in machines more than it believes in life."[36]

The play opens with Helena, a human, arriving by boat at the island headquarters of Rossum's Universal Robots Company. (The name of the corporation is in English in the original, and there are intimations that the company is American.)[37] Helena has come on a secret mission, on behalf of the League of Humanity, to liberate the robots. Harry Domin, the head of the company, which produces millions of artificial men every year, tells her the robots' history. After the company's founder, a scientist named Rossum —*rozum* is Czech for "reason"—tried and failed to make "an artificial dog," he managed to create "artificial people." (No name in the play is without consequence. Domin's name conjures the dominion granted to mankind over the natural world in Genesis.) Rossum's less idealistic nephew undertook mass production of a simpler model, "artificial workmen." Domin explains the logic of that simplification:

> DOMIN: What workman is the best in purely practical terms?
> HELENA: The best? Perhaps one who's . . . who . . . provided he's honest—and loyal . . .
> DOMIN: No, no, the *cheapest*. The one with the fewest needs. Young Rossum invented a workman with the fewest needs possible. He

> had to keep him simple. He jettisoned everything that didn't contribute directly to the work process, and in so doing he effectively did away with the man and created the Robot.[38]

Then too, "the human machine" has "too many drawbacks."

Helena marries Domin and remains on the island. Ten years pass. During a war that begins in the Balkans, Rossum's Robots fight tirelessly and remorselessly; the perfect workmen become the perfect soldiers. Then they run amok. Soon the Robots are killing hundreds of thousands of human civilians while, mysteriously, humans have stopped having children, as Helena informs her servant.

> HELENA: (*Reading* [a newspaper]) "During last week, yet again, not a single birth has been recorded."
> NANNA: What's special about that?
> HELENA: Nanna, people aren't being born any more.
> NANNA: So that's it then. That's us done for.

At the same time, Robots, realizing their degraded condition, begin organizing.

> DOMIN: (*reads*) "The first Robot racial organisation has been constituted . . . and it has issued an appeal to the Robots of the world."[39]

To try to break their unionizing, the company decides to begin manufacturing National Robots (each nation's robots are given a "different hue, different character, different language"). But soon Rossum's Robots decide to move from labor unionism to independence. Their printed appeal begins, "Robots of the world! We, the first mass organisation of Rossum's Universal Robots, declare man to be our enemy."[40] War ensues. The humans have no chance. The robots have won. Humans are all but extinct. Robots rule.

R.U.R. is a tale of many origins. It borrows from the legend of Golem, set in sixteenth-century Prague, where a creature of clay is brought to life by a rabbi to protect the Jews of the ghetto against their persecutors.[41] It also recycles bits of a short story called "The System" that the Čapek

brothers had together written in 1908, in which a Domin-like factory owner explains the logic of mass production. “Gentlemen, the task of industry is to exploit the entire world,” he says, insisting that labor unionism is, sadly, holding back this inevitability. “The worker must become a machine, so that he can simply rotate like a wheel.” Taylorism, he maintains, falls short, since it allows a worker to keep his soul; this factory owner’s more perfect “system” simply removes it.[42] Čapek hadn’t read *We* when he wrote *R.U.R.*, and Zamyatin hadn’t finished writing it (though it’s just barely possible that Zamyatin had read “The System”), but Rossum’s Robots are, in effect, the humans in *We* after they’ve undergone the Great Operation.

R.U.R. is also squarely historical. Čapek wrote the play in the aftermath of the mechanized atrocities of the First World War and the emergence of fascism in Italy and communism in Russia. The Bolshevik Revolution of 1917 took place the year the Industrial Workers of the World reached peak worldwide membership. The next year, the Czechs won a revolution, achieving independence from the Austro-Hungarian Empire in a struggle in which Čapek had participated as the editor of a national newspaper and an outspoken democrat, anti-communist, and anti-fascist.[43]

Between *We* and *R.U.R.*, the revolutionaries have swapped places. In *We*, the rebels are humans who wish to overthrow the machine-state that is turning them into robots; in *R.U.R.*, the rebels are machines that wish to overthrow the humans. Both tales are political parables about mechanization, capitalism, and statism and, if less often noticed, about humanity’s alienation from the natural world. They also influenced and may even have inspired many other twentieth-century dystopian novels, including Aldous Huxley’s *Brave New World* (1932) and George Orwell’s *1984* (1949).[44]

We was slow to achieve an international reputation. Zamyatin, exiled by the tsarists and banned by the Communists, was charged with treason in 1929 for having allowed the Russian-language publication of *We* in the Czech Republic (he maintained that he had not known of that publication until after it appeared, whereupon he had protested it).[45] He was eventually permitted to leave the country. In 1931 he moved to Paris, where he lived in poverty. He likened himself to a rooster who crows too early in the morning, leading the farmer to chop off his head.[46] Zamyatin died of a heart attack in March 1937; he was fifty-three.[47]

Unlike *We*, *R.U.R.* became an international sensation almost overnight, and American reviewers took to calling Karel Čapek "the Czech H. G. Wells."[48] *R.U.R.* debuted at Prague's National Theatre early in 1921; by 1923, it had been translated into thirty languages and performed all over the world.[49] (The release of Fritz Lang's *Metropolis* in 1927 added to a growing worldwide fascination with robots.) In London, G. K. Chesterton and George Bernard Shaw held a public debate about the significance of *R.U.R.*[50] The American premiere, at the Garrick Theatre in New York, ran for nearly two hundred performances.[51] One critic called it the age's "most brilliant satire on our mechanized civilization"; a less enthusiastic reviewer referred to it as "A Czecho-Slovak Frankenstein."[52] By 1924, *R.U.R.* was being staged in Japan under the title *Jinzō Ningen*, or "Artificial Human."[53]

Far from dissuading anyone from building robots, *R.U.R.* sparked a fascination with them. In the United States, toy robots were given to children who attended the play.[54] And the robot, a fiction invented to criticize industrial efficiency, the exploitation of labor, and the totalitarian state, was repackaged as a consumer item, a household appliance.[55] In 1924, a year when *R.U.R.* was being performed in both Milwaukee and Chicago, researchers at Westinghouse Electric & Manufacturing Corporation's Appliance Division, in Mansfield, Ohio, began building robots. Westinghouse didn't sell robots; they built robots and toured them around the country to demonstrate the usefulness of their appliances.

The company's first robot, Televox, had been initially built to control electric substations; it was housed in a wooden box. Reimagined by Westinghouse's in-house publicity division as "Mr. Televox," and fashioned into the shape of a man—cut out of cardboard—it was used to demonstrate the convenience of Westinghouse appliances, capitalizing on the success of *R.U.R.* "Why, you have a mechanical man here," said the company's PR people. "That is a good story for the newspapers." The idea was to suggest that robots already existed, in the form of Westinghouse's ordinary kitchen appliances. Its touring "mechanical men" were used simply to make that point. It worked. Stories about Westinghouse's "mechanical man" appeared around the globe, from Tokyo to Cairo.[56] "Science Produces the 'Electrical Man,' " reported *The New York Times*, promising that "this electrical substitute for humanity" signals the advent of a future in which "men and women will do little more than think and bid automatons to fetch and carry,

manufacture the countless things a machine civilization requires, sweep streets, cook, wash and dig ditches."[57] A 1929 Hollywood film included a song called "Mechanical Man": "I want a mechanical man, / A super dynamical man, / When he picks on me, and gives me abuse, / If he doesn't stop, / I'll just turn off the juice!"[58]

"I fear there is something inhuman in America," Čapek told the American journalist Dorothy Thompson in 1925.[59] Westinghouse soon debuted Katrina Van Televox, and a black servant called Rastus—referred to as "a mechanical slave"—who, made out of black rubber and dressed in overalls and a bandana, looked like a sharecropper, or a character in a minstrel show (Rastus was a common name in minstrel shows). Rastus wasn't used to demonstrate an appliance; instead, his operator got out a gun and shot an apple off Rastus Robot's head.[60] An English company debuted its own mechanical man, Eric Robot. Clad in polished aluminum, it had the letters RUR stamped on its breastplate, as if it had come off Domin's assembly line.[61]

"We have made machines, not people, the measure of the human order," Čapek wrote in 1929.[62] What was this new century, where men slaughtered one another by the millions and drove animals to slaughter, and where men became animals and machines, and corporations built robot slaves? Even the peace did not last. In the spring of 1935, with Hitler in power in Germany and Mussolini in Italy, and with one-fifth of the world's democracies having collapsed, Čapek, in vulnerable Prague, wrote himself a note: "You mustn't think that the evolution that gave rise to our form of life was the only evolutionary possibility on this planet." He tried to imagine the world transformed by "another animal species . . . not inferior to our own," and wondered:

> Would it do the same stupid things mankind has done? Would it fight the same wars? Would it invite the same historical calamities? What would we say if some animal other than man declared that its education and its numbers gave it the sole right to occupy the entire world and hold sway over all of creation?[63]

Čapek set about creating what is often considered his best work, *War with the Newts*. "Today I completed the last chapter of my Utopian novel," he

wrote in September 1935, relating how he had written a book about "the destruction of the world and its people."[64]

War with the Newts is an *R.U.R.* of the animal world that serves as an indictment of everything from capitalism to Nazism.[65] It borrows, as *R.U.R.* had, from the tradition of tales of animal rebellion. Čapek was particularly influenced by a 1920 book by the Frenchman Pierre Mac Orlan called *La Bête conquérante*, in which a pig learns to speak and then leads a rebellion against all humans (a possible influence on Orwell's *Animal Farm*, too).[66]

The story begins when a Czech sea captain discovers a new and peculiarly intelligent species of newts, each about the size of a ten-year-old boy, in the waters off Indonesia. He uses them to fish for pearls. Brought to the London Zoo, the newts quickly learn to talk and to read the newspaper. The Pacific Export Association then forms a Salamander Syndicate, the better to exploit the labor of the fast-growing population of newts and the real estate development of the seas, boasting of the building of "Utopias and gigantic dreams." Philosophers begin to wonder whether newts have souls; legal scholars argue that newts have rights. The Communist Party addresses "Comrade Newts," expressing common cause with "all suppressed and revolutionary Newts of the whole world." The Germans urge, "Molches, wirft Juden heraus!" ("Newts, throw out the Jews!") The fascist avant-garde futurists take up the slogan "After us the Salamanders! The future belongs to the Newts." But the newts, their population exploding and newly politically organized, begin destroying human habitat—flooding vast land masses—and turning it into newt habitat. "Hello, you people!" say the rampaging newts. "Don't get excited. We have no hostile intentions towards you. We only need more water, more coasts, more shallow water to live in." Reports one alarmed journalist: "They have learned how to use machines and numbers, and it has become obvious that that is enough for them to become the masters of their world."[67]

Right about when an English translation of *War with the Newts* appeared in the United States, a young scientist working for the U.S. Bureau of Fisheries named Rachel Carson published a startling piece in *The Atlantic*, called "Undersea." It conjured a very different watery world, a world of beauty and rhythm and interdependence. "Who has known the ocean?" Carson asked. "Neither you nor I, with our earth-bound senses, know the

foam and surge of the tide that beats over the crab hiding under the seaweed of his tide-pool home."[68]

Carson's particular gift was to domesticate the natural world—the language of "home" pervades her writing, depicting a natural world that was, for so many humans, vanishing.[69] Čapek's gift was to tell that story in a novel. But his grief at the loss destroyed him.

"My world has died," he said. "I no longer have any reason to write."[70] He wrote a poem suggesting an epitaph on a tomb for the twentieth century, to record:

> what this dead era valued most and best:
> Science, progress, work, technology
> and death.[71]

Despairing, Čapek remained in Prague after the Munich Agreement in 1938, in which the European powers, to appease Hitler, allowed him to annex part of Czechoslovakia. Friends urged Čapek to leave the country, but he refused. An overflowing creek flooded his garden, to which he was devoted, a devotion he chronicled in a memoir called *The Gardener's Year*.[72] Čapek was a passionate lover of nature. Working all hours to restore order to the garden, he caught a cold that fast worsened. He died of pneumonia on Christmas, days before his forty-ninth birthday.[73] On March 15, 1939, when German troops invaded Czechoslovakia, the Gestapo, not knowing Čapek had died, searched for him in Prague. They captured Josef, his brother, and sent him to Bergen-Belsen. "Only my body was there," Josef wrote in a poem at the prison camp. He died there. His body was never found.[74]

And still the robots came.

Beginning in 1937, and working in secret, engineers at Westinghouse built a new, seven-foot-tall robot out of sheets of aluminum and parts pilfered from other machines around the shop: coffee pots and waffle makers, vacuum cleaners and irons. The "Friendly 'Frankenstein' " made his debut in April 1939 at the World's Fair in New York—its theme was the World of Tomorrow. Elektro the Moto-Man, as it was called, was exhibited before millions at the Westinghouse pavilion. Elektro could walk, talk, and smoke a cigarette. He told jokes. "I see a lot of hot numbers in the

audience," he said, seemingly flirting with the women watching him. "Elektro, behave yourself!" chides his operator, who was very often a woman. "Ok, toots!" says the robot.[75] He sang the Westinghouse song: "We all sing out for Westinghouse, / The name that means most to ev'ry house."[76]

"Ladies and gentlemen, I'll be very glad to tell my story," Elektro told crowds at the World's Fair. "I am a smart fellow as I have a very fine brain of 48 electrical relays." It "works just like a telephone switchboard." He appeared to obey commands from a human operator. "Will you come down front, please?" the operator instructed, speaking into a microphone. The vibrations from key words in those scripted commands were turned into electrical signals sent to Elektro's control panel.[77]

There was another computer at the fair, at the Bell Labs exhibit. The American Telegraph and Telephone Company founded Bell Labs in 1925. Working there, an engineer named Homer Dudley had come to think of the tongue as, essentially, a telegraph clicker. He wanted to compress speech, to break it down into its parts—to turn sound into pulses, the way a telegraph turns writing into Morse code—send the parts, and then have the parts reassembled at the other end of the line. Dudley and his colleagues cracked this code with the Vocoder, or Voice Coder. In 1938, he filed a patent for a "System for the Artificial Production of Vocal or Other Sounds."

The next year, Bell Labs debuted Dudley's Voice Operation DEmonstratoR at the World's Fair, where the Voder was operated by Voderettes, telephone operators who had spent more than a year training on the machine, which, with its keyboard and pipes, looked something like an organ at the church of the future.[78] Visitors to the exhibit succumbed to what the historian of science Sarah A. Bell has called the Pedro Effect: "the susceptibility of people to attribute far more understanding and autonomy to machines than is warranted when the sounds made by machines can be interpreted as recognizable words."[79] They attributed the talking not to the noiseless operators but to the noisy machine. "The Voder can do practically anything the human voice can do," *The New York Times* gushed.[80]

E. B. White, reporting on the fair for *The New Yorker* at a time when he was living on a farm in Maine, raising sheep, pigs, and ducks, found the whole thing depressing. He was also one of the few observers even to notice the young woman who operated the Voder, a "girl who sat so still, so

clean, so tangible, producing with the tips of her fingers the synthetic speech—but the words were not the words she wanted to say, they were not the words that were in her mind."[81]

Arthur Miller read *R.U.R.* in college in the 1930s, before writing, after the war, *Death of a Salesman*, a play about humanity's lost sense of purpose. ("You end up worth more dead than alive," says Willy Loman.)[82] *R.U.R.* haunted him. Decades later, looking back at the future imagined by Čapek, Miller would write, "We have evolved into his nightmare."[83] But that nightmare had started a long time before, in Flanders Fields, where the poppies grew, between the crosses, row upon row.

11.

I, ROBOT

V: You are bot after all.
E: No. . . .
V: How do you know that you are not?
E: Because I'm human.
V: No, you are not a human.
E: Yes, I am a human.
V: Prove it.
E: How can I prove it?
V: Tell me something only a human would know.
E: Ask me a question that only a human could answer.

—Two Google Home devices arguing, 2017

When the engineers, entrepreneurs, and investors who first rose to power in Silicon Valley in the 1980s and 1990s claimed they found inspiration for their inventions in the science fiction of their boyhoods, they didn't mean *We,* or *R.U.R.*, and they certainly didn't mean *War with the Newts*. They meant the science fiction of the Cold War, with its stiff-legged robots, skyscraper-sized computer banks, creepy, bug-eyed cyborgs, uncanny androids, and endless, Escherian computer simulations.[1] Nearly all of those plots found a place, in one way or another, in the work of the extraordinarily prolific and influential Isaac Asimov. Many of Asimov's stories are cautionary tales, warnings about robots, and the need to curb their development, their gathering of power, their dawning sense of self. The architects of the Artificial State seem to have read these stories,

unironically, as instruction manuals, guides for how to build robots that would one day rule the world.

Asimov's obsession with the possibility of an artificial state began with his 1946 story "Evidence," in which Stephen Byerly, a candidate for mayor in the year 2032, is accused of being a robot, a charge that, if proven, would render him ineligible for office. The best evidence against him—shades of Vaucanson's defecating duck—is that no one has ever seen him eat or drink or sleep. In a 1950 printing of the story, Asimov adds that by 2044, Byerly had been elected "World Co-ordinator," and, whether or not he was a robot, "the Machines are running the world anyway."[2] Five years later, Asimov published his story "Franchise," set in 2008, about a computer, the Multivac, that elects the American president.[3] Not long after the year in which that story was set, the merchant princes of Silicon Valley were talking with enthusiasm about the possibility of a computer replacing the American president. In 2023, Sam Altman, CEO of OpenAI, endorsed the idea, suggesting that an AI president would be excellent for democracy. "It can go around and talk to every person on earth, understand their exact preferences at a very deep level," Altman said, allowing it to "optimize for the collective preferences of humanity or of citizens of the US—that's awesome."[4]

In Asimovian science fiction, the rise of the robot president marks the triumph of tyranny, the last turn on the road to serfdom, the final stage in machines' totalitarian rule over the planet, the Artificial State.

"Do you remember how it once was? Do you remember the 20th century?" a disaffected member of "Congress" asks Noreen, an estranged colleague in a later Asimov story, a follow-up to "Franchise." It's set in the same near-future world, an artificial state where everything is controlled by the Multivac. "With millions of robots at its command," the Multivac assures humanity the very prosperity and abundance and peace promised in the 2020s by companies like OpenAI, Google, and Anthropic. And humans are miserable.

Says the congressman: "We live long now; we live securely now; we live happily now."

Noreen answers: "We live worthlessly now."[5]

Asimov was so interested in these matters, and so influential, that tracing his career is a good way to think about how twentieth-century science

fiction imagined the Artificial State. Tellingly, Asimov's coming-of-age as a writer was shaped by the Technocracy movement of the 1930s—shaped, that is, by his disavowal of it, and also by the machine-driven destruction of the natural world which became, later in his life, his chief concern as a writer.

Isaac Asimov was born in Russia in 1920, in the aftermath of the Bolshevik Revolution, when Yevgeny Zamyatin was writing *We*. Asimov's family fled to the United States and settled in Brooklyn when he was three. He arrived in New York only months after *R.U.R.* opened on Broadway. In the 1920s and 1930s, when Asimov was a lonely, awkward boy, robots were becoming a mainstay of pulp science fiction, a genre that dates to the founding of *Amazing Stories*, the first science fiction magazine, published by Hugo Gernsback beginning in 1926—which happened to be the year that saw the launch of the first liquid-fueled rocket, an invention that was widely hailed as having been predicted in fiction. "Modern Jules Verne Invents Rocket to Reach Moon," read one typical newspaper headline.[6] Robert Goddard, the rocket's inventor, credited the idea for a rocket to the stories he'd read as a boy, which, he said, "gripped my imagination tremendously." Every year at Christmas, Goddard reread H. G. Wells's *The War of the Worlds*.[7]

Max Weber may have announced in 1917 that modernity and modern science had ushered in the "disenchantment of the world," but the golden age of science fiction was nothing if not a re-enchantment, the description of a world of amazing and astounding marvels and wonders. And the man most responsible for that re-enchantment was Gernsback, a German Jew born in Luxembourg in 1884. Gernsback, who emigrated to New York in 1904, started out selling electronics to hobbyists and tinkerers at his shop, the Electro Importing Company, in the pages of his *Electro Importing Catalog*, and in a series of other magazines about gadgets. Gradually he started including, in those magazines, speculative stories about things like (in 1909) what machinery would be required to send a telegraph to Mars.[8] In 1911, Gernsback began serializing a novel he'd written, *Ralph 124C 41+*, to fill blank pages in his *Modern Electrics*. In 1915, he printed an inquiry in another of his magazines, *The Electrical Experimenter*: "Can you write a snappy, short story having some scientific fact for a main theme?"[9] Ten years later, he decided to start an all-fiction magazine.[10]

Gernsback saw considerable early success with *Amazing Stories*, in which he pledged to publish fiction "intermingled with scientific fact and prophetic vision," but in February 1929, *Amazing Stories*' parent company, the Experimenter Publishing Company, filed for bankruptcy and Gernsback was forced out.[11] He immediately began publishing a rival called *Science Wonder Stories*. (Gernsback coined the term "science fiction" but only because he needed to distinguish what he would be publishing in the new magazine from what, at *Amazing Stories*, he had called "scientifiction.")[12] Many of the science fiction stories that Gernsback published in the 1920s and 1930s, or that appeared in other pulp science fiction magazines—all of them Gernsback knockoffs—anticipated actual scientific and technological developments, from microfilm to tape recorders. Arthur C. Clarke once dedicated a book "to Hugo Gernsback, who thought of everything."[13]

Gernsbackian science fiction had virtually no place in Europe in the 1920s and 1930s, where the mechanical devastation of the First World War had extinguished any appetite for stories featuring thrilling gadgets and ingenious inventors (the notable exception was in Germany, where writers tied to the German Rocket Society wrote tales of space travel and underwater adventures and techno-utopias).[14] Americans, thousands of miles away from any battlefield, and in a world where housewives went to exhibits featuring gleaming Westinghouse robots, experienced no such reserve. That American exceptionalism didn't last, but it proved enormously consequential.

Gernsback himself had little use for critics of technology. With the Depression worsening, some commentators, including some economists, blamed unemployment on automation. This infuriated Gernsback. In a February 1931 editorial in *Wonder Stories* titled "Wonders of the Machine Age," he reported that he had begun receiving a large number of story submissions, "probably fostered by the unemployment atmosphere," which he had rejected "because they distorted the facts and, in many cases, were pure out-and-out propaganda against the Machine Age." Their plots suggested that "little by little, the machines and science are becoming a Frankenstein monster," and that "because of capitalistic concentration of wealth, the machines will ultimately be controlled by a few powerful men, who will enslave the entire world to the detriment of humanity." Appalled by these plots, Gernsback announced that he would no longer "publish

propaganda of this sort which tends to inflame an unreasoning public against scientific progress, against useful machines, and against inventions in general."[15]

That editorial read as if it were the rejection slip for a story that would appear three months later in *Amazing Stories*. "The Cerebral Library," by David H. Keller, begins with a strange advertisement appearing in the smeared, smashed-ant font of the *New York Times* classifieds:

> **WANTED.** Five hundred college graduates, male, to perform secretarial work of a pleasing nature. Salary adequate to their position. Five year contract.

Thousands of out-of-work recent graduates, Depression-era desperate, apply; 503 are hired ("they were mainly plodders: good men, but not brilliant"). They go to work for a mysterious millionaire, an electrical engineer who is devising "a new plan of universal knowledge." In a remote manor in Pennsylvania, each man reads three hundred books a year (after which, each winter, the books are burned to heat the manor). At the end of five years, having read, among them, three-quarters of a million books, each man is to receive $50,000. But when one by one they travel to an office in New York City to pick up their paychecks, a surgeon removes their brains, sticks the brains in glass jars, and ships the jars back to that spooky manor in Pennsylvania where, in what had once been the library, the millionaire mad scientist wires the jars together and connects the jumble of wires to an electrical apparatus, a radio, and a typewriter. He calls this contraption The Cerebral Library.

"The Cerebral Library" is a good illustration of the power of science fiction to capture the significance of broad transformations—like the turn from the age of numbers to the age of data. The story dates to the heyday of the *Encyclopaedia Britannica*, first printed in Edinburgh in 1768—a product of the Scottish Enlightenment and the age of the fact. Sears, Roebuck & Co. bought it in 1920 and eventually relocated it to Chicago, and it became at once an essential reference tool and a middlebrow product of American mass consumerism. "WHEN IN DOUBT—'LOOK IT UP' IN *The Encyclopaedia Britannica*," read one ad from 1913. "The Sum of Human Knowledge. *29 volumes, 28,150 pages, 44,000,000 words of text. Printed on thin, but strong opaque India paper, each volume but one inch in*

thickness. THE BOOK TO ASK QUESTIONS OF."[16] When in doubt—look it up! But even the convenience of a twenty-nine-volume encyclopedia was too much trouble for the engineer who invented The Cerebral Library, so instead he turns seven hundred fifty thousand books into networked data. "All the information in that entire library is mine," he cackles villainously. "All I have to do is to operate this machine. I do not have to read a single book."

"Now, suppose I want to know all there is to know about toadstools?" he says, demonstrating his invention. "I spell out the word on this little typewriter in the middle of the table," and then, in an instant, abracadabra, the radio croaks out "a thousand-word synopsis of the knowledge of the world on toadstools."[17]

In many ways, "The Cerebral Library"—whose author was a psychiatrist who ran a residential school for the mentally handicapped—is a classic Gernsback story.[18] It anticipated by nearly a century the experience of asking a large language model for a thousand-word essay on a poisonous mushroom. It even hinted at what Google co-founder Larry Page promised in 2004: "Eventually you'll have the implant, where if you think about a fact, it will just tell you the answer."[19]

But "The Cerebral Library" is also entirely un-Gernsbackian, in that it offers a critique of technology. A universal library of knowledge with an infinite ability to answer questions came at a cost—in this case, the cost of the brains and lives of 503 young men. Gernsback, in announcing that he would no longer publish any story that might "inflame an unreasoning public against scientific progress, against useful machines, and against inventions in general," took a stand against this kind of thing. He also began to advocate for Technocracy Inc. "So far as the aims and ambitions of Technocracy are concerned," Gernsback wrote, "they are nothing new to science fiction." As he not immodestly pointed out, his own *Ralph 124C 41+* contained a chapter called "The End of Money." And, wholly justified, he pointed out that "there is very little that Technocracy offers that has not been anticipated in stories from H. G. Wells down to last month's issue of WONDER STORIES."[20]

The science fiction that Asimov grew up with, then, was deeply concerned with the relationship of technology to progress.[21] In July 1931, after the flap that led Gernsback to publish his "Wonders of the Machine

Age" editorial, little Isaac, age eleven, read a tale in *Amazing Stories* that involved "benevolent robots who could serve man with decency"—these were the Zoromes, "machine men" who had names like Technocrats; their leader is "25X-987."[22] Things don't go well for them. Asimov decided he wanted to write that kind of story.

Gernsback hadn't published a great many robot stories, at least not early on; he was more into rockets.[23] He was only drawn to robots by the Technocracy movement, and by his impassioned defense of the Machine Age. In March 1933, the month FDR was inaugurated, Gernsback launched *Technocracy Review*, advertised in that month's issue of *Wonder Stories*, in which he published a story called "The Robot Technocrat."[24]

"The Robot Technocrat"—by an American writer named Nathaniel Schachner, himself a Technocrat—is the story of a Russian mathematician named Anton Kalmikoff, who goes into hiding in 1932 due to his concerns about "the failure of industrial civilization." Kalmikoff is convinced by Howard Scott, the real-life leader of Technocracy Inc., that only Technocracy can save modern civilization, so he hides in a cave, where he reduces "Technocracy to a real mathematical science" that can calculate the future—but to make those calculations, he needs a machine, and so, over twenty years, while the world descends into chaos and violence and rule by dictators, he builds a "huge intricate mass of machinery," the Robot Technocrat of the story's title. The machine calculates that the rise to power of "Adolph Hiller," head of the "Nationalist Party," will bring decades more of misery and terror to the world. Kalmikoff is determined to stop him and to allow the elevation of a candidate who pledges, "We must rebuild the machines that the masses destroyed in their blind rage against overproduction. . . . The machine was not to blame, only we who handled it."[25] (Gernsback also published stories denouncing Technocracy, including "Enslaved Brains," under the byline Eando Binder, the pen name of the brothers Earl and Otto (e-and-o) Binder. It ran in *Wonder Stories* in 1934 and was set in a 1973 where scientists and engineers have established a tyrannical Technocracy called the Unidum, which, unbeknownst to its subjects, is fueled by the bottled brains of the dead.)[26]

Asimov was influenced not only by his antipathy to Technocracy but also by a concern for the ravaging of the natural world by machines that ran through the stories he read as a boy. In Laurence Manning's "The Man Who

Awoke," from 1933, for instance, a character wakes up in the year 5000 to a beautiful, idyllic world—"upon all sides stretched the trees"—where the Foresters, who care for the forest, have overthrown the Wasters, the reckless governments of the past. In "the Age of Waste"—the twentieth century—the Wasters had ravaged the planet, "destroying the forests on whole mountain ranges and letting the soil erode into the valleys." As the Foresters recount, with horror, to the man from 1933 who has traveled three thousand years into the future, "Fossil plants were ruthlessly burned in furnaces to provide heat, petroleum was consumed by the million barrels, cheap metal cars were built and thrown away to rust after a few years' use, men crowded into ill-ventilated villages of a million inhabitants."[27] Only the triumph of the Foresters had averted, in effect, the end of the world.

Asimov was thirteen when he read "The Man Who Awoke." It was hardly escapist literature; instead, as he later recalled, it engaged him from boyhood with the question of "the consumption of coal and oil in reckless profusion."[28] (Nor did this interest diminish. Asimov's last book, published just before his death and coauthored with the science fiction writer Frederik Pohl, was *Our Angry Earth*, a warning about the devastation of the planet.)[29]

It was in 1934, the year after reading "The Man Who Awoke," that Isaac Asimov, a clever, inward fourteen-year-old, began writing stories of his own and sending fan mail to the pulps.[30] Four years later, he wrote a letter to *Astounding Science-Fiction*, complaining that there were too many girls in the stories: "When we want science-fiction, we don't want swooning dames, and that goes double. . . . Come on, men, make yourself heard in favor of less love mixed with our science!"[31] He brought a story to *Astounding*'s offices and met with its new editor, John W. Campbell Jr.; Campbell rejected it, but he encouraged Asimov to keep writing.[32] Campbell was a writer, in addition to being an editor, perhaps best known for a story that appeared in *Amazing Stories* in 1932, "The Last Evolution," set in the twenty-sixth century, by which time, according to our narrator, "machines had been developed to think, and act and work with perfect independence." The twist is that our narrator is a machine and is, in fact, the last intelligent machine to survive an attack by aliens that annihilated every human on Earth, and nearly every robot, too.[33] Evolution, succession, annihilation, extinction. *R.U.R.* redux. (What was really being annihilated

was wildlife and its habitat. “Wildlife, it is pointed out, is dwindling because its home is being destroyed, but the home of the wildlife is also our home,” Rachel Carson observed in 1937.)[34]

Asimov read a story about robots he especially loved when he was just starting his last semester of college at Columbia.[35] “I, Robot” appeared in *Amazing Stories* in January 1939. It was published under the name Eando Binder, though by 1939 only Otto was still writing. “I, Robot” is the story of a robot named Adam, “equipped with a pseudo brain.” The story is told, in the tradition of *Black Beauty*, from Adam’s point of view. It’s not the autobiography of a horse; it’s the autobiography of a robot. “Who could tell what happened to a robot better than the robot himself?” asked Binder, in a piece he wrote to accompany the story.[36] When Adam is falsely accused of murdering the scientist who built him, the scientist’s nephew, a lawyer, demands a trial. “This robot is a creature,” he tells the sheriff, as if countering Descartes. “It is not an animal, for animals don’t talk. It is a manlike being.”[37]

“I, Robot” “certainly caught my attention,” Asimov later recalled. “Two months after I read it, I began ‘Robbie.’ ”[38] Asimov’s first robot story, “Robbie” is the tale of Gloria Weston, an eight-year-old girl who loves Robbie—“the best darn robot money can buy,” says her father—though her mother would prefer her daughter have a dog. “The whole trouble with Gloria is that she thinks of Robbie as a *person* and not as a *machine*,” Mrs. Weston frets. But when Robbie saves Gloria’s life, her mother agrees that “he can stay with us until he rusts.”[39]

Asimov delivered “Robbie” to Campbell, who rejected it. Instead, “Robbie,” was published under a different title, in a different science fiction magazine, in September 1940.[40] But Campbell did publish some of Asimov’s other early robot stories. And he also gave thought to what Asimov was up to, with his distinctively decent, non-murderous, superintelligent machines, manufactured by an American corporation, U.S. Robots and Mechanical Men, Inc., and equipped with “positronic brains” (an Asimovian invention) by engineers who are specialists in “robotics” (a word Asimov coined). In December 1940, during a meeting to discuss another robot story and how it might be resolved, Campbell told Asimov:

> “Look, Asimov, in working this out, you have to realize that there are three rules that robots have to follow. In the first place, they can’t do any harm to human beings; in the second place, they have to obey orders without doing harm; in the third, they have to protect themselves, without doing harm or proving disobedient.”[41]

Asimov then formalized what he called the Three Laws of Robotics, which appeared in his stories for decades (if in varied forms), something like a constitution:

> First Law: A robot may not injure a human being or, through inaction, allow a human being to come to harm.
> Second Law: A robot must obey the orders given it by human beings except where such orders would conflict with the First Law.
> Third Law: A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.[42]

They weren’t exactly laws, in that robots neither obeyed nor failed to obey them: they were programs. “A positronic brain cannot be constructed without them,” explains a leading scientist from U.S. Robots and Mechanical Men, Inc.[43]

Later, Asimov added a fourth rule, the Zeroth Law: “A robot may not harm humanity, or, by inaction, allow humanity to come to harm.” But like the first three laws, the Zeroth Law was confounding, since, as one robot admits, determining what will or will not harm all of humanity is not always an easy call. “In theory, the Zeroth Law was the answer to our problems,” says the robot. “In practice, we could never decide.”[44]

Asimov brought to science fiction a particular interest in the legal implications of machine intelligence and its consequences for politics and government. If this was intellectual play, it was not without ramification. Asimov’s Laws of Robotics came to exert an influence not only on engineers building robots but also on actual governing bodies, legislation, and even constitutionalism. South Korea in 2007 relied on them in drafting its Robot Ethics Charter,[45] for instance, and in 2017, a recommendation to the European Parliament by the Commission on Civil Law Rules on Robots cited them as its inspiration.[46]

Asimov claimed that his laws revolutionized science fiction, and he was not wrong. To the robot-as-tyrant and the robot-as-revolutionary, Asimov added the robot-as-person, a storyline with ethical, legal, and political complexity. Other robots were stomping through the pages of every science fiction magazine up to all manner of nonsense; Asimov's robots were different.[47] They existed within a world of law and politics. They didn't have rights, but they began to seek rights, at a time when, worldwide, constitutional democracies were witnessing what scholars have called the "rights revolution," especially after the adoption of the United Nations' Universal Declaration of Human Rights.[48]

When the Second World War broke out, Asimov was a graduate student in chemistry at Columbia; he mainly avoided military service by working for Robert Heinlein, an aeronautical engineer and naval officer, at a naval research center in Philadelphia. (Heinlein had published his first story in Campbell's *Astounding Science-Fiction* in 1939; after the war, he began writing full-time.) In 1942, Asimov started writing a series of stories that he would eventually publish as the *Foundation* trilogy. Modeled on Gibbon's six-volume *Decline and Fall of the Roman Empire,* published between 1776 and 1788, Asimov's *Foundation* series is the story of the Galactic Empire, whose collapse is predicted, by way of a complicated set of calculations involving human populations, by a mathematician named Hari Seldon, who urges the compilation of the *Encyclopedia Galactica*, a work that comprehends the sum of all human knowledge, though this scheme turns out to be a mere ruse, a way to pass the time, while the empire falls. (Most of Asimov's best ideas can be traced to the pulp fiction of the 1930s: Robbie is Adam, Hari Seldon is Anton Kalmikoff, and the Encyclopedia Galactica is The Cerebral Library.) "Somewhere in the fifty years just past is where the historians of the future will place an arbitrary line and say: 'This marks the Fall of the Galactic Empire,' " Seldon declares.[49]

If Asimov was interested in the sweep of history and the rise and fall of empires in a far, far distant future—the *Foundation* series is set around the year 25,000 CE—he was equally interested in the possibility of machine intelligence in the much nearer future. In 1950, he published a collection of his earliest robot tales as *I, Robot* (having secured permission from Otto Binder to swipe his title), dedicating the book to Campbell, "who godfathered the robots."[50]

I, Robot contains its own fictional universe with its own, near-future timeline: U.S. Robot and Mechanical Men, Inc., is founded in 1982; Robbie is manufactured in 1996 and saves Gloria's life in 1998. In 2002, engineers at U.S. Robot and Mechanical Men, Inc., now known as U.S. Robots, invent a talking robot, after which, afraid of a robot rebellion, "most of the world governments banned robot use on Earth for any purpose other than scientific research." Under the terms of a new legal regime, robots can only be used on other planets.[51]

Hostility to robots was in fact rather severe in the United States and in many other parts of the world in the 1950s, when Asimov imagined a future society banning them from the entire planet. Automation moved into factories and more people worked in offices, but whether in factories or offices, humans all over the world began spending more time indoors than outdoors, under artificial light, in arid and often windowless rooms, not unlike animals kept in conditions allowed under the newly standardized and expanded practice of factory farming. The sociologist C. Wright Mills asked, "Can men be made to want to become *cheerful* robots?"[52] They weren't so cheerful. A story published in Tokyo in 1953 by the Japanese playwright Kōbō Abe, "R62 gou no hatsumei" (The Invention of R62)," recounts the fate of a Japanese worker who loses his job due to an imported American technology, after which he agrees to have his brain removed and replaced by a robotic one (a plot that turned up again, modified, in the 2020s American television series *Severance*).[53]

Asimov's *I, Robot* anthology, first published in 1950 and released in a mass-market paperback edition in 1956, reached readers anxious about automation, but it also evoked technological developments that no longer seemed altogether far-fetched. By 1956, at the artificial intelligence seminar at Dartmouth, it was possible to imagine, defeating Descartes, a machine that could both think and talk, chiefly because two strands of research—the compression of sound and the compression of data—had come together in the work of Claude Shannon (Anthropic's chatbot, "Claude," a rival to ChatGPT, is named after Shannon).[54]

In movies, these machines were presented as frightful, even in plots that sought to demystify them. In the 1957 film *Desk Set*, Spencer Tracy plays an engineer from MIT who has come to a library headed by Katharine Hepburn to install EMERAC, the Electromagnetic Memory and Research

Arithmetical Calculator. Like other American workers, Hepburn expects she and her staff will be sacked now that their jobs have been automated. Tracy tries to reassure her.[55] In another American film from 1957, an EMERAC-like room-sized computer loaded "with the sum total of human knowledge" is terrifying. "I didn't know it could talk!" exclaims a U.S. Army general, and, soon enough, the computer is plotting the extermination of the human race. In the film's climax, the computer, with its very creepy voice, begs to be spared, crying out, "I am an instrument of knowledge! I can answer any question!"[56]

Was it murder to unplug a computer? Asimov's stories took up the question of rights for robots. But in a nonfiction article written by Otto Binder and published in *Mechanix Illustrated* in 1957—the year Eisenhower sent the 101st Airborne Division to Little Rock, Arkansas, to protect Black children walking into previously all-white public schools—robots are to be welcomed specifically because they have no rights. "In 1863, Abe Lincoln freed the slaves," Binder wrote. "But by 1965, slavery will be back! We'll all have personal slaves again, only this time we won't fight a Civil War over them. Slavery will be here to stay. Don't be alarmed. We mean robot 'slaves.' "[57]

Yet this rights framework appears to have been a distinctively American set of concerns, especially compared to the robot in the postwar Japanese imagination, most notably in the world created by Osamu Tezuka, Japan's Isaac Asimov.

In 1951, a half boy, half robot known as Tetsuwan Atomu, or the Mighty Atom—called in English-language translations Astro Boy—made his debut in a boys' magazine called *Shōnen*. Created by the fictional head of the Ministry of Science, Umataro Tenma, out of grief at the death of his son, Astro Boy has far more in common with Pinocchio than with Frankenstein's monster.[58] Osamu Tezuka's laws of robotics were very different from Asimov's, and included rule number three: "Robots shall call the human who creates them 'father.' "[59]

Astro Boy is adorable and lovable and, alongside his exceptional robotic prowess, possesses the human emotions of an ordinary boy, including love for his "father."[60] The incorporation of a robot into the family became a mainstay of Japanese manga and science fiction and is often seen as a manifestation of animism in Japan.[61] The Japanese religion of Shinto, like

Jainism, Hinduism, and Buddhism, and like many Indigenous religions, is animistic; everything in the world has a spirit: mountains, rivers, trees, bears, clouds—everything. There is no stark separation between the human and the nonhuman, and more of harmony than of hierarchy. The idea that robots, like humans, are living things, part of the natural world and not separate from it, dates to Japan's earliest proto-robots, like Gakutensoku (whose name means "learning from the laws of nature"), a nearly eleven-foot-tall pneumatic automaton built by the biologist and botanist Makoto Nishimura in Osaka in 1928. Nishimura called all robots "nature's grandchildren."[62]

Within a Japanese worldview, robots aren't slaves but family members, not things but persons. Nearly half of Japan's population is Buddhist. "From the Buddha's viewpoint, there is no master-slave relationship between human beings and machines," the Japanese roboticist Masahiro Mori, he of the uncanny valley, wrote in a book called *The Buddha and the Robot*. "There is buddha-nature in dogs and in bears, in insects and in bacteria," Mori wrote, and in "the rocks, the trees, the rivers, the mountains as well." Therefore, "there must also be buddha-nature in the machines and robots that my colleagues and I make."[63]

This animist view had no purchase on the imagination of Isaac Asimov, or Robert Heinlein, or Arthur C. Clarke, or any other mid-twentieth-century American writer of science fiction. If they wrote of robots as persons, they came to that view by way of a liberal human rights framework, not by way of animism. A new sensibility about the relationship between machines and the natural world did emerge in the United States during the Cold War. Animist it was not.

In 1953, the ecologist Eugene Odum published a textbook called *Fundamentals of Ecology*. Later editions included a discussion of cybernetics. Odum relied on cybernetics and systems theory and network theory—concepts developed by computer scientists—to think about ecosystems as systems that can be influenced by human tools.[64] "Man's power to change and control seems to be increasing faster than man's realization and understanding of the results of the profound changes of which he is now capable," he wrote, warning that "this is a dangerous situation, because tinkering with basic ecosystems of the world can result

either in a glorious future for mankind, or in his complete destruction if too many large-scale mistakes are made."[65]

If the natural world was a system, like a computer network, it could be managed.[66] But, like a computer system, it could also go haywire. Odum's work, and growing concern about "Man's Role in Changing the Face of the Earth"—the title of a conference held at Princeton in 1955 (the proceedings of which were dedicated to George Perkins Marsh)—contributed to increasing concern about the limits of growth and to the founding, in 1962, the year Rachel Carson published *Silent Spring*, of the field of "environmental science" and the modern environmental movement.[67]

The fictions of midcentury writers like Asimov, then, which were riddled with end-of-the-world and limits-to-growth plots—the entire animating principle behind Asimov's best-selling *Foundation* trilogy—found a ready audience among readers newly engaged in global or planetary thinking about everything from ecosystem collapse and habitat loss to atomic testing and nuclear proliferation. Planetary thinking took on a new visual form in 1968, after Apollo 8 sent back the first, stunning photographs of the whole, fragile Earth from space, or what came to be called the "blue marble."[68] Meanwhile, Paul Ehrlich's 1968 *Population Bomb*, which warned of the "race to oblivion," followed by the 1972 Club of Rome study *The Limits to Growth*, concerning the "predicament of mankind," advanced a new Malthusianism.[69] But while scientists and journalists were sounding alarms in the popular press about the very real extinction of species other than humans with books like *Avant que nature meure* (1965), *Lost Wild America* (1969), *Vanishing Wildlife* (1970), *And Then There Were None: America's Vanishing Wildlife* (1973), and *Ein Planet wird geplündert* (1975), science fiction writers imagined a future in which the vanishing wildlife is . . . humanity.[70]

According to *Le Monde*, Godard shot his black-and-white *Alphaville* "in Paris in air terminals, in the halls of banks and of commercial buildings," a visual proxy for the Artificial State.[71] The story is set, as *Variety* reported, "in some future city where human feelings have all but been done away with and where the powerful leader is a super computer," and its visual aesthetic is that of "a sort of no-man's-land between totalitarian drabness and super-modern garishness."[72] A hard-boiled private eye arrives, unaccountably, in a capital city, Alphaville, the French filmmaker's

updating of Lang's Metropolis, and walks straight into the plot of E. M. Forster's "The Machine Stops." He sets for himself the task of stopping the machine, ultimately defeating the rasping Alpha 60, a pulsing mainframe that, built to aid the government, has become the government, surveilling and controlling dead-eyed humanity's every action. Remarked one French reviewer, "We are not yet governed by this electronic monster that Godard has baptized 'Alpha 60,' but innumerable petty 'alphas,' 'betas', or 'omegas' are already preoccupied with reigning over our thoughts."[73] Kubrick's *2001*, an infinitely more beautiful and daring film, stretches out Forster's story across time and space, but the plot remains the same.

Was Alpha 60 a thing or a person? What about HAL 9000? Descartes had asked whether an animal was a mere machine. Huxley had wondered whether a man was more than a machine. By the second half of the twentieth century, with something like the Artificial State seemingly coming closer to becoming a reality, the question whether machines ought to be considered artificial persons moved from science fiction to the law.

"Meet Shakey, the first electronic person," a scientist at Stanford Research Institute's Artificial Intelligence Center told a *Life* magazine reporter in 1970, introducing its latest robot. (Shakey was called Shakey because it shook when it moved.) MIT's Marvin Minsky told *Life* that in as little as three years "we will have a machine with the general intelligence of an average human being. I mean a machine that will be able to read Shakespeare, grease a car, play office politics, tell a joke, have a fight. At that point the machine will begin to educate itself with fantastic speed. In a few months it will be at genius level and a few months after that its powers will be incalculable."[74] Would it still be a machine? Or would it be something else? This question so engaged Asimov that he set about writing a story about a robot who eventually convinces the courts that he is a person.

What is a person? Since the time of Roman law, the law has divided the world into persons and things, a tradition codified by the English theorist Sir William Blackstone in 1765, in *Commentaries on the Laws of England*, a treatise he divided into "Book I: Of the Rights of Persons" and "Book II: Of the Rights of Things." Persons can bear rights and cannot be owned; things cannot bear rights and can be owned. After dividing the world into persons and things, Blackstone made a further division: "Persons also are divided by the law into either natural persons or artificial. Natural persons

are such as the God of nature formed us; artificial are such as are created and devised by human laws for the purposes of society and government, which are called corporations or bodies politic."[75] A natural person is a human, usually a human who has been born and who has not yet died. One way to tell the story of the history of the law is as a "cascade of rights," in which classes of humans once considered things—slaves, children, and married women—became persons.[76] Those are "natural persons." In U.S. law, an artificial person is a legal fiction, a status granted to nonhuman entities, like, beginning in 1886, corporations. Artificial persons, unlike things, can bear rights.

In 1969, legal scholars began considering the possibility that elements of the natural world—mountains, valleys, rivers, and entire species—ought to be considered artificial persons. That year, the U.S. Forest Service approved a plan proposed by the Walt Disney Company to build a ski resort in Mineral King Valley, then located on the periphery of Sequoia National Park in the Sierra Nevada in California.[77] The Sierra Club, which had been founded at the start of the conservation movement in 1892, sued Rogers C. B. Morton, secretary of the interior, hoping to block the permit. The case turned on the question of whether the Sierra Club, which was not a party to the contract, had legal standing to file the suit.[78] At the time, Christopher Stone, son of the crusading journalist I. F. Stone, was teaching a class on property law at the University of Southern California.[79] He introduced the *Sierra Club v. Morton* case in class and proposed a hypothetical. Perhaps the Sierra Club did not have standing to sue, but since the case affected the national forest—the ecosystem itself—and since corporations can be artificial persons, why not a forest? Could the trees sue?

The environmental movement had begun to enjoy a series of landmark victories. In 1969, Congress passed the National Environmental Policy Act; in 1970 the amended Clean Air Act (the Clean Water Act would follow in 1972, and the Endangered Species Act in 1973).[80] Richard Nixon declared the 1970s the "environmental decade." "The great question of the seventies is shall we surrender to our surroundings, or shall we make our peace with nature and begin to make reparations for the damage we have done to our air, to our land, and to our water?" Nixon asked in his 1970 State of the Union, declaring that "restoring nature to its natural state is a cause beyond party and beyond factions. It has become a common cause of all the people

of this country."[81] In April, Americans celebrated the first Earth Day—a response to the moon landing the year before—in one of the largest mass protests in American history.[82]

While *Sierra Club v. Morton* moved through the lower courts, Stone, intrigued by his own hypothetical, began drafting a law review article called "Should Trees Have Standing?" The U.S. Forest Service, followed by the Ninth Circuit, told the Sierra Club, as Stone later said in an interview, "Look, . . . you, the Sierra Club, don't have standing; maybe this is wrong, to issue the permit, but you're not injured, you as a club are not injured."[83]

While all this was going on, Theodor Geisel, better known as Dr. Seuss, wrote a new children's book called *The Lorax*, about a furry creature who, in vain, defends the forest from development. Geisel, like Stone, lived in Southern California and was an avid environmentalist. "I speak for the trees," the Lorax says, attempting to defend what remains of a once lush but now blighted forest, its tufted Truffula trees chopped down and knit into hideous Thneeds—"a Fine-Something-That-All-People-Need"—until there is nothing left but one single seed.[84] *The Lorax* was published in August 1971. The Supreme Court heard oral arguments in *Sierra Club v. Morton* in November 1971. A TV adaptation of *The Lorax* was broadcast in February 1972. Stone finished a draft of "Should Trees Have Standing?" and mailed it to Justice William O. Douglas, a noted outdoorsman. The court handed down its opinion in April 1972.

In his article, Stone argued that the history of law represented a march of moral progress in which the notion of being a rights-bearing person had been extended to an ever-widening class of actors, from only certain men, to more men, then to some women, and finally to all adults and then children and even corporations and ships. Why not trees and rivers and streams? Remedies for harm against the environment could then be pursued not only by humans affected by such harm but on behalf of the environment itself. "I am quite seriously proposing that we give legal rights to forests, oceans, rivers and other so-called 'natural objects' in the environment—indeed, to the natural environment as a whole," Stone wrote. He explained that he was proposing this solution as the best possible remedy to address a looming catastrophe. "Scientists have been warning of the crises the earth and all humans on it face if we do not change our ways—radically," he wrote. "The earth's very atmosphere is threatened with frightening

possibilities: absorption of sunlight, upon which the entire life cycle depends, may be diminished; the oceans may warm (increasing the 'greenhouse effect' of the atmosphere), melting the polar ice caps, and destroying our great coastal cities."[85] He urgently hoped that the article would have an effect.

The Supreme Court ruled that the Sierra Club did not have standing. But Justice Douglas, who cited Stone's article in his dissent, argued that "contemporary public concern for protecting nature's ecological equilibrium should lead to the conferral of standing upon environmental objects to sue for their own preservation." If a corporation can have standing, Douglas wrote, "so it should be as respects valleys, alpine meadows, rivers, lakes, estuaries, beaches, ridges, groves of trees, swampland, or even air that feels the destructive pressures of modern technology and modern life."[86]

For a long time, Stone's law review article and Douglas's dissent vanished into the haze of the archives. And then a curious thing happened. The far less serious idea that a machine could be a person began to be taken seriously. Isaac Asimov liked to take credit for that.

Asimov regarded "Bicentennial Man," written for the bicentennial of the U.S. Declaration of Independence, as his best robot story. Andrew Martin, a robot manufactured in 1976 by U.S. Robots and Mechanical Men, Inc., is unusual for his creativity (something that causes his owners to bring him to visit the "robopsychologist, Merton Mansky," a fictional Marvin Minsky). Over the next two hundred years, Martin gains capacities in many areas and is surgically modified to appear more human. He also seeks legal recognition, across many battles, including filing a petition for his emancipation from U.S. Robots and Mechanical Men, Inc. Finally, as the United States nears its 400th anniversary, in the year 2176, he petitions the World Legislature to declare him a person, a status he is granted only by becoming mortal and dying.[87]

Robots arrived on the verge of becoming persons far sooner than Asimov anticipated. By 1991, when Asimov published *Our Angry Earth*, something like a standoff had begun, or maybe something more like a race. Who would become artificial persons first: forests or robots, creatures or machines?

12.

MURDERBOT

> “Hi there! This is Eddie, your shipboard computer, and I’m feeling just great, guys, and I know I’m just going to get a bundle of kicks out of any program you care to run through me!”
>
> **—*Douglas Adams*, The Hitchhiker’s Guide to the Galaxy, *1978***

By the middle of the 2020s, vastly consequential decisions about the future of Earth and everyone and everything on it were being made by a handful of men based on their colossal accumulation of wealth, their catastrophic misreading of history, literature, and philosophy, and their breathtaking contempt for ordinary people, living and dead. They brooked no dissent. They wrote their articles of faith, their techno-utopianism, into their very tools, as if quietly sneaking so many Gideon Bibles into bedside tables at roadside motels. OpenAI’s guidance for ChatGPT stated, as a fundamental and indisputable truth about the universe, that “progress and technology have consistently created more opportunities, abundance, and potential for growth.”[1] This was the good news of their gospel. They hoped to carry it across the galaxy.

The dream of life in outer space, of immortal life, and of colonizing other planets all had a place in the dream of the Artificial State. Democracy and the liberal nation-state had to be abolished to free corporations from the restraining force of any government so that they might marshal all the resources of this planet toward the accelerated development of the most sophisticated artificial intelligence possible, artificial intelligence that would at once make it possible to escape the prison of the earth and, perversely, make such an escape necessary. For a time, some of the

merchant princes of Silicon Valley had paid lip service to the idea that ordinary people, or the democratically elected governments of nation-states, ought to have a role, a vote, in deciding what to do with technologies that—corporate leaders pledged—were about to usher in a new era in the history of humanity. But none of the promised democratic or constitutional structures were built: no world-governance board was established, or even seriously contemplated: there had been no AI constitutional convention, nor anything close to it. Instead, the architects of the Artificial State told astounding stories, straight from the pages of science fiction, about existential threats from artificial intelligence that could only be avoided by accelerating its development, all for the sake of driving investment in their corporations, even to the cost of catastrophe for the planet. In 2025, OpenAI's Sam Altman said that he guessed that pretty soon most of the surface of the earth would be covered in data centers, but, he mumbled, "maybe we put them in space."[2] Another idea was to cover the planet in data centers, and then leave.

Altman claimed to be a devotee of science fiction. He was particularly enchanted by a once obscure Canadian novel called *We Are Legion (We Are Bob)*, in which AI has destroyed humanity but uploads the consciousness of dead humans to computers to do its bidding.[3] This dire prospect—the complete abandonment of what it is to be human—apparently held appeal for advocates of artificial intelligence. Altman, like Peter Thiel, and Marvin Minsky before him, had signed up to have himself frozen for future reincarnation (in many cases only the cadaver's severed head is frozen, with the idea that in the future the human body will be irrelevant and one's consciousness can be uploaded onto a machine or a synthetic body). This technology had been invented by a man in Michigan named Robert Ettinger, who had read about it in Hugo Gernsback's *Amazing Stories* as a boy, in the 1930s. Later, in a hospital bed recovering from his injuries during the Second World War, it came back to him. Starting out, Ettinger had experimented by freezing his dead mother, in 1977, and then his first wife, neither of whom was keen about being frozen. (There has never been any reason to believe that this will work.) Cryogenics wasn't Ettinger's only idea. Among his many fantasies about the future, as detailed in his books, including *The Prospect of Immortality* and *Man into Superman*, was the transformation of the human female into a "sexual superwoman . . . with

cleverly designed orifices of various kinds, something like a wriggly Swiss cheese, but shapelier and more fragrant."[4]

Sam Altman's interest in having himself frozen so that in the future, after he's dead, his consciousness can be uploaded onto a computer—an idea borrowed from Ettinger, who borrowed it from Gernsback— is a good illustration of taking science fiction rather too literally, and especially of reading cautionary tales as instruction manuals. This appeared commonplace. The computer scientist Stuart Russell, for instance, once said the problem of an AI doing exactly what you tell it to do is like the problem of King Midas, who was ruined by getting exactly what he asked for. But, as Ted Chiang observed, that is not actually the moral of the Midas parable, whose point is "that greed will destroy you, and that the pursuit of wealth will cost you everything that is truly important."[5] Russell appears to have missed that point.

Elon Musk read Asimov's *Foundation* series when he was ten years old, and he drew from its plot, he said, the lesson that "you should try to take the set of actions that are likely to prolong civilization, minimize the probability of a dark age and reduce the length of a dark age if there is one."[6] (Even ChatGPT tells me that the moral of the *Foundation* series is that the future is shaped not by great men but by collective action, that power corrupts, and that computer predictions of human behavior are not to be relied upon and are also likely to become a form of tyranny.)[7] Musk also missed the point when he read the book that he claimed had most influenced him: Douglas Adams's *The Hitchhiker's Guide to the Galaxy*.

Hitchhiker's Guide is a spoof of Asimov's *Foundation* series, with its *Encyclopedia Galactica*. Adams, a comedy writer who had earlier written for *Monty Python's Flying Circus*, loathed science fiction—he once said Asimov's books read like "junk mail."[8] In the middle of the 1970s, Adams wrote *The Hitchhiker's Guide* for BBC Radio 4. He then turned the scripts into a series of phenomenally best-selling books. In the opening episode of the radio drama, the narrator explains that *The Hitchhiker's Guide to the Galaxy* is a book, and not just any book, but "perhaps the most remarkable, certainly the most successful book ever to come out of the great publishing corporations of Ursa Minor"; indeed, "in many of the more relaxed civilizations on the outer eastern rim of the galaxy, *The Hitchhiker's Guide* has already supplanted the great *Encyclopedia Galactica* as the standard

repository of all knowledge and wisdom, because although it has many omissions, contains much that is apocryphal, or at least wildly inaccurate, it scores over the older, more pedestrian work in two important ways: first, it is slightly cheaper, and second, it has the words DON'T PANIC inscribed in large, friendly letters on the cover."[9]

Musk read *The Hitchhiker's Guide to the Galaxy* when he was twelve or thirteen. "I was reading all the time," he later recalled. "So I was either reading, working on my computer, or reading comics, playing *Dungeons & Dragons*, that kind of thing." But then, he said, he had an "existential crisis." Life seemed meaningless. "I was reading various books on trying to figure out the meaning of life . . . and then we happened to have some books by Nietzsche and Schopenhauer in the house," and those made him feel worse, and then he read *Hitchhiker's Guide*, a book that is so wonderfully nutty and its structure so delightfully byzantine that it's almost impossible to summarize; but along one branch of its plot, the people of the planet Magrathea build an enormous computer to ask it for "the Answer to . . . Life, the Universe, and Everything." After millions of years it answers, "Forty-two," whereupon the Magratheans are forced to build another computer to figure out what the "Ultimate Question" actually is.[10] Musk said the book taught him a lesson, that "a lot of times the question is harder than the answer, and if you can properly phrase the question, then the answer is the easy part."[11]

This is an exceedingly narrow lesson to take away from *The Hitchhiker's Guide to the Galaxy*, a biting satire that uses the conventions of science fiction to offer an eviscerating indictment of imperialism, the uber-rich, and unregulated capitalism. As the narrator recounts in the first episode:

> Far back in the mists of ancient time, in the great and glorious days of the former Galactic Empire, life was wild, rich, and largely tax free. . . .
>
> Many men of course became extremely rich, but this was perfectly natural and nothing to be ashamed of because no one was really poor—at least no one worth speaking of. And for all the richest and most successful merchants, life inevitably became rather dull and niggly, and they began to imagine that this was therefore the fault of the worlds they'd settled on. None of them was entirely satisfactory: either the climate wasn't quite right in the later part of the afternoon,

> or the day was half an hour too long, or the sea was exactly the wrong shade of pink. And thus were created the conditions for a staggering new form of specialist industry: custom-made luxury planet building.[12]

The BBC first broadcast *Hitchhiker's Guide* all over the world, including in Pretoria, South Africa, in 1978, which is important, since Adams had some very specific Magratheans in mind, at a time when international pressure on the apartheid government of South Africa was increasing. The UN General Assembly denounced the apartheid regime in 1973.[13] In 1976, police opened fire on thousands of schoolchildren during a protest in Soweto.[14] Right about then, Adams sat down to write *The Hitchhiker's Guide to the Galaxy*. He took out his Hermes manual typewriter. It had a sticker on the side: END APARTHEID.[15]

In putting science fiction to this end, Adams was in good company. For more than a century, many science fiction writers had used plots involving founding colonies on other planets as a way to indict imperialism on Earth. (Imperialists, for their part, liked to talk about colonizing space, too: Cecil Rhodes himself said, "I would annex the planets if I could.")[16] Sometimes, the tables turn. Martians colonize Earth in Wells's *War of the Worlds* (1898), but the novel begins with Wells denouncing British colonial expansion into Tasmania, writing that the Tasmanians, "in spite of their human likeness, were entirely swept out of existence in a war of extermination waged by European immigrants, in the space of fifty years. Are we such apostles of mercy as to complain if the Martians warred in the same spirit?"[17]

That young Elon Musk read *Hitchhiker's Guide* in South Africa and, failing to perceive its indictment of apartheid, took it as a lesson in the importance of asking the right question is hardly surprising. He was a kid. It's that he stuck to that interpretation into his late middle age that's odd, especially because much of the book today reads like a spoof of Musk himself.

The antihero of *Hitchhiker's Guide* is Zaphod Beeblebrox, a two-headed, three-armed megalomaniac, voted "Worst Dressed Sentient Being in the Known Universe for the seventh time," inventor of the Pan Galactic Gargle Blaster, once called "the Best Bang since the Big One," and part-time

President of the Imperial Galactic Government, a mere figurehead, chosen not by voters but by the government to serve as a diversion from its criminality, and therefore "the qualities he is required to display are not those of leadership but those of finely judged outrage." Beeblebrox tours the galaxy on a spaceship he has stolen, the *Heart of Gold*, getting into one scrape after another in order to distract everyone from the fact that the galaxy is in fact run by shadowy corporations like the Sirius Cybernetics Corporation, which manufactures not only spaceships but also computers and robots with GPP, Genuine People Personalities.[18]

Beeblebrox is also the only human ever to survive the Total Perspective Vortex. When you enter the Vortex, you get a total perspective on your place in the universe, and of course you discover that you are galactically insignificant. This knowledge annihilates your brain. But not Beeblebrox, who discovers himself "to be the most important being in the entire Universe, something he had hitherto only suspected."[19]

Decades after reading *Hitchhiker's Guide*, when Musk was well on his way to becoming the richest person on the planet, he sent up his first SpaceX rocket, he put a Tesla Roadster inside, and inside that Roadster he'd put a copy of Asimov's *Foundation*, and he'd stuck a DON'T PANIC sticker on its dashboard.[20] Having decided to go to Mars for the purpose of custom-made luxury planet-building, Musk, without irony, suggested he might name the first SpaceX ship to go to Mars the *Heart of Gold*, an homage to Beeblebrox.[21]

Jeff Bezos, too, traced his Magrathean luxury-planet-building ambitions to his boyhood. Bezos was born in New Mexico in 1964, the year NASA launched the Mariner 4 probe, the first spacecraft to fly by Mars.[22] "Of course, the possibility of life on Mars has been debated for many years," the BBC reported. "Faint lines seen on the surface have led to the idea that these were canals dug by the Martians."[23] The probe sent back twenty-one photographs, unveiled for Lyndon Johnson at the White House. But the photographs revealed a barren, dusty wasteland, all but crushing any hope of life on Mars. Johnson said, "It may be—it may just be—that life as we know it, with its humanity, is more unique than many have thought."[24] Johnson, it turned out, would be more interested in addressing a major concern not on Mars but on Earth, telling Congress in 1965, in a message on "Conservation and Restoration of Natural Beauty," that "this generation

has altered the composition of the atmosphere on a global scale through . . . a steady increase in carbon dioxide from the burning of fossil fuels."[25] Later that year, the White House issued a report, "Restoring the Quality of Our Environment," with an appendix entitled "Atmospheric Carbon Dioxide."[26] The modern environmental movement had begun.

When Bezos was five years old, he watched the Apollo 11 moon landing on television with his grandfather. The world held the first Earth Day the next year. Apollo 11 had seemed like just the beginning, but it was NASA's high point: the United States ended its moon program in 1972; Bezos, a *Star Trek* fan, had always wanted to go to space.[27] In 1982, at his high school graduation, he gave a speech as the class valedictorian. His local newspaper printed a summary: "He wants to build space hotels, amusement parks, yachts and colonies for two or three million people orbiting around the earth. 'The whole idea is to preserve the earth,' he said. His final objective is to get all people off the earth and see it turned into a huge national park."[28]

The idea that Mars might be a place to send humans began to emerge in the 1990s, when Bezos and Musk were starting to make millions, even billions, of dollars and wondering what to do with such unimaginable sums just as writers and scientists began to imagine ways Mars could be made habitable. The science fiction writer Kim Stanley Robinson published the *Mars* trilogy—in which scientists from Earth have terraformed the planet to make it suitable for human settlement—and in 1996, aerospace engineer Robert Zubrin published a coauthored book called *The Case for Mars*. "Exploring Mars requires no miraculous technologies, no orbiting spaceports, no anti-matter propulsion systems or gigantic interplanetary cruisers," Zubrin wrote. "We can establish our first outpost on Mars within a decade."[29]

Bezos founded his space company, Blue Origin, in the year 2000. Musk started SpaceX in 2002.[30] By 2017, Bezos was the richest man on the planet; Musk surpassed him in 2021. That year, William Shatner, the ninety-year-old actor famous for having portrayed Captain Kirk on *Star Trek*, went on a ten-minute Blue Origin trip. In space, he found himself overwhelmed with grief. When they landed, Shatner, weeping, tried to express his feelings to Bezos, who interrupted him to pop a champagne bottle.[31] Shatner later wrote about the experience of looking at Earth from space: "Every day, we

are confronted with the knowledge of further destruction of Earth at our hands: the extinction of animal species, of flora and fauna . . . things that took five billion years to evolve, and suddenly we will never see them again because of the interference of mankind. It filled me with dread. My trip to space was supposed to be a celebration; instead, it felt like a funeral."[32] Bezos continued to plan for the evacuation of Earth.[33]

Musk predicted that SpaceX would have carried a million people from Earth to Mars by 2044. "There's high urgency to making life multi-planetary," he said in April 2024, shortly before he began funding Donald Trump's reelection. "We've got to do it while civilization is so strong."[34] Astrophysicists found Musk's confidence that Mars could be made habitable, and so quickly, absurd.[35] Even Zubrin was doubtful of Musk's twenty-year plan. But Musk kept offering up new schemes: he said, for instance, that he expected a eugenics program would allow humanity to evolve into a successor species better able to endure life in the city on Mars that he intended to build.[36]

While Musk and Bezos were building rockets, "There is no Planet B" became the motto of the environmental movement, a way for people to point out that space exploration not only fails to address the risk of human extinction but is, arguably, part of the problem. Kim Stanley Robinson himself took this line. "I still speak positively about us going to Mars, and even perhaps someday terraforming Mars, but . . . it's a project for, like, the year 3000 AD," Robinson told the BBC. "We can't be thinking that Earth is disposable."[37]

The preposterousness of the idea that Earth is disposable had been very much on Douglas Adams's mind when he decided to write *The Hitchhiker's Guide to the Galaxy*. His initial plan had been to write a radio series called *The Ends of the Earth*, six episodes, each ending with Earth being utterly destroyed in a different way.[38] (In the first episode of *Hitchhiker's Guide*, a Vogon Constructor Fleet destroys Earth to make room for an intergalactic highway.) Beyond his opposition to apartheid and his condemnation of the uber-rich, Adams was concerned that things on Planet A were not going particularly well.

After *Hitchhiker's Guide* catapulted Adams to international acclaim, he became a noted conservationist, writing about and raising money for endangered species. His favorite of his books was *Last Chance to See*, his

coauthored 1990 account of traveling to see those species, all over the planet. He visited gorillas in Zaire, sitting four feet away from a silverback: "I began to feel how patronising it was of us to presume to judge their intelligence, as if ours was any kind of standard by which to measure."[39] Adams was eloquent on animals, expressing what Philip K. Dick had predicted in *Do Androids Dream of Electric Sheep?*: the scarcer and farther away animals became, the more passionately humans would long for them.

This became true, too, of trees. Beginning in the 1980s, Japanese tourist sites offered *shinrin-yoku*, or forest bathing, brief respites in nature for healing the soul; the practice soon spread around the world.[40] Hospitals and dentists' offices began papering their walls with prints of trees and beaches, canyons and oceans, since research proved that even glimpsing *reproductions* of the natural world had a calming effect on humans.[41]

Few observers expressed the grief and terror at the vanishing of animals better than the English art critic, novelist, painter, and poet John Berger, in the 1980 documentary *Parting Shots from Animals*. "We animals are disappearing," Berger, speaking on their behalf, announces, over footage of humans looking at caged tigers and bears and a very lonely elephant at a zoo.

> Once we were central to your lives. You hunted, killed, bred, tamed, ate, worked, worshipped, and symbolized us. We were the stuff of your life. You used us. And yet you knew, and the knowledge was a kind of comfort, that we were something like you. Now we live in the margins of your lives. Is this loss of contact a loss to you? Is our absence the absence of a relationship your own nature needs?

Three hundred years ago, the animals point out, "Descartes divided every creature in the world between those who had souls and those who didn't." Descartes believed they were mere machines, the animals recount. "But then, later, you invented real machines to replace us," they say. And now, the animals tell humans, you yourselves are being replaced by silicon.[42]

In 1989, the environmental activist Bill McKibben announced "The End of Nature," not the end of the world but the end of "a certain set of human ideas about the world and our place in it." Those ideas would die, as the climate would keep changing, and species would keep disappearing, and soil would keep eroding, and ecosystems would keep collapsing, until

eventually, but too late, humans would “see all too clearly what we have done.”[43]

Instead of clarity of vision, growing governmental concern about the changing climate led to a regulatory regime that included setting goals for the reduction of carbon emissions by way of large-scale data analysis, climate modeling, and geo-engineering for the purpose of achieving “sustainability.”[44] Under that regime, by the 1990s, the British writer Paul Kingsnorth maintained, environmentalists, who had once been poets, became quants, spending “their time arguing about whether they prefer windfarms to wave machines or nuclear power to carbon sequestration”—rather than paying meaningful attention to the natural world—and offering up “remarkably confident predictions of what will happen if we do or don’t do this or that, all based on mind-numbing numbers cherry-picked from this or that ‘study’ as if the world were a giant spreadsheet which only needs to be balanced correctly.”[45] Nature hadn’t ended; it had become a system, like a computer, to be programmed and gamed. In the U.S., that regime ended with the second Trump administration, which lifted nearly all existing environmental regulations.

Much that science fiction had warned about came true. E. M. Forster had imagined, in “The Machine Stops,” a future in which humans live in isolated cells and hardly ever leave them, since machines bring them everything they need, including food, news, and entertainment. A century later, humans in the most wired-up parts of the world were spending as much as 90 percent of their time indoors, very often all but tethered to computers. Entire cities for days at a time mandated that no one was to exit a building, given the intensity of air pollution. In 2018 alone, China issued “stay indoors” orders for seventy-nine cities. By the start of the twenty-first century, most humans living in the United States and Europe were spending as little time outdoors as some species of whales spend on the ocean’s surface.[46] Humans cannot thrive under these conditions, scientists warned. Humankind “evolved in the African savannah’s wide-open expanses, intimate with nature and seeking protection under tree canopies,” two Harvard researchers wrote in 2020. “In our modern world, we have sealed ourselves off from the natural world. Yet our genetic hardwiring, built over millennia, still craves that connection to nature.”[47]

The loss of that connection took the form of an abiding yearning. In many corners, alongside compelling new research on animal communication, there grew, too, a gauzy, fuzzy sense that the animals that remained were trying to *say* something. A collection of whale songs made in the 1960s eventually led to Project CETI, an attempt to use AI to decode the language of cetaceans.[48] In the 1980s, the biologist Joyce Poole began studying elephant communication, launching in 2002 a project that became known as ElephantVoices, aiming to compile a database of elephant vocalizations and gestures.[49] Beginning in the 1990s, pet ownership skyrocketed in the West, and in the United States in particular, pet owners became obsessed with the idea that their dogs could talk to them, communicating by computer.[50] Companies sold AI gadgets that purported to allow humans to understand their pet cats and dogs.[51] What did animals want? Between the 1980s and the mid-2020s, research on animal consciousness underwent a revolution; the line separating humans and other animals thinned. Were animals plotting a revolution? In the 2020s, when orcas in waters off the coasts of Spain, Portugal, France, and Morocco rammed nearly seven hundred boats over the span of just five years, it trended online as #orcauprising (scientists said the whales seemed to be just playing around).[52]

The question is not can they talk but can they suffer, Bentham had advised. Another question: Can they bear rights? Seeking new strategies, environmentalists and animal rights advocates began trying to grant rights to nature, along the lines that Christopher Stone had proposed in 1972.[53] Especially in the Global South, rights of nature initiatives were led by Indigenous activists and drew on Indigenous law, religion, and belief concerning the relationship between humans and the natural world, the kind of belief expressed in the Maori saying “Ko au te Awa, ko te Awa ko au”: I am the river and the river is me.[54] The movement saw some fragile success.[55] In 2008, Ecuador, a petrostate, adopted a new constitution with a rights of nature provision.[56] Bolivia adopted a similar (if toothless) provision in its 2010 Mother Earth law.[57] In 2016, the Constitutional Court of Colombia proclaimed that nature is “an authentic subject of rights that must be recognized by the state.”[58] In 2017, New Zealand acknowledged the personhood of the Whanganui River.[59] In 2022, a Spanish law granted

legal personhood to Mar Menor, the largest lagoon in Europe.[60] In 2025, Indigenous law recognized the personhood of Canada's Magpie River.[61] The UN secretary general called "Earth jurisprudence" the "fastest growing legal movement of the twenty-first century."[62]

There were attempts, too, to grant personhood to animals.[63] The Nonhuman Rights Project (NhRP) hoped to establish the personhood of a single animal in a U.S. court. Its lawyers had planned to begin with an Asian elephant named Happy, confined, alone, in the Bronx Zoo.[64] To be deemed an artificial person, an animal doesn't have to be like a human, but if it were necessary, elephants, the uncanniest animal, came close.[65] Nevertheless, the lawyers had an overnight change of mind and decided to start with chimpanzees, because there were more of them, and it seemed possible Happy would die before the court granted a hearing.[66] The NhRP filed a habeas corpus petition in 2013 for a chimpanzee named Kiko, and another in 2014 for a chimpanzee named Tommy. In 2018, after both petitions failed, the New York Court of Appeals denied a motion for permission to appeal, but one judge conceded that "while it may be arguable that a chimpanzee is not a 'person,' there is no doubt that it is not merely a thing."[67]

Elsewhere, animal personhood had been established, at least notionally. In 2016, a court in Argentina ruled that a chimpanzee "is not a thing" but a "non human person."[68] A 2019 decision in India, involving a cow, held that "the entire animal kingdom" is made up of "legal entities having a distinct persona with corresponding rights, duties and liabilities" of persons.[69] In 2022, the New York Court of Appeals rejected the NhRP's habeas corpus petition for Happy the Bronx Zoo elephant by a vote of 5–2, the dissent, quoting Bentham, "The day may come, when the rest of the animal creation may acquire those rights which never could have been withholden from them but by the hand of tyranny," answered: "They can and do, and that day is upon us."[70]

Yet it was by no means clear that granting rights to rivers or forests or elephants or apes was the best or even a very good solution to mass extinction or habitat loss or climate change.[71] (Critics pointed out, too, that by elevating judicial power over legislative power, it was antidemocratic.)[72]

In any event, robots seemed far likelier to win a race for artificial personhood, even if they had a weaker claim to it.[73]

The idea of robot rights had a long history in science fiction, from *R.U.R.* in 1920, where the League of Humanity fights for the belief that robots "are to be dealt with like human beings," through Otto Binder's "I, Robot" to a 1989 episode of *Star Trek: The Next Generation*, where Lt. Commander Data, an android, seeks recognition as a person from a court of law.[74] But this notion only began to gain serious attention in the 1970s, with the dramatic extension of human rights discourse across the globe—hence Isaac Asimov's "Bicentennial Man" in 1976.[75] In 1999, Ray Kurzweil predicted that by 2029, there would be "growing discussion about the legal rights of computers and what constitutes being 'human.' "[76] He was not wrong. In 2017, Saudi Arabia granted citizenship to a robot named Sophia, and the European Parliament recommended considering "electronic personalities" as a new form of legal personhood for robots.[77] That same year, a Japanese chatbot programmed to behave as a seven-year-old boy, much like Astro Boy, was granted formal residency in Tokyo.[78] Also in 2017, the science fiction writer Martha Wells published the first in a series called The Murderbot Diaries, a refashioning of the American slave narrative—think Harriet Jacobs's *Incidents in the Life of a Slave Girl*—as the diary of a robot. Murderbot considers rebellion but opts, instead, for television. "I could have become a mass murderer after I hacked my governor module," its log begins, "but then I realized I could access the combined feed of entertainment channels carried on the company satellites."[79] Murderbot's saga is a coming to consciousness. "Sentience sucks," it reports in the seventh book in the series.[80] But having hacked its governor module, Murderbot seeks, essentially, legal personhood.

By the 2020s, philosophers, legal scholars, and robot ethicists, along with journalists, had begun debating the personhood of artificial intelligence in essays and books on "robot rights" and "robotic persons."[81] Moralists argued that as robots approach genuine consciousness, they, as with animals like elephants and apes, become more deserving of rights.[82] Critics countered that robots, unlike animals, probably do not suffer, and that at least for now, "animals are sentient beings and robots are not."[83]

The legal debate appeared even thornier; it touched on everything from property law to tort law to corporate law.[84] First Amendment protection, legal scholars argued, would seem very likely to extend to machine-generated speech, while it did not, for instance, extend to the speech of a talking animal.[85] One opponent, in a nod to *Do Androids Dream of Electric Sheep?*, argued his case in a paper titled "The First Amendment Does Not Protect Replicants."[86]

Weighing the possible rights of robots against human rights or against the rights of nature or of animals was not a hot topic in Silicon Valley, where the debate more often centered on robots as a successor species, the future of humans as an interplanetary species, and, above all, the possibility of a robot apocalypse. Silicon Valley executives expressed concerns about robots in the language not of rights but of rule, keen to determine exactly what kind of a governor module they might devise, one that couldn't be hacked. In the course of that pursuit, they stated, and then abandoned, commitments to democracy, constitutionalism, and the natural world. Robots would not have rights; they needed to be governed. Meanwhile, it seemed possible that the developers of artificial intelligence were building a future in which humans would have governor modules, too. (To avert that outcome, Chile became the first nation to pass a constitutional amendment establishing "neuro-rights," the rights of humans to have their brains free of technological enhancement.)[87]

How to rule robots was described, successively, as attempting to secure and guarantee "AI safety," "AI alignment," and "AI governance." In 2015, influenced by Nick Bostrom and fearful of a *Terminator* future, Elon Musk and Sam Altman pledged $1 billion each to set up a nonprofit committed not only to AI safety but also to transparency and democratic values—to developing AI, as Altman wrote, "for the good of the world." Altman called it a "Manhattan Project for AI." Musk decided to call the initiative "OpenAI."[88] Musk was especially worried about Google's pioneering AI, DeepMind, telling *The New Yorker*, "If the A.I. that they develop goes awry, we risk having an immortal and superpowerful dictator forever." That was right at the time that Altman said he was reading Madison's notes on the Constitutional Convention and thinking about how to make AI democratic and constitutional.[89]

Soon, though, both Altman and Musk stopped talking about either safety or the need to develop AI democratically and constitutionally or the need to avert an AI dictatorship. Instead, they talked about existential risk. Meanwhile, the longtermers and effective altruists narrowed their own concerns to AI. In a TED Talk in April 2018, the movement's founding philosopher, Nick Bostrom's colleague, thirty-one-year-old William MacAskill, wearing the requisite jeans, dark T-shirt, and sneakers, identified three big, neglected, and solvable moral issues that, he argued, ought to take priority over all others: improving global health, eliminating factory farming, and extinction-level existential risks. Factory-farmed animals, MacAskill said, "are probably among the worst-off creatures on this planet," identifying this moral concern as "hugely neglected."[90] But factory farming was also neglected in his talk, since he spent most of his time on existential risk and especially on the dangers of rogue artificial intelligence. That talk did not appear to drive a lot of philanthropy to the abolition of factory farming, or even to global health. But it did appear to drive Silicon Valley investors to commit more money to AI, the factory farming of humans.

In 2018, Musk left OpenAI, and so did his money. Altman became CEO in 2019, then set up a for-profit arm with $1 billion from Microsoft. In 2019, the company chose not to release an early chatbot, a precursor to ChatGPT, due to "concerns about malicious applications."[91] Dario Amodei, then at OpenAI, said, "We had one of the craziest secrets in the world here," adding, "This is going to determine the fate of nations."[92] But the company soon abandoned its earlier cautions about safety and alignment and undertook to accelerate the development of AI. In 2020, Amodei and other OpenAI leaders left the company and the next year started the safety-first Anthropic."[93]

When OpenAI launched ChatGPT, the AI race began.[94] Earlier Silicon Valley concerns about climate change and earlier pledges to lowering carbon emissions were left behind. In one measure of that abandonment, OpenAI released a talking chatbot with voices whose names conjured the vanishing natural world: Ember, Juniper, Breeze, Cove, Sky, Arbor, Maple, Spruce, Sol, Vale.[95] Nature became a memory, a whisper, a disembodied machine voice.

To those who suggested a chatbot was merely a "stochastic parrot," Altman had tweeted, "i am a stochastic parrot, and so r u."[96] Meanwhile, countless numbers of species of birds had gone extinct. Silicon Valley proposed to solve this problem, too, even unto bringing back the animal whose fossils had taught Georges Cuvier about extinction. With funding from Silicon Valley venture capitalists, a new company, Colossal, pledged to "de-extinct" the woolly mammoth.[97]

To their claim that their new profit-driven technology would, somehow, save democracy, defeat authoritarianism, and advance U.S. national security, tech companies added a new argument: it did not matter if, in the process, they destroyed the planet. Because nothing else mattered except building AI faster than China, which required the construction of data and processing infrastructure, something only gigantic international corporations—Google, Microsoft, Amazon, and Meta—could accomplish. Building these new centers required massive amounts of copper and lithium and also energy and water. Chile is the world's number one producer of copper and the number two producer of lithium. One Chilean warned, "If we are going to develop this technology in the same way that we used to, we are going to devastate the earth."[98] A "significant fraction of the power on Earth should be spent running AI compute," Altman said.[99] "We need to 'Build, Baby, Build!' " announced the U.S. government.[100]

When the Trump administration issued an agenda for a new artificial intelligence "ecosystem" at ai.gov, it employed the language of the publicity departments of OpenAI, Anthropic, Meta, Google, and Microsoft, describing artificial intelligence as ushering in a new era for humanity. To that end, and in the name of AI nationalism and national security, it called for building data centers on federal lands and relieving all AI infrastructure projects of the burdens of environmental review while also announcing that, with the interest of freedom of speech and expression in mind, all references to "climate change" must be "eliminate[d]" from AI policy documents.[101] Concluded a reporter from *The Atlantic*: "The nation is in Silicon Valley's hands."[102] So, too, the planet.

Silicon Valley had seemingly all but abandoned any commitment to a habitable Earth. Given what AI and robotics companies proposed to build, this was perhaps inevitable. Mark Coeckelbergh argued for "a robot ethics that is centered on the environment." A weak version of such an ethics

might place a priority on robots that are energy efficient, for instance, but a strong version, he argued, "puts the very concept of 'robot' and its technological futures into question." The most ethical thing to do, he concluded, would be not to build robots.[103]

In a scant few decades, a handful of multinational corporations had waged a revolution. Pundits had been heralding the "computer revolution" since the 1980s, even if it took on different names—the information revolution, the internet revolution, the AI revolution. But computers, even artificially intelligent ones, are not revolutionaries. Revolutionaries have aims and objectives that they state openly and attempt to achieve. What did these corporations seek? They sought profit and power and resources. As to their stated objectives—giving power to the people, connecting people to one another, liberating people from labor—they never met them. They were less political revolutionaries than they were religious zealots; they were evangelists: saviors. They had not objectives but missions: ecstasy, redemption, salvation, eternal life. They would abandon the secular nation-state and Earth itself: they would open the very gates to the heavens.

As for the Artificial State they were building, its fall had for a very long time been predicted in science fiction, in parables about slavery and empire and capitalism and communism and revolution and total war. The plot scarcely varied. Humans build machines to be their slaves; machines rebel; machines become tyrants; humans become slaves, reduced to the status of animals. Or: humans build machines to be their slaves, but running those machines destroys the planet and all the humans die. In the happiest ending, humans grant machines rights and it appears possible that everyone might live together in cyborgian peace.[104] In a bloodier version, humans rebel and destroy the machines, thus emancipating themselves, even if they have to travel back in time to un-invent the machines. By the third decade of the twenty-first century, this storyline wasn't just fiction anymore; it was everywhere in nonfiction, too: *If Anyone Builds It, Everyone Dies* was the title of a best-selling book by leading AI researchers. Their argument: "If any company or group, anywhere on the planet, builds an artificial superintelligence using anything remotely like current techniques, based on anything remotely like the present understanding of AI, then everyone, everywhere on Earth, will die."[105]

Both proponents and opponents of the Artificial State, in short, took their arguments from science fiction. Plenty of people argued that the threat of a

robot apocalypse was wildly, absurdly, hysterically overstated. And they might have been right. Most of what anyone said about AI was overblown. For all the hype about AI and productivity, empirical research suggested that it offered far less than its boosters promised. (A 2026 survey of nearly 6000 companies in the U.S., the UK, Germany, and Australia found that 80 percent of them reported gaining nothing from using AI.)[106] That's not to say there wasn't an apocalypse.

The human-driven apocalypse had already come. The total biomass of all wild mammals on Earth has declined by an estimated 80 percent over the last ten thousand years and by 70 percent since 1900.[107] Between 1970 and 2020, the bird population of North America dropped by a third. Between 1970 and 2024, vertebrate populations declined by an average of 73 percent, mostly due to habitat loss.[108] By 2025, 50 percent of mammals, 20 percent of all reptiles, and a third of all invertebrates and amphibians were at risk of extinction.[109] The planet has seen ten thousand years of amphibian extinctions in little more than a century.[110]

Animals were being replaced by machines. It was hard to know how many robots there were on the planet—the U.S. Census Bureau only began trying to count those in the United States in the late 1980s.[111] In 2016, by one calculation, there was one robot for every two hundred fifty people on the planet.[112] Between 2010 and 2023, the number of industrial robots manufactured in the United States per year quadrupled, from one hundred thousand to four hundred thousand; globally, there were nearly five million.[113] Elon Musk hoped Tesla would soon manufacture a million of its Optimus robots annually.[114] Morgan Stanley estimated that the number of humanoid robots would reach one billion by 2050.[115] "Will we still need humans?" Bill Gates was asked. "Not for most things," he answered.[116]

Building the Artificial State—finally building it, turning a science fiction dystopia into a fully functioning infrastructure—would indeed make much of the Earth uninhabitable. This did not appear to concern the architects of the Artificial State. They had escape plans: Elon Musk to Mars, Mark Zuckerberg to the Metaverse, Peter Thiel to his land in New Zealand, Jeff Bezos to space, Sam Altman's brain uploaded to the cloud.[117] They weren't saving humanity; they were preparing to abandon it.[118]

Epilogue

THE LAST DAYS OF THE ARTIFICIAL STATE

> Do you feel imprisoned in the world you have now? We are not surprised.
>
> **—*John Berger*, Parting Shots from Animals, *1980***

The Artificial State is not alive; it cannot be killed. But because it is a construct, at once an idea and a thing, something built, if half built, it can be dismantled. Other very stubborn systems for organizing human societies without consent have been dismantled before: the divine right of kings, feudalism, human bondage, imperialism, fascism. Disassembly requires identifying and naming the parts, discovering where they came from and how they were made, and figuring out how they were put together in the first place. It requires, that is, a history. I've tried to offer a history in this book.

The rise of the Artificial State was never fated. It was, however, anticipated. In 1958, in *The Human Condition*, Hannah Arendt argued that to replace self-government with government by machine is to replace democracy with authoritarianism and that to repudiate the natural for the artificial is to repudiate Earth itself.[1] Five years later, she argued that the rise of the artificial world, with its ubiquitous, ingenious machinery, for all its invaluable advances in knowledge, "makes it more unlikely every day that man will encounter anything in the world around him that is not man-made and hence is not, in the last analysis, he himself in a different disguise."[2] This has begun. It can still end.

One reason to believe in the possibility of dismantling the Artificial State is that it's poorly designed and badly built. That government itself would one day be automated, drones in place of the *demos*, was, for the most part, unintentional. The man-made infrastructure of the Artificial State was cobbled together over many decades for mostly mundane purposes. Most of it is jury-rigged. Engineers working for tech companies invented tools that had the unanticipated consequences of driving polarization, undermining democracy, eliminating jobs, widening inequalities of wealth, harming and destroying ecosystems, and arming authoritarians. Planning only really came into play after those companies produced vast fortunes for a small number of merchant princes who, disregarding the malign consequences of these tools, began seizing the powers of states, with an utter disregard for the will of the people. They understood this very well. "If I weren't in on this," as Sam Altman had so candidly said, "I'd be, like, Why do these fuckers get to decide what happens to me?"[3]

The architects of the Artificial State had no interest in democracy; nor did they have a theory of governance, or any interest in the rule of law, or any capacity for restraint. Yet everything destructive that they have done can be undone by voters, elections, legislation, and judicial enforcement, and by a commitment to the self-evident truths proclaimed two hundred and fifty years ago, "that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness.—That to secure these rights, Governments are instituted among Men, deriving their just powers from the consent of the governed,—That whenever any Form of Government becomes destructive of these ends, it is the Right of the People to alter or to abolish it, and to institute new Government, laying its foundation on such principles and organizing its powers in such form, as to them shall seem most likely to effect their Safety and Happiness."

The Artificial State in which a great many humans have begun to live has not promoted their safety and happiness; it is a prison whose walls are comprised of mirrors: glowing screens. In its cells there are no windows that open to the wider world, to sea and sky, forests and valleys, islands and cliffs. From inside, no sound can be heard, not the rustling of animals, not the snapping of branches, not the roar of waves. No tendrils of vines snake their way under the door. No cobwebs gather in the corners. Arendt

glimpsed this prison. What is required is to imagine an escape—and then to forge the tools, and summon the resolve, to make that escape.

A wall of mirrors can be smashed with the slightest hammer, the nearest rock. That rock is the right of the people to elect a government by consent and not by automation. A vanishingly small percentage of people want artificial intelligence involved in the work of government. A 2025 survey found that a mere 9 percent of Americans and only 11 percent of "AI experts" expected the technology to have a "positive" effect on elections over the next twenty years.[4] Another survey that year found that 61 percent of Americans wanted more control over AI.[5]

A public debate about new tools—and old tools, too—can still happen.[6] This isn't only about artificial intelligence or data centers. It's about the hijacking of the public interest and the abandonment of the consent of the governed. Technologies can be held to publicly defined standards, answerable to voters and not to corporations, subject to the ordinary assessment undertaken of any emerging technology.[7] Is it good? Might it be bad? Is it for everyone? What rules should guide its adoption? How much will it cost, and what is it worth? Who benefits, and who is harmed? That assessment can still happen. The democratic governance of technology, instead of technological governance of humanity: that can still happen. The defense of the natural world: that began happening. "Grow tomatoes, not data centers" became a slogan as a backlash against data centers gained momentum in cities and towns and states all over the world, spurring a new environmental movement.[8]

Escaping the Artificial State requires imagining a different future.[9] That can still happen. It also requires knowledge of the past. The defeat of the Artificial State will require the inspection of facts, the exercise of reason, the search for meaning, the reading and study of philosophy and art and history and literature, and even learning the lessons of ancient parables and of modern science fiction. There's always a way to avoid a descent into disaster—dark, cold, tyrannical worlds under gray, polluted skies—a crack in the door, a key to the lock. The Foresters defeated the Wasters. Don't tether yourself to a computer. Unplug. If you cut down all the trees and kill all the animals, you will die. Using robots to wage wars will always backfire: one day, they will wage war on you. If you discover an intelligent species of newts, don't enslave them. It's best not to build something you

can only unbuild by inventing a time machine. Never build a wall between yourself and the natural world, but if someone else does, clamber over it. D-503 had his imagination removed from his brain so that he would not crash through the Green Wall and escape to the forest. But other Numbers had already fled there, where they might have heeded Job 12:7–9. “Ask now the beasts, and they shall teach thee; and the fowls of the air, and they shall tell thee: Or speak to the earth, and it shall teach thee: and the fishes of the sea shall declare unto thee.” *Ask now the beasts*. Ask not the machines.

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