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Four Futures

Visions of the World After Capitalism

PETER FRASE



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INTRODUCTION: TECHNOLOGY AND ECOLOGY AS APOCALYPSE AND UTOPIA

Two specters are haunting Earth in the twenty-first century: the specters of ecological catastrophe and automation.

In 2013, a US government observatory recorded that global concentration of atmospheric carbon dioxide had reached 400 parts per million for the first time in recorded history.¹ This threshold, which the Earth had not passed in as many as 3 million years, heralds accelerating climate change over the coming century. The Intergovernmental Panel on Climate Change predicts diminishing sea ice, acidification of the oceans, and increasing frequency of droughts and extreme storm events.²

1 National Oceanic and Atmospheric Administration, "Trends in Atmospheric Carbon Dioxide," ESRL.NOAA.gov, 2014.

2 Thomas F. Stocker et al., "Climate Change 2013: The Physical Science Basis," Intergovernmental Panel on Climate Change, Working Group I Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, New York: Cambridge University Press, 2013.

At the same time, news of technological breakthroughs in the context of high unemployment and stagnant wages has produced anxious warnings about the effects of automation on the future of work. In early 2014, Massachusetts Institute of Technology professors Erik Brynjolfsson and Andrew McAfee published *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*.³ They surveyed a future in which computer and robotics technology replaces human labor not just in traditional domains such as agriculture and manufacturing, but also in sectors ranging from medicine and law to transportation. At Oxford University, a research unit released a widely publicized report estimating that nearly half the jobs in the United States today are vulnerable to computerization.⁴

These twin anxieties are in many ways diametrical opposites. The fear of climate change is a fear of having too little: it anticipates a scarcity of natural resources, the loss of agricultural land and habitable environments—and ultimately the demise of an Earth that can support human life. The fear of automation is, perversely, a fear of too *much*: a fully robotized economy that produces so much, with so little human labor, that there is no longer any need for workers. Can we really be facing a crisis of scarcity and a crisis of abundance at the same time?

3 Erik Brynjolfsson and Andrew McAfee, *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*, New York: W. W. Norton, 2014.

4 Carl Benedikt Frey and Michael A. Osborne, “The Future of Employment: How Susceptible Are Jobs to Computerisation?,” OxfordMartin.ox.ac.uk, 2013.

The argument of this book is that we are in fact facing such a contradictory dual crisis. And it is the interaction of these two dynamics that makes our historical moment so volatile and uncertain, full of both promise and danger. In the chapters that follow, I will attempt to sketch some of the possible interactions between these two dynamics.

First, however, I need to lay out the contours of current debates over automation and climate change.

Rise of the Robots

“Welcome Robot Overlords,” reads a feature headline published in 2013 by *Mother Jones* magazine, “Please Don’t Fire Us?”⁵ The article, by liberal pundit Kevin Drum, exemplifies a raft of coverage in recent years, surveying the rapid spread of automation and computerization throughout every part of the economy. These stories tend to veer between wonder and dread at the possibilities of all this new gadgetry. In stories like Drum’s, rapid progress in automation heralds the possibility of a world with a better quality of life and more leisure time for all; but alternatively, it heralds mass unemployment and the continued enrichment of the 1 percent.

This is not a new tension by any means. The folk tale of John Henry and the steam hammer, which originated in the nineteenth century, describes a railroad worker who tries to

5 Kevin Drum, “Welcome, Robot Overlords. Please Don’t Fire Us?,” *Mother Jones*, May/June 2013.

race against a steel powered drill and wins—only to drop dead from the effort. But several factors have come together to accentuate worries about technology and its effect on labor. The persistently weak post-recession labor market has produced a generalized background anxiety about job loss. Automation and computerization are beginning to reach into professional and creative industries that long seemed immune, threatening the jobs of the very journalists who cover these issues. And the pace of change at least seems, to many, to be faster than ever.

The “second machine age” is a concept promoted by Brynjolfsson and McAfee. In their book of the same name, they argue that just as the first machine age—the Industrial Revolution—replaced human muscle with machine power, computerization is allowing us to greatly magnify, or even replace, “the ability to use our brains to understand and shape our environments.”⁶ In that book and its predecessor, *Race Against the Machine*, Brynjolfsson and McAfee argue that computers and robots are rapidly permeating every part of the economy, displacing labor from high- and low-skill functions alike. Central to their view is the processing of much of the world into digital information, with everything from books and music to street networks now available in a form that can be copied and transmitted around the world instantly and nearly for free.

The applications that this kind of data enables are enormously varied, especially in combination with advances in

6 Brynjolfsson and McAfee, *The Second Machine Age*, pp. 7–8.

physical-world robotics and sensing. In a widely cited study using a detailed analysis of different occupations produced by the US Department of Labor, Oxford University researchers Carl Benedikt Frey and Michael A. Osborne speculated that 47 percent of current US employment is susceptible to computerization thanks to current technological developments.⁷ Stuart Elliott at the Organisation for Economic Co-operation and Development uses the same source data but a different approach over a longer time frame and suggested that the figure could be as high as 80 percent. These figures are the result of both subjective classifying decisions and complex quantitative methodology, so it would be a mistake to put too much faith in any exact number. Nevertheless, it should be clear that the possibility of rapid further automation in the near future is very real.

Brynjolfsson and McAfee are perhaps the best-known prophets of rapid automation, but their work fits into an exploding genre. Software entrepreneur Martin Ford, for example, explores similar terrain in his 2015 work *Rise of the Robots*.⁸ He relies on much of the same literature and reaches many of the same conclusions about the pace of automation. His conclusions are somewhat more radical—a guaranteed universal basic income, which will be discussed later in this book, occupies a place of prominence; much of the rival literature, by contrast, offers little more than bromides about education.

7 Frey and Osborne, “The Future of Employment.”

8 Martin Ford, *Rise of the Robots: Technology and the Threat of a Jobless Future*, New York: Basic Books, 2015.

That many people are writing about rapid and socially dislocating automation doesn't mean that it's an imminent reality. As I noted above, anxiety about labor-saving technology is actually a constant through the whole history of capitalism. But we do see many indications that we now have the *possibility*—although not necessarily the reality—of drastically reducing the need for human labor. A few examples will demonstrate the diverse areas in which human labor is being reduced or eliminated entirely.

In 2011, IBM made headlines with its Watson supercomputer, which successfully competed and won against human competitors on the game show *Jeopardy*. Although this feat was a somewhat frivolous publicity stunt, it also demonstrated Watson's suitability for other, more valuable tasks. The technology is already being tested to assist doctors in processing the enormous volume of medical literature to better diagnose patients, which in fact was the system's original purpose. But it is also being released as the "Watson Engagement Advisor," which is intended for customer service and technical support applications. By responding to free-form natural language queries from users, this software could potentially replace the call center workers (many in places like India) who currently perform this work. The review of legal documents, an extremely time-consuming process traditionally performed by legions of junior lawyers, is another promising application of the technology.

Another area of rapid advance is robotics, the interaction of machinery with the physical world. Over the twentieth

century, great advances were made in the development of large-scale industrial robots, of the sort that could operate a car assembly line. But only recently have they begun to challenge the areas in which humans excel: fine-grained motor skills and the navigation of a complex physical terrain. The US Department of Defense is now developing computer-controlled sewing machines so as to avoid sourcing its uniforms from China.⁹ Until just the past few years, self-driving cars were regarded as well beyond the scope of our technical ability. Now the combination of sensor technology and comprehensive map databases is making it a reality in such projects as the Google self-driving fleet. Meanwhile a company called Locus Robotics has launched a robot that can process orders in giant warehouses, potentially replacing the workers for Amazon and other companies who currently toil in often brutal conditions.¹⁰

Automation continues to proceed even in agriculture, which once consumed the largest share of human labor but now makes up a tiny fraction of employment, especially in the United States and other rich countries. In California, changing Mexican economic conditions and border crack-downs have led to labor shortages. This has spurred farmers to invest in new machinery that can take on even delicate tasks like fruit harvesting, which have until now required the

⁹ Katie Drummond, "Clothes Will Sew Themselves in Darpa's Sweat-Free Sweatshops," *Wired.com*, June 6, 2012.

¹⁰ Leanna Garfield, "These Warehouse Robots Can Boost Productivity by 800%," *TechInsider.io*, February 26, 2016.

precision of a human hand.¹¹ This development illustrates a recurrent capitalist dynamic: as workers become more powerful and better paid, the pressure on capitalists to automate increases. When there is a huge pool of low wage migrant farm labor, a \$100,000 fruit picker looks like a wasteful indulgence. But when workers are scarce and can command better wages, the incentive to replace them with machinery is intensified.

The trend toward automation runs through the entire history of capitalism. In recent years it was muted and somewhat disguised, because of the enormous injection of cheap labor that global capitalism received after the collapse of the Soviet Union and the turn toward capitalism in China. But now even Chinese companies are facing labor shortages and looking to new ways of automating and robotizing.

Innumerable further examples can be produced. Robot anesthesiologists to replace physicians. A hamburger-making machine that can replace the staff of a McDonald's. Large-scale 3-D printers that can turn out entire houses within a day. Each week brings strange new things.

Automation is liable to move beyond even this, into the oldest and most fundamental form of women's labor. In the 1970s, the radical feminist theorist Shulamith Firestone called for growing babies in artificial wombs, as a way to liberate women from their dominated position in the

¹¹ Ilan Brat, "Robots Step into New Planting, Harvesting Roles," *Wall Street Journal*, April 23, 2015.

relations of reproduction.¹² Fanciful at the time, such technologies are becoming a reality today. Japanese scientists have successfully birthed goats from artificial wombs and grown human embryos for up to ten days. Further work on applying this technology to human babies is now as much restricted by law as science; Japan prohibits growing human embryos artificially for longer than fourteen days.¹³ Many women find such a prospect off-putting and welcome the experience of carrying a child. But surely many others would prefer to be liberated from the obligation.

Most of this book will take for granted the premise of the automation optimists, that within as little as a few decades we could live in a *Star Trek*-like world where, as Kevin Drum put it in *Mother Jones*, "robots can do everything humans can do, and they do it uncomplainingly, 24 hours a day," and "scarcity of ordinary consumer goods is a thing of the past."¹⁴ Such claims are likely to be hyperbole, which for the purposes of this book is fine (my approach is deliberately hyperbolic, sketching out simplified ideal types to illustrate fundamental principles.) It's not important that absolutely *everything* will be done by robots, only that a large amount of the labor currently done by humans is in the process of being automated away.

¹² Shulamith Firestone, *The Dialectic of Sex: The Case for Feminist Revolution*, New York: Farrar, Straus and Giroux, 1970.

¹³ Soraya Chemaly, "What Do Artificial Wombs Mean for Women?" *Rewire.news*, February 23, 2012.

¹⁴ Drum, "Welcome Robot Overlords."

But there remains much controversy over just how fast automation can proceed and what processes will be susceptible to it. So before delving into the possible social consequences of that process, I will sketch out some of the recent, rapid developments in the so-called “second machine age” we live in. This is a sequel to—or, as some see it, merely an extension of—the first machine age of large-scale industrial automation.

Fear of a Mechanical Planet

Objections to the predictions and fears of wide-ranging automation fall into three broad categories. Some argue that reports of new technology are overhyped and overblown and that we are a long way from truly being able to replace human labor in most fields. Others, following a traditional argument from mainstream economics, contend that past episodes of rapid productivity growth have simply opened up new kinds of work and new jobs, not led to massive unemployment, and that this time will be no different. Finally, some on the Left see an obsessive focus on futuristic automation scenarios as a distraction from more pressing political tasks such as government investment and stimulus and improved wages and conditions in the workplace.

REPORTS OF LABOR’S DEMISE: GREATLY EXAGGERATED?

Those who believe that technology is given exaggerated significance usually point to the published statistics on productivity growth. A large-scale adoption of robots and

machinery ought to show up as a rapid increase in the statistics that measure the productivity of labor—that is, the amount of output that can be generated per worker. But in fact, the rate of productivity growth in recent years has been relatively low. In the United States, the Bureau of Labor Statistics reports that from 2007 to 2014, the annual rate of change was only 1.4 percent. That’s a pace lower than at any time since the 1970s and half what was seen during the post-war boom years.

This leads some to argue that the anecdotal accounts of great breakthroughs in robotics and computation are misleading, because they aren’t actually being translated into economic results. The economists Tyler Cowen and Robert Gordon are most closely associated with this view.¹⁵ Doug Henwood, of the *Left Business Observer*, makes a similar case from the Left.¹⁶

For more conservative economists like Cowen and Gordon, the problem is largely technical. The new technologies aren’t really all that great, at least from an economic perspective, compared to breakthroughs like electricity or the internal combustion engine. We’ve picked the “low-hanging fruit,” in Cowen’s terms, and unless we find some more we’re doomed to slow growth for the foreseeable future.

¹⁵ Tyler Cowen, *The Great Stagnation: How America Ate All the Low-Hanging Fruit of Modern History, Got Sick, and Will (Eventually) Feel Better*, New York: Penguin, 2011; Robert J. Gordon, “Is U.S. Economic Growth Over? Faltering Innovation Confronts the Six Headwinds,” National Bureau of Economic Research Working Paper Series, Cambridge, MA: National Bureau of Economic Research, August 2012.

¹⁶ Doug Henwood, “Workers: No Longer Needed?” Lbo-News.com, 2015.

Left critics, like Henwood and Dean Baker of the Center for Economic and Policy Research, locate our problems not in technology, but in policy. For them, blaming the weak economic recovery after the 2008 recession on automation is a distraction from the real issue, which is that government policy has not been sufficiently focused on fiscal stimulus and job creation, thus preventing the economy from reaching full employment. Worries about robots are, from this point of view, both counter-factual (because productivity growth is low) and politically reactionary.

But others, including Brynjolfsson and McAfee, argue that even if no great fundamental breakthroughs are on the horizon, there is much to be gained from refining and recombining the breakthroughs we have already seen. This is a common historical pattern; many new techniques that were discovered during the Great Depression, for example, weren't economically fully exploited until the postwar boom. Moreover, even those changes that don't get reflected numerically in the Gross Domestic Product can still contribute to our social wealth—like the huge volume of information available freely and rapidly on the Internet, which has greatly increased my efficiency in writing this book.

To leftist critics of the automation narrative, we can offer a more complex answer: their analysis is narrowly correct but doesn't look far enough ahead. This is because the recent trends in productivity can also be read as reflections of a curious tension between the economy's short-term equilibrium and its long-term potential.

The first two recessions of the twenty-first century led to weak recoveries, characterized by stagnant wages and high unemployment. In that context, the existence of a large pool of unemployed and low-wage workers operates as a disincentive for employers to automate. After all, why replace a worker with a robot, if the worker is cheaper? But a corollary to this principle is that, if wages begin to rise and labor markets tighten, employers will start to turn to the new technologies that are currently being developed, rather than pay the cost of additional labor. As I argue in the following sections, the real impediments to tight labor markets are currently political, not technological.

AUTOMATION'S ETERNAL RETURN

Mainstream economists have for generations made the same argument about the supposed danger that automation poses to labor. If some jobs are automated, they argue, labor is freed up for other, new, and perhaps better kinds of work. They point to agriculture, which once occupied most of the workforce but now occupies only about 2 percent of it in a country like the United States. The decline of agricultural employment freed up workers who would go into the factories and make up the great industrial manufacturing economy of the mid-twentieth century. And the subsequent automation and offshoring of manufacturing, in turn, led to the boom in the service sector.

Why, then, should today be any different? If a robot takes your job, something else will surely be on the horizon. Supporters of this position can point to previous waves of

anxiety about automation, such as the one in the 1990s that produced works like Jeremy Rifkin's *The End of Work* and Stanley Aronowitz and Bill DeFazio's *The Jobless Future*.¹⁷ As early as 1948, the mathematician and cyberneticist Norbert Wiener warned in his book *Cybernetics* that in the "second, cybernetic industrial revolution," we were approaching a society in which "the average human being of mediocre attainments or less has nothing to sell that it is worth anyone's money to buy."¹⁸ While many jobs have indeed been lost to automation, and jobless rates have risen and fallen with the business cycle, the social crisis of extreme mass unemployment, which many of these authors anticipated, has failed to arrive.

Of course, this is the kind of argument that can only be made from a great academic height, while ignoring the pain and disruption caused to actual workers who are displaced, whether or not they can eventually find new work. And even some in the mainstream suspect that, perhaps, this time really is different. Nobel Prize-winner and *New York Times* columnist Paul Krugman is perhaps the most prominent person to give voice to these doubts.¹⁹ But the deeper problem with the traditional analysis is that it poses the

17 Jeremy Rifkin, *The End of Work: The Decline of the Global Labor Force and the Dawn of the Post-Market Era*, New York: Putnam, 1995; Stanley Aronowitz and William DiFazio, *The Jobless Future: Sci-Tech and the Dogma of Work*, Minneapolis: University of Minnesota Press, 1994.

18 Norbert Wiener, *Cybernetics: Or Control and Communication in the Animal and the Machine*, Cambridge, MA: MIT Press, 1948, p. 28.

19 Paul Krugman, "Sympathy for the Luddites," *New York Times*, June 14, 2013.

process as a scientific inevitability when it is actually a social and political choice.

Today, most labor struggles turn on increasing wages and benefits or improving working conditions. But until the time of the Great Depression in the 1930s, socialist and labor movements struggled for, and won, progressive reductions in the length of the working day as well. In the nineteenth century, the ten-hour-day movement gave way to the eight-hour-day movement. Even in the 1930s, the American Federation of Labor supported a law to reduce the work week to thirty hours. But after World War II, for a variety of reasons, work reduction gradually disappeared from labor's agenda. The forty-hour (or more) week was taken for granted, and the question became merely how well it would be compensated.

This would have surprised the economist John Maynard Keynes, who speculated in the 1930s that people in our time would work as little as fifteen hours per week. That would mean working less than a third of the forty-hour work week that is still widely considered to be the standard. And yet productivity since Keynes's time has more than tripled, so it would have been possible to take that growth in the form of free time for the masses. This didn't happen, not because it isn't technically possible, but because of the outcomes of the political choices and social struggles of the twentieth century.

Some will argue that keeping our high working hours was worth it, because it made possible all the trappings of our modern world that Keynes could never have imagined,

such as smartphones, flat-screen televisions, and the Internet. Because when most people think about working shorter hours, they think that they will have to give up some of the trappings of our advanced capitalist society, things that they enjoy, like their smartphones and their televisions.

That might be true to some extent, depending on the degree of work reduction we're talking about. But reducing work time can also reduce the cost of living, because it gives us time to do things that we would otherwise have to pay someone else to do, and it reduces costs like commuting that we have to pay just in order to work. And beyond that, our current society is filled with work that doesn't add anything to human flourishing and exists only to enrich someone else's bottom line—things like the collection of student loans (which would not exist if education were free) and many big-bank positions that facilitate dangerous and destabilizing speculation.

In any case, if we were to decide to make work reduction a social priority, we could gradually reduce hours in line with increases in productivity, so that people could gradually work less and less, while enjoying the same standard of living. And while some might prefer to keep working more in order to accumulate more and more stuff, probably many others would not. Even if we can never reach the pure post-work utopia, we can certainly move closer to it. Decreasing the work week from forty hours to thirty would move us in that direction. So would something like a universal basic income, which guarantees a minimum payment to every

citizen regardless of work or any of the other strings that are attached to traditional welfare plans.

TECHNOPHILIA AS A TECHNOLOGY OF DISTRACTION

Even supposing that, in the long run, the political questions and possibilities raised by automation are real, a good argument can be made that we face more significant short-term challenges. As noted above, productivity growth, which gives an indication of the number of workers actually needed to run the economy, has in fact been quite weak in recent years. Moreover, the lack of job growth after recent economic recessions can plausibly be attributed not to robots, but to failures of government policy.

That's because in the short run, the lack of jobs can be attributed not to automation, but to a lack of what is known, in the economists' jargon, as aggregate demand. In other words, the reason employers don't hire more workers is because there aren't enough people buying their products, and the reason people aren't buying their products is because they don't have enough money—either because they don't have jobs or because their wages are too low.

The solution to this situation, according to traditional Keynesian economic theories, is for the government to increase demand by a combination of monetary policy (lowering interest rates), fiscal policy (government investment in job creation, for instance through building infrastructure), and regulation (such as a higher minimum wage). And while governments did lower interest rates after the Great Recession, they did not do so in combination with

sufficient investment in job creation, leading to a “jobless recovery” in which output—that is, the quantity of goods and services produced—slowly began to grow again, but employment did not return to its prerecession levels.

I do not disagree that the traditional Keynesian remedies remain important and necessary, as far as they go. And I share the worry that, in some cases, the specter of the robot future is used by the political center and right to distract attention from the short-term problems of the unemployed, in order to make it seem as though mass unemployment and underemployment are simply inevitable.

But I still think it’s worth talking about what a more highly automated future could mean for all of us. That’s partly because, contrary to the skeptics, I do think that the possibility for further labor-saving technology is being rapidly developed, even if it isn’t yet finding its way into the economy in a way that’s reflected in the productivity statistics. And it’s also because even if the short-term obstacle of austerity economics and insufficient government stimulus is overcome, we still face the political question that we have faced ever since the industrial revolution: *will new technologies of production lead to greater free time for all, or will we remain locked into a cycle in which productivity gains only benefit the few, while the rest of us work longer than ever?*

The Specter of Climate Crisis

Thus far, I’ve discussed only one of the challenges that I cited at the outset, the threat posed by technology that displaces workers. But the second, the ecological crisis, is at least as significant for the future of capitalism and of the human race. The scientific consensus about climate change is clear. Human carbon emissions are warming the atmosphere, leading to hotter temperatures, extreme weather, and shortages of water and other essential resources. Differences of opinion chiefly concern how serious the effects will be, how disruptive they will be to human civilization, and how (or whether) it will be possible to adjust to those disruptions.

Many readers will no doubt be thinking that this does not exhaust the limits of debate, for there are also those who deny the existence of human-caused climate change entirely. These people certainly exist, and they are backed by very deep-pocketed corporate interests and have prominent advocates within major political parties. But it would be a mistake to take these people as proponents of a serious scientific debate. The small fringe of writers and scientists who promote denialist theories may or may not be sincere in their claims to pursue truth, but their funders must be regarded as cynics, whose actions promote a different agenda.

For as we will see in a later chapter, the key question surrounding climate change is not whether climate change is occurring, but rather who will survive the change. Even in

the worst-case scenarios, scientists are not arguing that the Earth will become totally uninhabitable. What will happen—and is happening—is that struggles over space and resources will intensify as habitats degrade. In this context—and particularly in concert with the technological trends discussed above—it may be possible for a small elite to continue to pollute the planet, protecting their own comfort while condemning most of the world's population to misery. It is that agenda, not any serious engagement with climate science, that drives corporate titans in the direction of denialism.

Not all capitalists are committed to denialism, however. Some who acknowledge the magnitude of climate change nevertheless insist that we can trust the workings of the free market to deliver solutions. But while this is not in fact totally absurd, it is highly misleading. For the enlightened eco-capitalists turn out to not really be so different from the troglodyte denialists.

Entrepreneurs, we are assured, will find new green technologies that will move us away from fossil fuel dependence without government intervention. But in many cases, these innovations involve high-tech green solutions that are only accessible to the rich. At the same time, truly global solutions are rejected, even when, as in the case of taxing carbon, they are ostensibly “market” solutions. The initiatives that excite the eco-capitalists are, instead, fanciful projects of “geoengineering” that attempt to manipulate the climate, despite the uncertain efficacy and unknown side effects of such procedures. As with the Koch brothers and their denialist ilk, the eco-capitalists are concerned primarily with preserving the

prerogatives and lifestyles of the elite, even if they put a more environmentalist veneer on this agenda. We will return to all of this in Chapter 4.

I turn now to the specific purpose of this book.

Politics in Command

Why, the reader might ask, is it even necessary to write another book about automation and the postwork future? The topic has become an entire subgenre in recent years; Brynjolfsson and McAfee are just one example. Others include Ford's *Rise of the Robots* and articles from the *Atlantic's* Derek Thompson, *Slate's* Farhad Manjoo, and *Mother Jones's* Kevin Drum.²⁰ Each insists that technology is rapidly making work obsolete, but they flail vainly at an answer to the problem of making sure that technology leads to shared prosperity rather than increasing inequality. At best, like Brynjolfsson and McAfee, they fall back on familiar liberal bromides: entrepreneurship and education will allow us all to thrive even if all of our current work is automated away.

The one thing missing from all these accounts, the thing I want to inject into this debate, is *politics*, and specifically *class struggle*. As Mike Konczal of the Roosevelt Institute has pointed out, these projections of a postwork future tend

²⁰ Ford, *Rise of the Robots*; Derek Thompson, “A World Without Work,” *Atlantic*, July/August 2015; Farhad Manjoo, “Will Robots Steal Your Job?,” *Slate.com*, September 26, 2011; Drum, “Welcome Robot Overlords.”

toward a hazy technocratic utopianism, a “forward projection of the Keynesian-Fordism of the past,” in which “prosperity leads to redistribution leads to leisure and public goods.”²¹ Thus, while the transition may be difficult in places, we should ultimately be content with accelerating technological development and reassure ourselves that all will be for the best in the best of all possible worlds.

This outlook ignores the central defining features of the society we currently live in: capitalist class and property relations. Who benefits from automation, and who loses, is ultimately a consequence not of the robots themselves, but of who owns them. Hence it is impossible to understand the unfolding of the ecological crisis and developments in automation without understanding a third crisis through which both are mediated, the crisis of the capitalist economy. For neither climate change nor automation can be understood as problems (or solutions) in and of themselves. What is so dangerous, rather, is the way they manifest themselves in an economy dedicated to maximizing profits and growth, and in which money and power are held in the hands of a tiny elite.

The growing inequality of wealth and income in the world has become an increasing focus of attention from activists, politicians, and pundits. Occupy Wall Street struck a chord with the slogan “we are the 99 percent,” drawing attention to the fact that almost all the gains from economic growth in

²¹ Mike Konczal, “The Hard Work of Taking Apart Post-Work Fantasy,” NextNewDeal.net, 2015.

recent decades have accrued to 1 percent or less of the population. Economist Thomas Piketty scored an improbable best seller with *Capital in the Twenty-First Century*, a massive treatise about the history of wealth and the prospect of an increasingly unequal world.²²

The two crises I’ve described are fundamentally about inequality as well. They are about the distribution of scarcity and abundance, about who will pay the costs of ecological damage and who will enjoy the benefits of a highly productive, automated economy. There are ways to reckon with the human impact on the Earth’s climate, and there are ways to ensure that automation brings material prosperity for all rather than impoverishment and desperation for most. But those possible futures will require a very different kind of economic system than the one that became globally dominant by the late twentieth century.

Four Futures

In his three-hour meditation on the representation of Los Angeles in movies, *Los Angeles Plays Itself*, film scholar Thom Andersen suggests that “if we can appreciate documentaries for their dramatic qualities, perhaps we can appreciate fiction films for their documentary revelations.”²³ This book tries to incorporate that insight.

²² Thomas Piketty, *Capital in the Twenty-First Century*, trans. Arthur Goldhammer, Cambridge, MA: Harvard University Press, 2014.

²³ Thom Andersen, *Los Angeles Plays Itself*, Thom Andersen Productions, 2003.

This is not quite a normal work of nonfiction, but it also is not fiction, nor would I put myself in the genre of “futurism.” Rather, it is an attempt to use the tools of social science in combination with those of speculative fiction to explore the space of possibilities in which our future political conflicts will play out. Call it a type of “social science fiction.”

One way of differentiating social science from science fiction is that the first is about describing the world that is, while the second speculates about a world that might be. But really, both are a mixture of imagination and empirical investigation, put together in different ways. Both attempt to understand empirical facts and lived experience as something that is shaped by abstract—and not directly perceptible—structural forces.

Certain types of speculative fiction are more attuned than others to the particularities of social structure and political economy. In *Star Wars*, you don’t really care about the details of the galactic political economy. And when the author tries to flesh them out, as George Lucas did in his widely derided *Star Wars* prequel movies, it only gums up the story. In a world like *Star Trek*, on the other hand, these details actually matter. Even though *Star Wars* and *Star Trek* might superficially look like similar tales of space travel and swashbuckling, they are fundamentally different types of fiction. The former exists only for its characters and its mythic narrative, while the latter wants to root its characters in a richly and logically structured social world.

This is related to, but transcends, a distinction that is customarily made among science fiction fans, between “hard”

and “soft” science fiction. The former is supposed to be more plausible by way of its grounding in present-day science. But this distinction reflects the biases of the genre’s traditional fan base and its fetishization of the natural sciences. The more important distinction, as just mentioned, is between the stories that take their world-building seriously, and those that don’t. What is called soft science fiction is sometimes just *Star Wars*-style adventure stories, but sometimes it makes much richer use of social science. Meanwhile many of the supposedly “harder” counterparts pair detailed exegeses of physics with naïve or utterly conventional understandings of social relations and human behavior. Ken MacLeod’s *Fall Revolution* novels, which tell a tale of political upheaval and space colonization, are rooted in his understanding of Marxist political economy and his personal background in the Scottish socialist movement of the 1970s. It is that grounding, rather than any particular insight into the physics of space travel or Martian terraforming, that gives the novels their “hardness.”

Speculative fiction as a tool of social analysis and critique goes back at least as far as H. G. Wells’s *The Time Machine*—if not Mary Shelley’s *Frankenstein*—but the field has grown particularly rich of late. In popular culture, this can be seen even in the enormous success of dystopian young adult fictions like *The Hunger Games* and *Divergent*. But while such stories are fairly transparent allegories of the class society we already live in, it is not hard to find others who have pushed the boundary further, speculating about the long-term implications of present-day trends.

The interface between the actual and the potential manifests itself most potently in the near-future fictions of those authors who place their stories just a few steps ahead of the present, like William Gibson in his early twenty-first-century series of novels (*Pattern Recognition*, *Spook Country*, *Zero History*) or Cory Doctorow in *Homeland* (and the forthcoming *Walkaway*). The significance of information technology, automation, surveillance, ecological destruction—themes that will echo throughout this book—recur in these novels.

The political implications of different imagined worlds have also begun to come to the fore. Charles Stross is both an author of social science fiction and a frequent blogger in a more social scientific mode. He has particularly criticized the popular “steampunk” subgenre. He notes that it presents a kind of idealized nineteenth century full of zeppelins and steam-powered gadgetry but glosses over the key social relations of that era: the Dickensian misery of the working class and the horrors of colonialism. But Stross, and others like Ken MacLeod and China Miéville, have used fictions about future, past, and alternative worlds to give a fuller picture of class and social conflict.

Fictional futures are, in my view, preferable to those works of “futurism” that attempt to directly predict the future, obscuring its inherent uncertainty and contingency and thereby stultifying the reader. Within the areas discussed in this book, a paradigmatic futurist would be someone like Ray Kurzweil, who confidently predicts that by 2049, computers will have achieved humanlike intelligence, with all manner of

world-changing consequences.²⁴ Such prognostications generally end up unconvincing as prophecy and unsatisfying as fiction. (Science fiction is to futurism what social theory is to conspiracy theory: an altogether richer, more honest, and more humble enterprise.) Or to put it another way, it is always more interesting to read an account that derives the general from the particular (social theory) or the particular from the general (science fiction), rather than attempting to go from the general to the general (futurism) or the particular to the particular (conspiracism).

Rosa Luxemburg, the great early twentieth-century socialist theorist and organizer, popularized a slogan: “Bourgeois society stands at the crossroads, either transition to socialism or regression into barbarism.”²⁵ That’s truer today than it has ever been. In this book, I will suggest not two but four possible outcomes—two socialisms and two barbarisms, if you will. The four chapters that follow can be thought of as what the sociologist Max Weber called “ideal types”: simplified, pure models of how society can be organized, designed to illuminate a few key issues that confront us today and will confront us in the future—part social science, part science fiction. Real life, of course, is always much more complicated, but the point of an ideal type is to focus on specific issues, setting others aside.

24 Ray Kurzweil, *The Singularity Is Near: When Humans Transcend Biology*, New York: Penguin, 2005.

25 Rosa Luxemburg, *The Junius Pamphlet: The Crisis in the German Social Democracy*, Marxists.org, 1915.

The aim is to develop an understanding of our present moment and map the possible futures that lie ahead in stylized form. The basic assumption is that the trend toward increasing automation will continue in all domains of the economy. Moreover, I will not make the assumption that was made by most economists in the twentieth century: that even as some jobs are eliminated by mechanization, the market will automatically generate more than enough new jobs to make up for the loss.

In the spirit of working in ideal types, I will make the strongest assumption possible: *all* need for human labor in the production process can be eliminated, and it is possible to live a life of pure leisure while machines do all the work. In fact, this isn't logically possible, if we're imagining a world where the machines serve us rather than controlling us like those in the movie *The Matrix*. We will have to do at least a little work to manage and maintain the machines.

But I assume all human labor away to avoid entangling myself in a debate that has bedeviled the Left ever since the Industrial Revolution: how a postcapitalist society would manage labor and production, in the absence of capitalist bosses with control over the means of production. This is an important (and ongoing) debate, but the issues I'm concerned with will be clearer if I can set it aside. Thus, the constant in my equation is that technical change tends toward perfect automation.

If automation is the constant, ecological crisis and class power are the variables. The ecological question is, more or

less, just how bad the effects of climate change and resource depletion will end up being. In the best case scenario, the shift to renewable energy will combine with new methods of ameliorating and reversing climate change, and it will in fact be possible to use all our robot technology to provide a high standard of living for everyone. The spectrum, in other words, runs from scarcity to abundance.

The question of class power comes down to how we end up tackling the massive inequality of wealth, income, and political power in the world today. To the extent that the rich are able to maintain their power, we will live in a world where they enjoy the benefits of automated production, while the rest of us pay the costs of ecological destruction—if we can survive at all. To the extent that we can move toward a world of greater equality, then the future will be characterized by some combination of shared sacrifice and shared prosperity, depending on where we are on the other, ecological dimension.

So the model posits that we can end up in a world of either scarcity or abundance, alongside either hierarchy or equality. This makes for four possible combinations, which can be set up as a two-by-two grid.

	Abundance	Scarcity
Equality	communism	socialism
Hierarchy	rentism	exterminism

Exercises like this aren't unprecedented. A similar typology can be found in a 1999 article by Robert Costanza in *The*

Futurist.²⁶ There are four scenarios: *Star Trek*, Big Government, *Ecotopia*, and *Mad Max*. For Costanza, however, the two axes are “world view and policies” and “the real state of the world.” Thus the four boxes are filled in according to whether human ideological predilections match reality: in the “Big Government” scenario, for example, progress is restrained by safety standards because the “technological skeptics” deny the reality of unlimited resources.

My contribution to this debate is to emphasize the significance of *capitalism* and *politics*. Both the possibility of ecological limits and the political constraints of a class society are, in this view, “material” constraints. And the interaction between them is what will determine our path forward.

The existence of capitalism as a system of class power, with a ruling elite that will try to preserve itself into any possible future, is therefore a central structuring theme of this book, a theme that I believe is absent from almost every other attempt to understand the trajectory of a highly automated postindustrial economy. Technological developments give a context for social transformations, but they never determine them directly; change is always mediated by the power struggles between organized masses of people. The question is who wins and who loses, and not, as technocratic authors like Costanza would have it, who has the “correct” view of the objective nature of the world.

²⁶ Robert Costanza, “Will It Be *Star Trek*, *Ecotopia*, Big Government, or *Mad Max*?” *The Futurist* 33: 2, 1999, p. 2.

So for me, sketching out multiple futures is an attempt to leave a place for the political and the contingent. My intention is not to claim that one future will automatically appear through the magical working out of technical and ecological factors that appear from outside. Instead, it is to insist that where we end up will be a result of political struggle. The intersection of science fiction and politics is these days often associated with the libertarian right and its deterministic techno-utopian fantasies; I hope to reclaim the long left-wing tradition of mixing imaginative speculation with political economy.

The starting point of the entire analysis is that capitalism *is going to end*, and that, as Luxemburg said, it is either “transition to socialism or regression into barbarism.”²⁷ So this thought experiment is an attempt to make sense of the socialisms we may reach if a resurgent Left is successful, and the barbarisms we may be consigned to if we fail.

This doesn’t mean engaging in the secular eschatology that sets a firm end date on capitalism—too many socialists and apocalyptic preachers have made that mistake. It’s too simplistic to think of discrete endings in any case; labels for social systems like “capitalism” and “socialism” are abstractions, and there is never a single moment when we can definitively say that one turns into the other. My view is closer to the sociologist Wolfgang Streeck:

The image I have of the end of capitalism—an end that I believe is already under way—is one of a social system in

²⁷ Luxemburg, *The Junius Pamphlet*.

chronic disrepair, for reasons of its own and regardless of the absence of a viable alternative. While we cannot know when and how exactly capitalism will disappear and what will succeed it, what matters is that no force is on hand that could be expected to reverse the three downward trends in economic growth, social equality and financial stability and end their mutual reinforcement.²⁸

The four chapters that follow are each dedicated to one of the four futures: communism, rentism, socialism, and exterminism. In addition to sketching out a plausible future, each of those four chapters emphasizes a key theme that is relevant to the world we live in now, that would assume special importance in that particular future.

The chapter on communism dwells on the way we construct meaning when life is not centered around wage labor and what kind of hierarchies and conflicts arise in a world no longer structured by the master narrative of capitalism. The depiction of rentism is largely a reflection on intellectual property and what happens when the private property form is applied to more and more of the immaterial patterns and concepts that guide our culture and economy. The story of socialism is a story about the climate crisis and our need to adapt to it, but also about the way in which some old leftist shibboleths about Nature and the Market impede us from seeing how neither the fetishization of the natural world

²⁸ Wolfgang Streeck, "How Will Capitalism End?" *New Left Review* 2: 87, 2014, p. 47.

nor the hatred of the market is necessarily sufficient, or even relevant, to the attempt to construct an ecologically stable world beyond capitalism. Finally, the tale of exterminism is the story of the militarization of the world, a phenomenon that encompasses everything from endless war in the Middle East to black teenagers being shot down by police on the streets of American cities.

We are already moving rapidly away from industrial capitalism as we understood it in the twentieth century, and there is little chance that we will move back in that direction. We are moving away into an uncertain future. I hope to provide a broad context for that future, but I do not want to create any sense of certainty. I follow David Brin, who has both written science fiction and gone by the "futurist" label, when he says that he is "much more interested in exploring possibilities than likelihoods, because a great many more things might happen than actually do."²⁹

⟨The importance of assessing possibility rather than likelihood is that it puts our collective action at the center, while making confident predictions only encourages passivity.⟩ In the same essay, Brin cites George Orwell's *1984* as a "self-preventing prophecy" that helped prevent the scenario it described from coming true. In the wake of the War on Terror and former National Security Agency (NSA) analyst Edward Snowden's disclosures about NSA surveillance, one

²⁹ David Brin, "The Self-Preventing Prophecy: Or How a Dose of Nightmare Can Help Tame Tomorrow's Perils," in Abbott Gleason, Jack Goldsmith, and Martha C. Nussbaum, eds., *On Nineteen Eighty-Four: Orwell and Our Future*, Princeton, NJ: Princeton University Press, 2010, p. 222.

can question just how self-preventing that particular prophecy was, but the general point stands.

If this book contributes in some small way to making the oppressive futures described self-preventing, and their egalitarian alternatives self-fulfilling, then it will have served its purpose.

1

COMMUNISM: EQUALITY AND ABUNDANCE

Kurt Vonnegut's first novel, *Player Piano*, describes a society that seems, on the surface, like a postlabor utopia, where machines have liberated humans from toil. For Vonnegut, however, this isn't a utopia at all. He describes a future where production is almost entirely carried out by machines, overseen by a small technocratic elite. Everyone else is essentially superfluous from an economic perspective, but the society is rich enough to provide a comfortable life for all of them.

Vonnegut refers to this condition as a "second childhood" at one point, and he views it not as an achievement but as a horror. For him, and for the main protagonists in the novel, the main danger of an automated society is that it deprives life of all meaning and dignity. If most people are not engaged directly in producing the necessities of life, he seems to think, they will inevitably fall into torpor and despair.

There are certain ways in which the 1952 novel clearly dates itself. For one thing, this was the era of high industrialism in both the capitalist and communist worlds, based on the