

2. Sharing, Collaboration, and the Commons in the Fourth Industrial Revolution

The Appropriative Techniques of Technoliberal Capitalism

Public Library: Memory of the World is an online archive of digitized books curated by countless anonymous “librarians.” The project is collectively organized by hacktivists including Marcell Mars and scholar activists including historian Tomislav Medek. Librarians are contributors who generate free and publicly available digital files of books through their labor of creating, compiling, and cataloguing electronic files of scanned books deemed important for public access by each anonymous individual. Mars describes the process of selection as based on the interest and political commitments of people who volunteer to contribute their labor to the project, rather than on any overarching idea of what texts are most important for public knowledge.¹ Organizers offer workshops and online guides for how to become a librarian and enter books into the online archive through digital scanning, and to aid this process, they have established scanner access in several European cities.²

The vision of *Public Library* is that the world’s documentary heritage belongs to all and should be preserved and protected for everyone’s access. In the menu banner on its home page, the project runs a live log of cata-

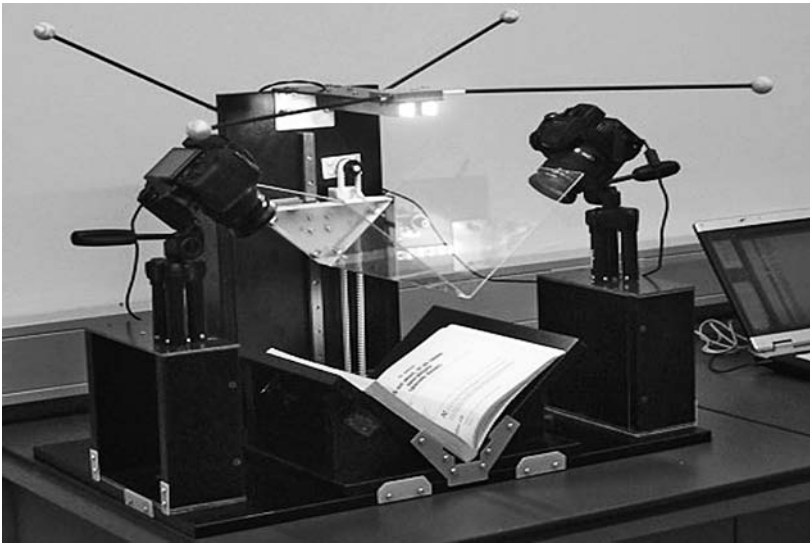


Figure 2.1. “Our Beloved Bookscanner.”

logged books, which totaled 109,734 on October 31, 2017.³ Its catalogue is organized by country/language,⁴ and chronologically by date of upload.⁵ One of the mottos of the project is, “When everyone is librarian, library is everywhere.”

Public Library creates librarians and its digital library by installing scanners for digitizing books in publicly accessible locations. It has set up scanning stations like the one pictured here (figure 2.1) in Ljubljana, Zagreb, Belgrade, Berlin, London, and Calafou. The website overview points out that most personal and corporate copiers are also scanners, and with the scanning and uploading software and contribution guides provided on the website (found under headers “workflow” and “tools”), the website promises that “you can learn to be a librarian too. A good one.”

In one of the rotating concept notes that run as a banner on the project’s home page, the public library is politicized as a historical goal connected to emancipatory revolution, empowering the oppressed by providing the means for them to “reach their dreams.” Citing US librarian and educator Melvin Dewey’s dream of free schools and public libraries for all, this concept note by Tomislav Medak describes the collective behind *Public Library* as artists and hacktivists and “potentially everyone else” who can make this dream a reality. Of course, discourses of collecting resources for the

good of universal humanity have been heavily critiqued by feminists and by postcolonial and critical race scholars, particularly in the arenas demanding repatriations of European colonial museum acquisitions⁶ and native remains.⁷ Though the project does not align itself publicly with freedom of information movements, it is also compatible with those politics, and therefore is in conversation with critiques of the fetishization of the digital. These concerns must be part of any discussion of common wealth and common good.

The *Public Library* project offers an imaginary of collaboration and sharing that evokes, yet does not adhere to, older socialist imaginaries of the commons and communal good. It provides an example of the proliferation of discourses, hopes, and fears tied to emergent technologies and technological platforms that call for an engagement with how, as Langdon Winner puts it, technologies are “ways of building the world.”⁸ *Public Library* takes up a long tradition in Western thought of imagining the commonwealth as the antithesis of private property, since at least the early writings of Karl Marx and Friedrich Engels, and therefore as the stronghold of emancipation from capitalist exploitation and appropriation of resources and living labor.

We begin this chapter with the *Public Library* project as a way of introducing how collaboration and sharing through technological platforms can be positioned as part of a progressive politics. Collaboration and sharing, in this sense, are politicized. Meanwhile, these very concepts (collaboration, sharing, and the commons) have undergone a radical decontextualization as they have risen to prominence as descriptors of what makes the technological innovations of the fourth industrial revolution socially and economically revolutionary. Technoliberalism appropriates collaboration, sharing, and the commons to announce capital’s unprecedented liberatory potential, while divesting the concepts it uses from an anticapitalist politics and ethos.

In 2015, the *Oxford English Dictionary* introduced “sharing economy” as a term it would now include.⁹ The sharing economy is a socioeconomic system built around the sharing of human, physical, and intellectual resources, especially those that individuals may see themselves as possessing and underutilizing (Airbnb, where people rent out unused rooms to travelers, is one well-known example). The sharing economy thus includes collaborative creation, production, distribution, trade, and consumption

of goods and services by different people and organizations.¹⁰ The sharing economy is framed as being built on “distributed power and trust within communities [of users] as opposed to centralized institutions,” blurring the lines between producer and consumer.¹¹ Based on the name alone, the much-touted sharing economy, enabled by digital connectivity and wide distribution of the means of production, sounds like it approaches a socialist ideal of “the commons,” land or shared resources belonging to a whole community that provide life necessities. Yet, although the sharing economy is sometimes also referred to as the “collaborative economy” because of initiatives based on horizontal networks and the participation of a community, “community” is defined tautologically as simply the whole of those who participate as users. The field of robotics has also taken up re-branding itself. The emergence on the market of collaborative robots has been touted as revolutionizing older, industrial robotics.

In this chapter, we critique technoliberal imaginaries of the so-called creative disruptions to capitalism, which propose that technology will bring about the end of capitalism as we know it through the creation of collaborative robots and a collaborative commons built on the inter-networking of things and people in the sharing economy. We contend that unlike Marxist feminists, who have theorized the rise of capitalist wealth accumulation as dependent on the unpaid labor of racialized and gendered populations, technoliberal appropriation of collaboration, sharing, and the commons reproduces the erasure of racialized and gendered work in their postcapitalist techno-utopias. Within technoliberalism, the commons, once the staging ground and goal of potential socialist proletarian revolution, is evacuated of political content. Sharing becomes an anonymized market transaction that can sidestep the social and what Marx called “species life,” a material and ontological underpinning to the commons that gave it a teleologically revolutionary potential. Put otherwise, our critique of the “sharing” in the sharing economy, as our critique of the “collaborative” in collaborative robotics, draws attention to the ways in which the architecture of postindustrial surrogate humanity works through the elision of the racial and gendered dimensions of capitalist development in its production of the fully human. This chapter thus investigates the ways in which socialist concepts of collaboration, sharing, and the commons have been appropriated within technoliberalism for purposes of accumulation and expropriation, even as technoliberalism claims

freedom and equality as its express end goal. In contradistinction to the recently popularized discourses of the sharing economy, and to a lesser extent collaborative robotics, imaginaries of technology, sharing, and collaboration from Marx and Engels's *Communist Manifesto* to Haraway's *A Cyborg Manifesto* offer their political motivations as being at the heart of their uses of technology as "decolonizing" and "liberating." At the same time, as feminists and critical race thinkers have pointed out, even these imaginaries risk refusing difference in the name of a universal (humanist) revolutionary call.

The chapter begins with an overview and analysis of how economists, entrepreneurs, and the media have framed the Internet of Things and the sharing economy as a new commons that can liberate human beings from having to perform work considered miserable or degrading. We then connect this context to the emergence of a new category of industrial technologies called "collaborative robots," extending our critique of the imaginary of collaboration in robotics from our critique of how sharing and the commons have been materialized by proponents of the sharing economy. The chapter then moves to a discussion of how racialized and gendered discourses concerning outsourcing in the 1980s and 1990s connect to how categories of race and gender are embedded and embodied (even in their erasures) in the emergence of smart, collaborative robots and the sharing economy. We juxtapose our analysis of how technoliberalism's appropriative techniques uphold the surrogate effect of technology with a dissenting imaginary of the relationship between technology and the commons, and we assess how a project like GynePunk's 3D-printed speculum raises the question of what a collaborative technology that continues a tradition of emancipatory politics and that increases access to knowledge and resources against privatization and property might look like. Rethinking scholarship on technology, liberation, and the commons from Marx and Engels through Haraway, we think through the GynePunk project to reengage a multiplicity of socialist imaginaries against the seeming monolith of technoliberalism's appropriative techniques. We return, as we began, to *Public Library*, in order to dwell with alternative imaginaries of use that don't have to do with the propagation of capitalist production, and what radical collaborations and collaborative commons are possible outside the technoliberal imaginary.

Technoliberal Capitalism and the Fourth Industrial Revolution

A 2015 report released by Bank of America claimed that the three main “ecosystems” of “creative disruption” in the global economy are the Internet of Things, in which ordinary objects such as thermostats have network connectivity that enables them to send and receive data; the sharing economy; and online services.¹² These ecosystems, along with what Bank of America termed a revolution in robotics—the prediction that by 2025, 45 percent of all manufacturing jobs will be done by robots—will, according to the report, profoundly change “how we work and live.”¹³ A second report issued by the Bank of America further estimates that

The robots and AI solutions market will grow to US\$153bn by 2020, comprising US\$83bn for robot and robotics, and US\$70bn for AI-based analytics. . . . Adoption of robots and AI could boost productivity by 30% in many industries, while cutting manufacturing labour costs by 18–33%. We are facing a paradigm shift which will change the way we live and work. We anticipate the greatest potential challenges, . . . notably the possible displacement of human labour (with 47% of US jobs having the potential to be automated) and growth in inequality (with a 10% supply and demand gap between skilled and non-skilled workers by 2020).¹⁴

The “robot revolution” and the sharing economy, based on the internet-working of objects and people that this Bank of America report highlights, are both a part of what the World Economic Forum has termed the Fourth Industrial Revolution and what scholars Erik Brynjolfsson and Andrew McAfee have termed “the Second Machine Age.”

According to Klaus Schwab, founder of the World Economic Forum, “The First Industrial Revolution used water and steam power to mechanize production. The Second used electric power to create mass production. The Third used electronics and information technology to automate production. Now a Fourth Industrial Revolution is building on the Third, the digital revolution that has been occurring since the middle of the last century. It is characterized by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres.”¹⁵ Similarly, for Brynjolfsson and McAfee, the industrial revolution can be thought of as the first machine age, while the second machine age, driven by Moore’s

law (Gordon Moore's 1965 prediction that "computing would dramatically increase in power, and decrease in relative cost, at an exponential pace"), is about the automation of cognition evident in innovations such as Google's autonomous cars and IBM's Watson computer, which can beat the best human *Jeopardy!* players.¹⁶ Unlike the World Economic Forum, which is hopeful about the human benefits of the fourth industrial revolution, however, Brynjolfsson and McAfee, along with the Bank of America report, caution that as machines replace humans in various spheres of life and labor, there will be increased inequality—something that is already visible in the economies of the US and Western Europe. At the same time, they remain hopeful about programs that could retrain humans toward different potential roles.

The coming together of techno-utopic and more cautious approaches to the economic paradigm shift brought about by technological infrastructures is elucidated in the compendium of short essays on technology and the future of work put together by *Pacific Standard* in 2015. This project assembled speculations on the topic from industry leaders, technologists, social scientists, and journalists. One focus in these debates was the contest between technologies designed to enhance what humans already do and technologies designed to replace humans. In spite of differences, both sides tether techno-futurity to the surrogate human effect of emergent technologies and digital platforms. John Markoff (science writer for the *New York Times*) describes two primary arguments about the effect of technology on labor: (1) AI and robotics are developing so rapidly that virtually all human labor will be replaceable within three decades (represented for him by Moshe Vardé at Rice University); and (2) robotics will lead to new jobs and create immense economic activity (represented by the International Federation of Robotics). In both perspectives, human futures are linked to capitalist-driven technological developments focused on questions of productivity and efficiency.

The two philosophies of how to engineer human-robot and human-AI relations in the realm of labor presented by Markoff date back to 1964 and the beginning of interactive computing at Stanford.¹⁷ John McCarthy, who coined the phrase "artificial intelligence," believed he could begin designing an AI that could replicate human capabilities in a single decade. In contrast, Douglas Engelbert set up a lab with the goal of developing technologies that would "augment," or extend, rather than replace, human capabilities.¹⁸ These evolved into two opposing camps that worked largely in

isolation: artificial intelligence research and human–computer interaction design research. Boston Dynamics, the MIT Media Lab–derived US military robotics contractor, is the preeminent example of the AI group. Tom Gruber, an Apple engineer who designed Siri speech recognition, has worked to prototype the other. The competition between two models of a future dominated by machines that Markoff sets up brings attention to the way they will materialize existing implicit and explicit social values: “Will a world watched over by what the 1960s poet Richard Brautigan described as ‘machines of loving grace’ be a free world? The best way to answer questions about the shape of a world full of smart machines is by understanding the values of those who are actually building these systems.”¹⁹ In short, engineers and designers will build values into the hardware and software constituting the infrastructure that organizes human–machine interaction.

Because they are sutured to capitalist demands for faster production to generate more profit, present-day techno-futurities, while claiming to be about technologies that are distinct from the modes of automation in the early and mid-twentieth century we addressed in chapter 1, continue to be haunted by the specter of the obsolescence of the human worker. Thus, a number of scholars and thinkers still fear that this second machine age will drastically reduce the number of available jobs, leading to more and more people without employment. Computer scientist and leader in artificial intelligence development Nils J. Nillson sums up these concerns in his assertion that automation will put wealth in the hands of a small number of “super-managers” worldwide, while leaving the masses jobless and impoverished.²⁰ The question of what will happen to the vast numbers of unemployed people seems to be up for all sorts of dystopic conjecture: working more and more for less and less, perhaps winning more leisure time (but will people start hobbies or will they just do drugs and other socially destructive things? asks Nillson). While Nillson positions techno-dispossession as a thing of the future, it is not difficult to find real-time models for economies that cannot employ their own citizens. Most of the formerly colonized world contends with this problem in different ways because of international lending (Third World debt) and the ongoing struggle to regain self-sufficiency in restructuring infrastructures designed to evacuate resources. A small number of people will gain wealth, as in India and China, but the vast majority will lose quality of life, lose land, and lose employment. There will be massive migration to centers of wealth, and

modes of life and self-sustenance will be further destroyed, then rebuilt and managed for the gain of others, elsewhere.

For example, in the issue of *Pacific Standard* on this topic, contributors suggest that one solution to the coming robotics-induced obsolescence of human workers is to institute a universal basic income. As robots take our jobs, the argument goes, the additional wealth created will be enough that the growing number of unnecessary human workers can be supported. Even some longtime labor activists, most prominently Andy Stern, the former president of the largest and one of the most influential unions in the US, the Service Employees International Union (SEIU), which represents 1.5 million public service workers, including nurses, care providers, and security workers, have capitulated to the idea that within the next two decades machines will replace over half of US jobs.²¹ According to Stern, as more tasks are automated and full-time jobs disappear, the role of collective bargaining will become marginalized and dues-paying union members will be fewer and farther between. Stern is a member of the steering committee of one of the foremost organizations pushing for a universal basic income (UBI), the Economic Security Project, which asserts that “In a time of immense wealth, no one should live in poverty, nor should the middle class be consigned to a future of permanent stagnation or anxiety. Automation, globalization, and financialization are changing the nature of work, and these shifts require us to rethink how to create economic opportunity for all.”²² To enable a new American Dream, argues Stern, we need to implement a UBI of at least \$12,000 a year so that no one falls into poverty. However, as union educator, activist, and scholar Heidi Hoechst points out, when all that remains of a labor movement is the fight for a UBI, the movement has capitulated to the neoliberal restructuring of the fabric of society.²³ With everyone receiving a minimum income, the last vestiges of social support, such as the costs of Medicare and welfare, will be transferred to the individual.

What will happen to workers with the increase of robotic automation in manufacturing is a question that news media and technoliberal elites are also rushing to answer.²⁴ Christopher Hughes, the cofounder of Facebook, is also the cofounder of the Economic Security Project. He argues that in a time when the US is more divided than at any other time since the Civil War, and in a time when faith in the opportunity for a good life in the US has waned, it is crucial to use cash in the form of a distributed universal basic income to harness technology for social justice. As he puts

it, “Median household incomes in the US haven’t budged in decades even though the price of healthcare, education, and housing have skyrocketed. The old idea that if you work hard and play by the rules, you can get ahead has disappeared. As a handful of people at the top have thrived, the rest of America—urban and rural, white people and people of color, old and young—has nearly uniformly been left behind.”²⁵ While Hughes acknowledges that historically the myth of opportunity has not applied to people of color in the US, in his formulation of an argument for UBI, precarity has become universal: “Americans of nearly all backgrounds now believe their kids are likely to fare worse than they have. Major forces like automation and globalization have changed the nature of jobs, making nearly half of them piecemeal, part-time, and contingent—Uber drivers, part-time workers, TaskRabbit workers abound.”²⁶ In the technoliberal formulation of UBI, which would allow everyone to, in Hughes’s words, “create a ladder of economic opportunity,” the regressiveness of UBI is justified because what used to be racialized precarity now affects all (including white people who were formerly securely in the middle class because of race privilege). It is thus an appropriation of both the racial histories of devalued labor and a socialist imaginary of distributed wealth. In fact, however, the most that is proposed as part of UBI is \$1,000 per month—hardly a subsistence wage in most parts of the United States.

Universal basic income is particularly interesting in thinking about how and why socialist ideals are redefined and appropriated as part of technoliberal reimaginings of the common social good. Hughes and others are aware that the increasing wealth disparity and the disproportionate number of young tech billionaires whose wealth accumulation has been unprecedented are unsustainable and unjust. Yet, in articulating a need for UBI, they also assert that technology is a kind of public good tied to US citizenship. In a 2017 article in *Wired* magazine, two examples are used to explain why UBI can work. The first is a survey of Alaskans who receive \$2,000 per person per year from the state’s oil revenues conducted by the Economic Security Project. In this example, the profit from oil, a public good, is distributed among residents of the state (thus membership in the state determines equal distribution). The second example is that of the Eastern Band of Cherokee Indians in North Carolina, who split 97 percent of casino profits. The model is slightly different from that of Alaska: “In 2016, every tribal member received roughly \$12,000. . . . All children in the community, have been accruing payments since the day they were

born. The tribe sets the money aside and invests it, so the children cash out a substantial nest egg when they are 18.²⁷ At the moment, this payout is around \$105,000. The article, rather than dwelling on the politics of land, dispossession, settler colonialism, and the politics of tribal casinos in the US, instead asserts that citizenship, rather than need, should be the basis for distributing UBI:

The idea is not exactly new—Thomas Paine proposed a form of basic income back in 1797—but in this country, aside from Social Security and Medicare, most government payouts are based on individual need rather than simply citizenship. Lately, however, tech leaders, including Facebook founders Mark Zuckerberg and Chris Hughes, Tesla’s Elon Musk, and Y Combinator president Sam Altman, have begun pushing the concept as a potential solution to the economic anxiety brought on by automation and globalization—anxiety the tech industry has played its own role in creating.²⁸

In the technoliberal imaginary of a just distribution of some of the tech wealth, then, settler citizenship both appropriates and erases the settler colonial violence upon which wealth accumulation is based in the US. Notions of distribution (and of tech as a US national resource) thus also further the project of US imperialism.

Colonizing the Commons

In spite of claims that we are entering a new social and economic moment that, enabled by technology, can finally fully free the human from drudgery of service work and repetitive tasks that can now be done by machines, the reliance on surrogates who perform devalued tasks to enable the freedom and autonomy of the liberal subject is one that dates back to imperial modernity and the very premises of capitalist developmentalism. The ways in which the socioeconomic scaffolding of empire enabled imaginaries of surplus or obsolete humanity to begin with is crucial for understanding the dystopic fears surrounding the surplus of modern man himself.²⁹ We might think of this as the longer historical context for Stephen Hawking’s publicly expressed fear that AI will be the end of the human species.³⁰ At the same time, techno-utopic predictions about the end of capitalism, the focus of this section, as well as less optimistic assessments of the second

machine age that fear a rising tide of unemployment as discussed above, displace humanity from the scene of degraded, racialized, and gendered work (enabled through technological development) in order to posit a moment of emancipation or species evolution.

Like universal basic income, the so-called sharing economy is an example of technoliberalism's postlabor imagination of common wealth, or a common social good, that is in fact a technoliberal appropriation of socialist ideals that further the capitalist expropriation of labor and life. For example, Jeremy Rifkin's popular book *The Zero Marginal Cost Society* argues that the internetworking of humans and things—physically and affectively—renders human labor obsolete but will in fact ultimately revolutionize life by freeing humans for more meaningful or creative pursuits. Rifkin is a US economic and social theorist who has written over twenty books since the 1970s on the environment, energy, the economy, and technology, and who has advised numerous world leaders in Europe. He is “the principal architect of the European Union's Third Industrial Revolution long term economic sustainability plan to address the triple challenge of the global economic crisis, energy security, and climate change.”³¹ It is from this stance that he builds on his prior interest in political-economic alternatives to posit that technological innovation can bring about a zero marginal cost society and an end to capitalism. This is Rifkin's formulation of a new collaborative commons—one based on human creativity and collaboration enabled by technological advancements and the infrastructures of the sharing economy.

The Internet of Things (IoT) is a social-technological infrastructure that is designed to largely bypass the need for human oversight and intervention, and yet manage the mundane and reproductive work of daily life. This seemingly neutral and mechanical technological infrastructure, composed of so-called smart objects that communicate with one another, organizes the temporal experience of work and the form of subjectivity through which one must engage that infrastructure. The IoT (see figure 2.2) has been touted by engineers and writers as the next economic paradigm shift, and Rifkin has been its biggest proponent, heralding it as bringing about human emancipation from work and the end of capitalism. In *The Zero Marginal Cost Society*, he writes, “If I had told you 25 years ago that, in a quarter century's time, one-third of the human race would be communicating with one another in huge global networks of hundreds of millions of people . . . and that the cost of doing so would be nearly free, you would

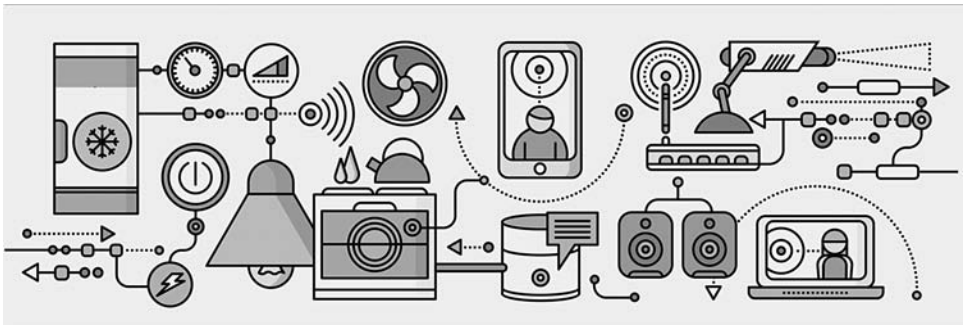


Figure 2.2. The Internet of Things as depicted by *Computer Weekly*.

have shaken your head in disbelief.”³² Rifkin takes the notion that free information and communication are harbingers of a large-scale revolution in which we move toward a “near zero marginal cost” society—one in which “nearly free goods and services” emerge through the optimization of productivity (that is, with the development of technologies such as 3D printing, because of which the “cost of producing an additional good or service is nearly zero”).³³ In this postcapitalist techno-utopia, with goods being free to produce, the very idea of property would become meaningless. Meanwhile, traditional areas of work, even that of repairing the machines that create goods and render services, would be done by the machines themselves.

Rifkin sees smart technologies as enabling the uncoupling of human productivity from employment, thus freeing humans for the “evolving social economy” embedded in a “Collaborative Commons” organized by social networks and open-source programming. “Big Data, advanced analytics, algorithms, Artificial Intelligence (AI), and robotics are replacing human labor across the manufacturing industries, service industries, and knowledge-and-entertainment sectors, leading to the very real prospect of liberating hundreds of millions of people from work in the market economy.”³⁴ Rifkin argues, in short, that the infrastructure revolution, marking a break from the first (eighteenth-century) and second (early-twentieth-century) industrial revolutions, emancipates human creativity from the drudgery of wage work.³⁵

Although this argument is ostensibly about technology as the condition of possibility for freeing human creativity, Rifkin glosses over the question of how economic, social, and human obsolescence has been figured through

a racial-imperial episteme. The replaceability of human labor through the surrogate effect of objects in the Internet of Things is contextualized by capitalist development in the Global North, in which the specter of unemployment is attached only to those populations not already marked for elimination or surplus. The Internet of Things thus effectively materializes assumptions of what constitutes a human, even as it excludes those who are not the intended subjects of a postlabor world. The celebration of the Internet of Things and “smart” infrastructures is connected to colonial spatial imaginaries that are the foundation of the sharing economy. We identify these technologies as part of an impetus to colonize the notion of the common in the name of proclaiming the end of capitalism. New technologies that purport to substitute smart objects for humans extend racial colonial logics into the imagined evacuation of the human entirely. As discussed in the introduction to this book, the condition of surplus being, or of the production of the obsolete, is always racialized even if, and precisely because, techno-revolutionary fantasies of the twenty-first century congeal around a dehistoricized imaginary of emancipation and free labor.³⁶

The gender component of this structuring contradiction—whereby the populations subjugated through racial and gendered differentiation are surplused, and their protest and struggle to preserve the commons or resources of common wealth are hidden in favor of a teleological narrative of capitalism’s historical development—is at the center of Silvia Federici’s *Caliban and the Witch*. This study, in the tradition of materialist, socialist, and Marxist feminisms, points to this structuring contradiction in its assessment of the end of the commons and the ascent of global capitalism. Federici argues that the privatization of common lands (the enclosure of the commons) necessitated the taking away of women’s autonomy over their bodies and the use of gender and class as a means to divide and conquer opposition to primitive accumulation.³⁷ She also connects the emergence of reproductive unpaid women’s work in Europe, which enabled the accumulation of wealth, to European expansion in the colonies. These substitute (or, we might say, surrogate) workforces were meant to replace the rebellious peasants opposing the enclosure of common lands and resources. Demonstrating that the commonplace assumption that modern capitalism defeated the tyranny of feudalism is a mythology that persists today, Federici argues instead that what was in fact defeated by capitalism and privatization were mass uprisings and opposition to the enclosure of the commons. The sixteenth- and seventeenth-century witch hunts in Europe,

she suggests, can therefore be read as attempts to quell what was the first women's movement for bodily autonomy.

Federici's argument is crucial for understanding how certain figures (like the witch) must be expunged from the history of modern capitalism so that, rather than being seen as figures of rebellion, they become the spectral figures of an unenlightened premodernity. As we argue here, the new collaborative commons, rather than being based on earlier socialist models of the commons, is instead built upon these very erasures that enabled the spread of global capitalism. This ethos of capitalist expansionism, enabled as it is by the division and capture of racialized and gendered labor, persists in the present-day techno-utopic vision of a new commons. We see this, for instance, in the way Rifkin distinguishes two categories or species of the human produced within the IoT: There are the makers, and there are those who are replaceable by self-replicating machines, such as 3D printers.

With regard to the former, Rifkin contends that the maker movement is nothing less than the early embodiment of the new human consciousness. He cites the creation of Fab Lab in 2005 at MIT, an outreach project that uses open-source software to allow anyone to create their own 3D printed objects, thus creating prosumers (producers and consumers).³⁸ The now seventy Fab Labs, though primarily located in the industrialized urban North, have also made their way to the Global South, where they enable simple tools and objects to be created in order to advance economic welfare.³⁹ Purportedly emanating from "world class universities and global companies," Rifkin calls this multisited space the "people's lab" as it has made its way to nonelite neighborhoods. In this frame, 3D printing is understood to be part of the new collaborative commons because of its potential to democratize the means of production. Equally important, Rifkin highlights that the cost of making thousands of products is no more than the cost of making just one. A dream machine, the 3D printer can even make its own parts, rendering it a "self-replicating" machine that costs next to nothing to repair and run.⁴⁰

Rifkin envisions more than just a trickle-down benefit of creativity from the urban Global North to the Global South, which can then use these innovations of the collaborative commons for economic uplift. He also understands technological self-replication and cheapness to lead to a reversal of outsourcing, which has been the hallmark of imperial and neoliberal economic practice, and which relies on surplus populations that it has

itself made surplus. Yet, as his thinking demonstrates, these populations must be rendered obsolete in order for the IoT economy to thrive. Rifkin writes, “manufacturers that have long relied on cheap labor in their Chinese production facilities are bringing production back home with advanced robotics that is cheaper and more efficient than their Chinese workforces. At Philips’s new electronic factory in the Netherlands, the 128 robot arms work at such a quick pace that they have to be put behind glass cases so that the handful of supervisors aren’t injured. Philips’s roboticized Dutch electronics factory produces the equivalent output of its Chinese production facility with one-tenth of the number of workers.”⁴¹

That one species of human (the exploitable labor force in former Second and Third Worlds) is being replaced in its function by technological innovation—by things (surrogate human technologies) in the IoT—replicates a sliding scale of humanity established through the development of capitalism in the colonies. In this sense, the use of robots as replacements for degraded workers confirms an already existing bias about what kind of workers can be replaced easily by machines that are more accurate and economical. Terry Gou, CEO of Foxconn, articulates the racialized condition of replaceability most explicitly. Gou, Rifkin relates, “joked that he would prefer one million robots [to his one million workers]. ‘As human beings are also animals, to manage one million animals gives me a headache.’” As Rifkin elaborates, “China, India, Mexico, and other emerging nations are learning quickly that the cheapest workers in the world are not as cheap, efficient, and productive as the information technology, robotics, and artificial intelligence that replace them.”⁴²

The “new human consciousness” of the collaborative commons that Rifkin predicts will emerge through the makers movement thus reasserts a human–thing hierarchy that is mapped onto well-worn racial–imperial paradigms.⁴³ Yet, despite techno-utopic projections, as we elaborate in chapter 3, human labor power continues to be an irreplaceable commodity, highlighting the growing unevenness between racialized, gendered, and ostensibly endlessly exploitable populations who labor in places like China, India, and Mexico. While it is worthwhile to point out how neatly Rifkin’s techno-utopia relies on imperial and neoimperial imaginaries of surplus labor (as surplus populations), it is equally important to note the need to replace the exact functions of such populations with technology. This is a racial logic of elimination in which the violence happens not through physical extermination. Rather, the violence of this fantasy occurs

through the desire to subsume the global racial other into the IoT's "things" by reducing the "cheapest" of labor subjects to their mere function within global capitalism.

Collaboration and the Robot Revolution

The Internet of Things and other techno-fantasies may be entangled with wishes to be freed from miserable labor, but even when they have a political intention like the end of capitalism, they reproduce a worldview in which technology is conceived and developed only to do what humans already do. Put otherwise, technologies that scaffold the fourth industrial revolution and second machine age are reproducing the ongoing contradictions and violence of capitalist expansion, imagining and generating only surrogate humans, rather than new social, political, and subjective forms yet to be. One recent development in robotics, to which we turn in this section, that attempts to resolve the anxieties about robots replacing humans (and of racialized outsourcing of cheap labor) is the emergent field of collaborative robotics. Collaborative robots are said to work alongside humans, rather than being designed to replace them. Yet "collaboration" as imagined in mainstream robotics rehearses the mind/body split, where the human can now be free to cultivate the soul (that is, creative potential) because it is liberated from unnecessary toil. Meanwhile, the robot does the devalued work of the body. When we examine the history of collaborative robot design, we see an insistence on affirming an appropriate level of difference in the form and function of varieties of labor performed by humans and machines. This is a level of difference that makes machines unthreatening because they maintain the primacy of the human. The problem of degrees of difference between human and machine (that is, the distance along a spectrum from the fully human to the unquestionably nonhuman) raises the critical question of what it is that a human does (and how the human is defined by the quality of their labor).

Maintaining a clear idea of human essence through an articulation of what is different between what humans and machines can and should do is a defining aspect of collaborative robots. As technologies that enact the surrogate human effect, collaborative robots take up the racial imaginary of labor without intelligence that is also at work behind the logics of colonization and outsourcing. Indeed, emergent technologies and platforms

propose a future free from degraded work through “robot collaboration,” yet the infrastructures of the collaborative human–machine economy retain the degraded categories of labor formerly done by racialized others. Hopes that the surrogate human effect of technology will free “humans” from degraded labor thus also necessitate platforms that must actively conceal the fact that other forms of “miserable” work are still being done by humans. The surrogate human as collaborator extracts miserable work out of populations marked for elimination or extinction (factory workers and the racialized low-wage laborer) even as it substitutes the partner and tool for the surrogate human. As Langdon Winner has written, a flexibility that inheres in technologies vanishes “once initial commitments are made” as to how these technologies will order human activity and influence work, consumption, communication, and everyday life.⁴⁴

Models of a postlabor technological revolution via smart objects and the sharing economy subsume “collaboration” and “sharing” in the name of a neoliberal interest in increased exploitation of “free” time. The collaborative parameters of collaborative robots, much like the sharing aspect of the sharing economy, seem to mark a complete shift from earlier socioeconomic models of labor exploitation, but in reality they demand an ever-increasing use of spare time and unpaid labor to be put back into the economy of things. For instance, in September 2015, the BBC ran an interactive quiz titled “Will a Robot Take Your Job?” Part of a longer series of articles, videos, and interactive content analyzing what the news outlet termed the “revolutionary” nature of AI and robotics in the twenty-first century, occupations ranging from actor to tax expert were classified by percentage of “risk” for human obsolescence. Selecting probation officer from the list, for instance, a user would find that this profession is quite unlikely to be replaced. In contrast, telephone salespeople, bookkeepers, and waiters/waitresses are categorized as almost certainly obsolete professions for humans.

What was the reasoning behind these classifications? According to the BBC, “Oxford University academics Michael Osborne and Carl Frey calculated how susceptible to automation each job is based on nine key skills required to perform it: social perceptiveness, negotiation, persuasion, assisting and caring for others, originality, fine arts, finger dexterity, manual dexterity and the need to work in a cramped work space.”⁴⁵ The study concluded that “roles requiring employees to think on their feet and come up with creative and original ideas, for example artists,

designers or engineers, hold a significant advantage in the face of automation. Additionally, occupations involving tasks that require a high degree of social intelligence and negotiating skills, like managerial positions, are considerably less at risk from machines according to the study.” In contrast, the study explains, “while certain sales jobs like telemarketers and bank clerks may involve interactive tasks they do not necessarily need a high degree of social intelligence, leaving them exposed to automation. As more advanced industrial robots gain improved senses and the ability to make more coordinated finger and hand movements to manipulate and assemble objects, they will be able to perform a wider range of increasingly complex manual tasks.”⁴⁶

Twenty-first-century reconfigurations of human-machine social relations continue to be haunted by specters of unemployment, echoing the historical crises surrounding technological development and instances of racialized outsourcing of forms of labor. At the same time, as with earlier racial discourses about unemployment, contemporary articulations propose that there is a fully human essence that can never be replicated by the nonhuman or not-quite-human. The BBC quiz, with its distinction between modes of labor that can be replicated by robots and those that cannot, recalls the racial panic brought about by outsourcing that began in the early 1990s. Outsourcing, as a technique of cheapening production and service labor, often moved operations to the same decolonizing labor populations in the Third World and Global South. The justification was that these laborers were most fit for reproducing the inventions of the centers of capital in the US and northwestern Europe.⁴⁷

For MIT roboticist Rodney Brooks and others, the key to allaying techno-dystopic anxieties of impending human obsolescence through robotics and outsourcing is to focus on developing robots that are different from but complementary to the function of the human worker. Brooks’s robots are not surrogate humans, but, as the replacement of miserable functions that were never human (the so-called dull, dirty, repetitive work), they enact a surrogate effect undergirding the fantasy of human freedom. As the engineering and functionality of collaborative robots makes clear, seemingly novel notions of human-machine collaboration can still perpetuate the human social relations of racial colonialism as new technologies inhabit a space of subservience. This is evidenced in their programmed responsiveness and receptiveness to others’ commands



Figure 2.3. The Baxter robot from Rethink Robotics.

and desires as workers. In 2012, Brooks, best known for his research on robotics and mobility, and commercially for his participation as a co-founder of iRobot (maker of the Roomba vacuum cleaner), introduced the world to Baxter (figure 2.3). Baxter, which is a product of Brooks's most recent for-profit venture, the firm Rethink Robotics, is billed as “the safe, flexible, affordable alternative to outsourced labor and fixed automation.”⁴⁸ Baxter is the best-known collaborative robot on the market to date. “A cobot or ‘collaborative robot’ is a robot designed to assist human beings as a guide or assistor in a specific task. A regular robot is designed to be programmed to work more or less autonomously.”⁴⁹ In the present moment, Cold War-era robots have been refigured as dumb and dangerous to workers—large, heavy, difficult to program, and so potentially hazardous to the workforce that they had to operate behind cages. As roboticists like Brooks insist, there is nothing to fear in factory robots 2.0 like Baxter. After all, according to this line of argumentation, none of these earlier epochs of machine evolution displaced humans from the workforce—rather, they just changed the nature of what humans do (on factory floors or in the office).⁵⁰

Baxter has been advertised as redefining the parameters of human labor. Rethinking robotics, as in the company's name, conjures the need

to also rethink the nature of human work. Brooks and the media coverage he has received have underscored that Baxter is designed to work alongside humans. This is what makes it a collaborative and complementary machine that ostensibly enhances the human, rather than a machine designed to replace the human. In this sense, Brooks proposes that contemporary robotics break away from Cold War industrial robots discussed in the previous chapter. Collaboration in the field of robotics, like the sharing of the sharing digital economy, refigures notions of the collective by looking for ways to exploit and discipline untapped human potential, now “freed” through technology. In this imaginary, older Marxist and socialist perspectives on labor as a state of political consciousness, and as a condition around which to organize political action, are rendered obsolete, along with the older model of the worker who has been marked for extinction. Collaborative robots like Baxter seek to usher in a relation between robot and machine that enhances the human, now divorced from labor as a model for collective action. Indeed, the collaboration between the robot and the human makes a human workforce unlikely subjects of rebellion against exploitation.

Baxter is a humanoid robot with a tablet serving as its “head.” Because of the revolutionary attributes attached to Baxter as a new kind of industrial machine, we describe its form and function in some detail. Baxter’s tablet head displays

animated cartoony eyes and eyebrows [that] change expression to convey intuitive messages to nearby workers. These expressions include closed eyes when it is on stand-by; neutrality when it is ready to start learning (eyes wide open and eyebrows parallel to eyes), concentration when its [sic] in the middle of learning (eyes wide open and eyebrows slanted down toward the center), focus when it is working without any issues (eyes looking downward and eyebrows slanted down toward the center), surprise when a person comes nearby (wide eyes with dilated pupils, eyebrows raised and an orange screen background), confusion when it’s having an issue with a task (wide eyes with one eyebrow inverted and both slanted downward toward the outside) and sadness when there is a problem and it has given up trying to work on a task (eyes looking downward with both eyes and with eyebrows inverted and slanted down toward the out-

side). Baxter's eyes also move in the direction one of its arms is about to move as a warning to anyone working nearby.

On its torso, two arms are mounted that measure 41 inches (104 centimeters) from shoulder to end-effector plate, an area with interchangeable end-effectors, or "hands," that serve various purposes. Baxter comes with two hand types: a vacuum cup and an electric parallel gripper with something like fingers. . . . Each arm has seven degrees of freedom, and they can work in tandem or independently of one another, depending upon need. This means you can do things like put Baxter in between two conveyor belts and have it work both. The arms are also compliant, a robotics term meaning that rather than being completely rigid and unable to change course, they can sense and adjust to any obstacles they encounter. If you grab, push or bump into one of its arms, it will give rather than remaining fixed. This compliance is made possible by using series elastic actuators, in which a motor and gearbox control a spring that drives the joints, rather than directly controlling the joints. It's the springs that make each arm less rigid than typical robot arms, and they are also used to measure forces acting on the arms.⁵¹

According to Brooks, the idea for the Baxter cobot came about through his travels to China, where the iRobot products were manufactured. In an interview, he explained that he "realized that [outsourcing manufacturing to China] wasn't sustainable, because once the cost of Chinese labor starts to go up, the appeal of doing a product there starts to go away. . . . He concluded that a fairly simple robot could do lots of those tasks, like basic material handling, packing and unpacking boxes, and polishing and grinding."⁵² Thus, Baxter, like other collaborative robots designed to work alongside a human workforce, was built to replicate "repetitive and boring jobs, and ergonomically challenging tasks," so that these tasks could be done right in the US and Western Europe.⁵³

The human-machine partnership embodied in the collaborative robot, while celebrating the emancipation of the worker in the Global North, nonetheless presumes and necessitates the excision of the global racial other (the surplus is here initially articulated as those distant from Euro-American modernity rather than the worker). Brooks's spark of inspiration during his travels to Chinese factories sheds light on the racial infrastruc-

ture of robotics innovations in the field of labor. On the one hand, the impetus toward the invention of Baxter suggests that as a surrogate for outsourced labor, Baxter will return manufacturing to the US. This is something Brooks has articulated as an explicit goal of the machine.⁵⁴ At the same time, the racial/devalued imaginary of labor appropriate for outsourcing remains intact. As the Rethink Robotics webpage touts, “This smart, collaborative robot is ready to get to work for your company—doing the monotonous tasks that free up your skilled human labor to be exactly that.”⁵⁵ This statement suggests that not much has changed from the 1990s distinction between creative, skilled labor and the uncreative, monotonous, reproductive labor that undergirded understandings of how outsourcing would work.

Other kinds of collaborative robots, like Botlr, are also designed to fill in for tasks seen as undesirable for a human workforce (figure 2.4). As one journalist observed after receiving a courtesy toothbrush delivered by the short robot who moves around on wheels and has a touchscreen as its head, “Botlr isn’t the first mass market robot, but it is among the first to perform a service industry job that was once exclusively done by humans. Work as a bellhop may not be the most appealing job, nor does it pay particularly well. But usually, it’s a person’s job. In this Aloft Hotel, at least, a person isn’t needed anymore.”⁵⁶ Yet, as the piece on Botlr concludes, those marginalized skills that can be “robot replaced” need not signal the mass displacement of humans by robots. Rather, Botlr is an indication that human society needs to ask how it can be “robot enabled” rather than “robot replaced.”⁵⁷

The work of enabling and improving the lives of privileged subjects, it is worth recalling, is historically and geopolitically racialized and gendered. Those conceived of as already fully human are never threatened with *replacement* by a mass of exploitable natural and human resources; rather, those resources *enable* their lives as fully human (and indeed, what Vora has elsewhere termed their vital energies for creativity, productivity, and even reproductivity). It is thus difficult to ignore the global racial imaginaries built into notions of robots that can undergird human wonder at the marvels of technology in places like a Cupertino hotel next door to Apple’s headquarters, where Botlr serves guests. In this sense, we might view Botlr as the inheritor of the Bangalore Butler. As Vora writes, in an earlier moment, 2007, the Bangalore Butler was touted as the newest development in the outsourcing of personal assistants. She explains that not only is the Bangalore Butler “redolent with a [racial] fantasy of the luxury of British



Figure 2.4. Botlr at the Aloft Hotel in Cupertino.

colonial India, where brown men in crisp white uniforms and turbans served meals on silver platters to smartly dressed colonials,” but also that “Indian workers occupy particular positions in the international division of labor as a result of the material conditions India inherited from the British colonial period.”⁵⁸

The kinds of skills and the kinds of people marked as replaceable, therefore, are already entangled with the historical weight of the kinds of skills and people that are rendered valueless precisely because of their exploitability in an imperial economy. Indeed, as even the most prominent proponents of human–robot collaboration acknowledge, some skills and certain people *are* being replaced. For instance, those performing outsourced work are now ostensibly made redundant by robots (though it is more the imaginary that they are rendered redundant, rather than their actual redundancy, that fills out the racial form of our contemporary techno-imperial epoch).

To return to Baxter: like the Chinese workforce that inspired Brooks, Baxter is billed as cheap. The cobot only costs \$22,000 for a business to acquire (as opposed to \$50,000–\$100,000 for conventional industrial robots), and the cost of Baxter’s “employment” is only \$4 an hour.⁵⁹ When the robot becomes even cheaper than an already disposable reserve workforce, it makes clear the extent to which attributes of the properly human are not only racial, but also geopolitical. In the cobot

imaginary, properly human labor that has been “freed” by machine labor still resides primarily in the (post)imperial US and the industrialized Global North.

On the Extinction of the Industrial Worker in a Postlabor World

We have argued thus far that collaborative robots in factories refigure the robot as an emancipating tool and partner for the human as the latter evolves (with the help of technology) toward less mundane, boring, dirty, dangerous, and repetitive tasks. In this section, we consider how the notion of human–robot “collaboration” also works to predict the extinction of a particular species of the human: the industrial worker of an earlier era of automation. The specter of a dying workforce as a way to refigure the “scariness” of the robots that will take human jobs and shift toward a more humane version of robots poised to not only collaborate with, but care for, a human population is central to how human–robot collaboration has been framed in the twenty-first century. Much of the publicity around robot–human collaboration centers on robots as already being embraced without reservation by US corporations and workers. As George Helms of Steelcase said of Baxter and its successor robot, Sawyer (a lighter one-armed robot), these are tools meant to be employee “enhancements” and “multipliers” rather than replacements.⁶⁰ Significantly, the cobot is not seen as just a tool for the performance of certain tasks; in addition, it is framed as a tool in the evolution of what a worker does. Put otherwise, worker sociality and sense of collectivity are tethered to the robot, and not to fellow workers.

Throughout his interviews and talks about Baxter, Brooks has painted a picture in which factory workers come to embrace collaborative robots. In the following speech, he tells the story of Mildred, an older worker who has grown to love factory robots:

Mildred’s a factory worker in Connecticut. She’s worked on the line for over 20 years. One hour after she saw her first industrial robot, she had programmed it to do some tasks in the factory. She decided she really liked robots. And it was doing the simple repetitive tasks that she had had to do beforehand. Now she’s got the robot doing it. When we first went out to talk to people in factories about how we could get robots

to interact with them better, one of the questions we asked them was, “Do you want your children to work in a factory?” The universal answer was “No, I want a better job than that for my children.” And as a result of that, Mildred is very typical of today’s factory workers in the U.S. They’re older, and they’re getting older and older. There aren’t many young people coming into factory work. And as their tasks become more onerous on them, we need to give them tools that they can collaborate with, so that they can be part of the solution, so that they can continue to work and we can continue to produce in the U.S. And so our vision is that Mildred who’s the line worker becomes Mildred the robot trainer. She lifts her game. . . . We’re not giving them tools that they have to go and study for years and years in order to use. They’re tools that they can just learn how to operate in a few minutes.⁶¹

According to Brooks and several of the clients whose interviews are posted on the Rethink Robotics website (such as General Electric and Steelcase), Baxter does away with the prior association of industrial robots as “scary” entities taking away human jobs. Conceived of as the opposite of outsourcing logics of the past, this new iteration of human workers training robots to do the tasks that they had done before is disassociated from the numerous instances where laid-off (outsourced) workers trained their underpaid replacements and counterparts in the Global South.

Given the existence of software and hardware enabling workers to train a robot with no prior knowledge, the cobot raises the question of whether human factory and service workers have been further reduced to the pure body, while consciousness, intuition, and learning are now the purview of the robot inheritors of ostensibly dull, dirty, and dangerous jobs. This shift demands close attention to the parameters of the human–machine collaboration envisioned in the concept of “collaborative robots.” For instance, even as the collaborative robot is positioned as the opposite of a robot that can take a worker’s job as the robotic arms of the 1980s did, Brooks’s perspective nonetheless predicts the extinction of factory workers, and thus falls in line with imaginaries of technology that project the end of labor- or class-based social movements. Mildred and other workers are not taught indispensable skills. In the above quote, Brooks emphasizes that no technical or engineering knowledge and expertise are required for an industrial worker to become a robot trainer in the twenty-first century. This means that “robot trainers” are themselves infinitely and quickly

replicable. Additionally, the reader can infer that once the current (aging) generation of workers to which Mildred belongs dies out, they will already have trained robots to do tasks done by factory workers of the past. New (younger) workers will go on to do more exciting (skilled, creative) work, not the devalued work that their parents (like Mildred) want them to stay away from. Thus, in this new economy of people and things, it is robots that have vitality, whereas manual labor is situated in a necro-temporality that need only be managed for a short period of time. In this sense, Baxter reiterates the technoliberal futurity of a postlabor world.

Reimagining Sharing and the Commons

Though Marx's later writings consider technology as a tool for liberating humans from toil, for the most part, and against technoliberal arguments that technology is inherently revolutionary, technology increases toil and exploitation for workers. At the same time, technology is in fact responsible for the Marxian imaginary of labor as the material basis for asserting the uniform and revolutionary subject that will reclaim the commons appropriated by capitalists. For Marx and Engels, it is industrial machinery that creates the universalized quality of the labor-based proletarian subject in the first place by also increasing the unbearable quality of work, as

owing to the extensive use of machinery, and to the division of labour, the work of the proletarians has lost all individual character, and, consequently, all charm for the workman. He becomes an appendage of the machine, and it is only the most simple, most monotonous, and most easily acquired knack, that is required of him. Hence, the cost of production of a workman is restricted, almost entirely, to the means of subsistence that he requires for maintenance, and for the propagation of his race. But the price of a commodity, and therefore also of labour, is equal to its cost of production. In proportion, therefore, as the repulsiveness of the work increases, the wage decreases. Nay more, in proportion as the use of machinery and division of labour increases, in the same proportion the burden of toil also increases, whether by prolongation of the working hours, by the increase of the work exacted in a given time or by increased speed of machinery, etc.⁶²

Yet, as Haraway points out in the 1991 *Cyborg Manifesto*, universalizing categories intended to promote revolutionary consciousness negate histories of radical difference that must be acknowledged as they continue, both in human social life and in technoliberal design imaginaries, like those of the IoT and collaborative robotics that enact the surrogate human effect.⁶³ The *Cyborg Manifesto* offers a constructive critique of the limits of equating gender with gendered reproductive activity in materialist feminist arguments like Federici's, though it predates *Caliban and the Witch*. She notes that "one important route for reconstructing socialist-feminist politics is through theory and practice addressed to the social relations of science and technology, including crucially the systems of myth and meanings structuring our imagination."⁶⁴ This argument, made at a time when feminists were focused on discourses of the natural, and thereby not attending to technology, connects materialist feminism to technologies that are restructuring the social politics of difference.

Part of the call of the *Cyborg Manifesto* is for feminists to assert their influence and power by becoming the makers and designers of technology, and built into this call is an attempt to accommodate the inextricability of a multiplicity of situated feminisms with conversations in biology and biotechnology.⁶⁵ The manifesto does not assert a new technologically enabled commons, but rather experiments with imagining a shared feminist politics that embraces its entanglement with new technologies without asserting a unity among feminist politics nor a shared "common" of gendered activity, or what Haraway describes as "women's activity" of "reproduction in the socialist-feminist sense."⁶⁶ Here we find grounds to undermine the claims made by Italian post-autonomous thinkers, like Lazzarato, and Hardt and Negri, who imagine immaterial labor (knowledge and care work) as a commons under threat by capitalist appropriation, but also a commons that is available for all in service of anticapitalist revolution.⁶⁷ Haraway critiques the "unity of women [that] rests on an epistemology based on the ontological structure of 'labour.'"⁶⁸ Whereas Haraway is concerned with how socialist-feminists essentialize women's activity (reproduction) through analogy to labor, her critique also applies to an uncritical notion of the unity of the commons: "my complaint about socialist/Marxian standpoints is their unintended erasure of polyvocal, unassimilable, radical difference made visible in anti-colonial discourse and practice."⁶⁹ Haraway argues in favor of partial, rather than totalizing, explanations. She argues that new technologies, especially in biotech, reorganize production and reproduction,

requiring a “feminist science.”⁷⁰ She says, “What kind of constitutive role in the production of knowledge, imagination and practice can new groups doing science have? How can these groups be allied with progressive social and political movements? Might there be ways of developing feminist science/technology politics in alliance with anti-military science facility conversion action groups?”⁷¹

What can feminist makers of technologies that avoid unifying categories materialized through the surrogate human effect look like? Luis Martin-Cabrera brings together two transnational examples of anticolonial, perhaps feminist, engagements with technologies and the problem of universalizing the commons. He reads Alex Rivera’s film *Sleep Dealer* as a futuristic musing that “establishes a dialogue with post-autonomous thinkers while exposing the limits of their assumptions by showing how technology and cognitive labor may actually reproduce forms of colonial exploitation and oppression rather than leading to automatic liberation from the shackles of physical labor. The film shows how technology is perfectly compatible with poverty and exploitation.”⁷² Specifically, he points out that the internal contradictions of capitalist forces of production will not lead to its demise, as per post-autonomous thinking, and for our purposes technoliberal thinking; rather, this can only result from “a political decision to struggle from within the system.”⁷³ He then connects this to the *Ley Sinde*, a 2011 Spanish law that was defended as protecting the work of artists and their copyright by criminalizing web pages that, like *Public Library*, provide access to “illegal” archives.⁷⁴ Rather than embracing the preservation of nondigital property law being translated to the realm of the digital, or the freedom of information movement, both of which Martin-Cabrera rightly understands as reifying the digital, he offers a third position represented by the authors of a “Manifiesto en defensa de una red libre.” The authors insist on the enduring connection between the analogue and the digital, and therefore the immaterial and the material by linking this all to the struggle at the level of the Pueblo.⁷⁵ In other words, they refuse the erasure of the lives and labor of the people who continue to make the world, whether or not they are allowed visibility. As we have continued to argue in this and other chapters, invisibilizing labor has always been part of the surrogate effect that allows for the existence and seeming autonomy of the liberal subject. Universalizing the commons is therefore another project that serves the technoliberal instantiation of that project by asserting the digital as somehow immate-

rial, and the commons as once again only for that universalized liberal subject.

An overtly feminist imaginary of the use of new technologies and of generating feminist maker spaces is GynePunk, a Catalan-based feminist biohacking initiative. GynePunk is self-described as a “postcapitalist ecoindustrial colony” in Calafou, where they live and work on collectively owned property.⁷⁶ Located in the mountains outside Barcelona, this group lives and works on communally owned property, creating women’s health technologies and preventive gynecological care kits for women who don’t have access to primary care, and for themselves, toward their overall goal of “decoloniz[ing] the female body.”

Their collective space includes a biohacking lab. Pechblenda, one part of an international open-source biology network called Hackteria, currently occupies the space, and conceived of GynePunk as an approach to “decolonize the female body” by way of developing accessible and mobile female gynecological and health tools.⁷⁷ Klau Kinky, one of the founders of GynePunk and designer of an emergency gynecologist kit for use by “immigrants without health coverage, for refugee camps . . . sex workers,” and also members of the collective themselves, dedicated the project to Anarcha, Betsy, and Lucy, three women who were operated upon for fistula repair, without anesthesia, while enslaved by the renowned gynecologist J. Marion Sims in Alabama between 1945 and 1949.

Democratizing and liberating the instruments and protocols of obstetrics and gynecology is also part of the GynePunk project. The 3D-printable speculum is one of these tools whose design is open access with a Creative Commons license through websites like Thingiverse (figure 2.5).⁷⁸ It is circulated with web-based instructions for use, as well as directions to find further diagnostic and analytical tools on GynePunk’s web archives. Three-dimensional printing, along with internet-based distribution of guides for use and complimentary practices of diagnosis and treatment, becomes a technology of both decolonizing bodies and health care, as well as communalizing knowledge. In this way, they engage not the political project of socialist feminists Haraway criticizes for universalizing “woman” through universalizing reproductive activity, but rather the political project Michelle Murphy has called “seizing the means of reproduction.” By this, Murphy means “technically manipulating [the] very embodied relationship to sexed, lived being itself.”⁷⁹ Both GynePunk and Murphy offer a direct intervention into Karl Marx’s historical materialist theory of world

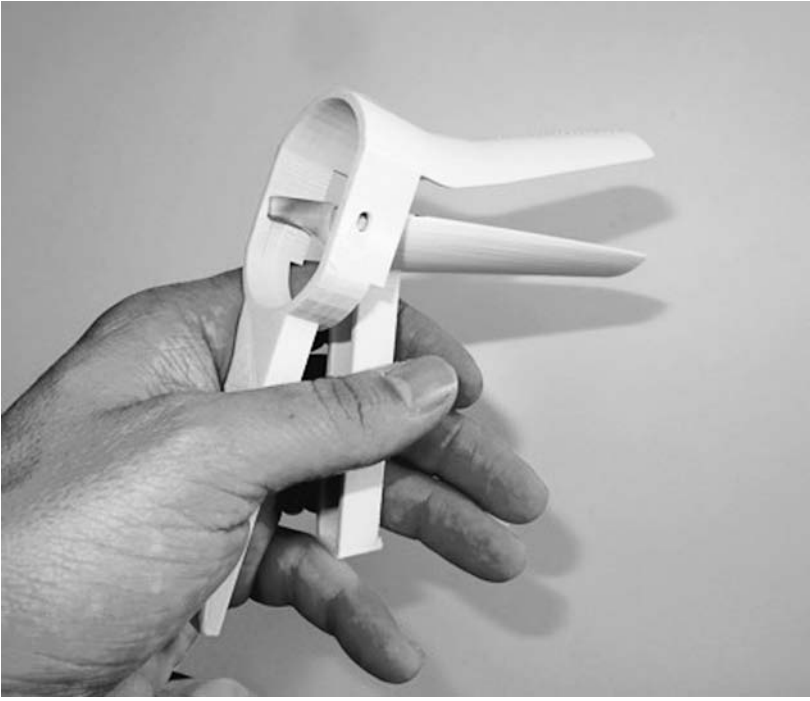


Figure 2.5. GynePunk speculum by gaudi, published June 5, 2015.

revolution, in which workers refuse to be instruments of industrial production, and instead socialize ownership of the infrastructure of industrial production, and therefore the economy. Murphy’s concept of “sexed, lived being” offers a more expansive and multiple alternative to the revolutionary subject of Marx’s labor power, disassembling the “sex/gender division by using technoscience to redistribute reproduction.”⁸⁰ Unlike technoliberal imaginaries, where 3D printing is potentially revolutionary (bringing about the end of capitalism) because it might democratize the means of production, GynePunk’s speculum, together with its distribution, manuals, support kits, and outreach and education, allows makers and users to “redistribute reproduction” and “manipulate their relation to sexed/lived being” as political projects that do not make claims to being revolutionary (which is revealed not to be just teleological but always threatening to flatten difference).

Both GynePunk’s model of decolonizing the body through open-sourced blueprints for gynecological health technologies, like the 3D-printed specu-

lum, and *Public Library*, with which we began, understand knowledge to be an essential part of providing common resources that do not assert a universal subject, body, or need, despite their inhabiting the same digital realm as that translated into private property by laws like Spain's *Ley Sinde*. What should be apparent after reviewing both the technoliberal imaginary of the new commons, exemplified in Rifkin's celebration of the IoT, as well as emergent formulations of the collaborative commons found as early as Haraway's *Cyborg Manifesto* and the work of GynePunk, are the structural inequalities that result from histories of colonial, racial, and gender dispossession that map directly onto new technological platforms. This also marks a continuing need to think about different kinds of collectives, and what they mean for the ways that the space and time of the political have shifted, even as the struggle to bring the knowledge and bodies that ethnic studies represents into the academy continues.

The impasse in linking technological futures to political collectivity, represented in this chapter by the conflation of revolution with techno-objects and the end of human labor (as the advent of full humanity for only the privileged few), calls for a dialogue between the multiple inheritances of socialism and alternate postcapitalist imaginaries in the present. J. K. Gibson-Graham points out that capitalism itself, imagined as a systemic concentration of power that transcended the revolutionary potential of socialism, is in fact "a set of economic practices scattered over a landscape."⁸¹ How, then, do we understand the relationship between the afterlives of distinct, if interlinked, socialisms and the politics of revolution as a mode of social transformation?

Foregrounding the limitations of techno-revolutionary imaginaries as in fact colonizing the notions of sharing, the commons, and collaboration, as we have done in this chapter, we wish to excavate the past and present politics invested in collectives, in what is common and shared. Rather than assuming a Marxist, Leninist, or even immaterialist "commons" of affect and intellect, it is crucial to make legible specifically nonuniversal collectivist endeavors as connected to pasts that in some instances were overwritten by Cold War politics, and in other instances are self-generating communal investments in a common good. For instance, Gibson-Graham's theory of postcapitalism refuses a model of millennial future revolution and instead identifies models of local transformation, like that of the Zapatistas and the World Social Forum, which bring together movements of many political orientations as part of a global "movement of movements" that does not

require transformation at larger scales.⁸² They connect these “noncapitalist” local projects through a language of economic difference from capitalism rather than through a shared model of global transformation, and they argue that the subject of postcapitalist politics is marked by new ethical practices of becoming different kinds of economic subjects and beings.⁸³ *The Ends of Capitalism* “queer[ed] and deconstructed” capitalism, highlighting an affect within left revolutionary politics that focused “somewhat blankly” on a “millennial future revolution.”⁸⁴ *Postcapitalist Politics*, the title and topic of their second book, refuses this blank focus of the left, and instead focuses on an emerging political imaginary that connects already existing localized economic alternatives to capitalism.

The ultimate project, then, is to continue taking into account the use of specific technologies in the service of racializing and devaluing particular populations and various modes of imperial domination, but at the same time, to be able to consider how those same sorts of technologies can be used to form or imagine different types of collectives beyond the nation-state, institutionalized religion, or class-based agitation. These collectives may emphasize both their continuity with historical forms, and also the importance of ongoing social justice imaginaries as they have been adapted to ever-emerging new social-technological platforms, political imaginaries that protest capitalist developmentalist and neoliberal cultural and economic projects.

2. Sharing, Collaboration, and the Commons in the Fourth Industrial Revolution

1. Marcell Mars in conversation with the authors, Luneburg, Germany, July 3, 2017.
2. “Tools: How to: Bookscanning,” accessed July 31, 2017, <https://www.memoryoftheworld.org/blog/2014/12/08/how-to-bookscanning/>.
3. “Catalog,” accessed July 31, 2017, <https://www.memoryoftheworld.org/blog/catalog/>.
4. “Catalog.”
5. “Catalog.”
6. For example, in a piece on the importance of Ivan Sertima’s collection “Black Women in Antiquity,” Fatima El-Tayeb explains one significance of this work as providing the historical explanations that support claims of groups like the Caricom Reparations Commission (formed of fifteen Caribbean nations), which in its 2013 report explains how European museum collections and research centers allow them to generate histories that continue to disempower and silence Caribbean voices and histories, linking this to the ongoing legacies of colonialism and slavery in the Caribbean. Fatima El-Tayeb, “Black Women in Antiquity, edited by Ivan Van Sertima, 1988,” *Contemporaryand.com* (forthcoming).
7. For example, in the US the Havasupai launched a long campaign to retrieve human remains held by Arizona State University, whose defense was that the remains were important to scientists for reasons important to humanity. They won their case under the Native American Graves Protection and Repatriation Act in 2011. Similar repatriation demands have been made by the Yaqui of the University of California San Diego but are thus far unmet. Ongoing NAGPRA cases can be found at <https://www.nps.gov/nagpra/MANDATES/INDEX.HTM>.
8. Langdon Winner, “Do Artifacts Have a Politics?,” *Daedalus* 109 (1980): 121–36, 128.
9. In attempting to explain and condense the multiple definitions of sharing or collaborative economies, Rachel Botsman, an expert on technology-enabled collaboration who teaches at the Said Business School at Oxford, articulated several aspects she thinks are key to the new economy: “I think there are five key ingredients to truly collaborative, sharing-driven companies: The core business idea involves unlocking the value of unused or under-utilized assets (‘idling capacity’) whether it’s for monetary or non-monetary benefits. The company should have a clear values-driven mission and be built on meaningful principles including transparency, humanness, and authenticity that inform short and long-term strategic decisions. The providers on the supply-side should be valued, respected, and empowered and the companies committed to making the lives of these providers economically and socially better. The customers on the demand side of the platforms should benefit from the ability to get goods and services in more efficient ways that mean they pay for access instead of ownership. The business should be built on distributed marketplaces or decentralized networks that create a sense of belonging, collective accountability and mutual benefit through the community they build.” Rachel Botsman, “Defining the Sharing Economy: What Is Collaborative Consumption—And What Isn’t?,” *Fastcoexist.com*,

May 27, 2015, <https://www.fastcoexist.com/3046119/defining-the-sharing-economy-what-is-collaborative-consumption-and-what-isnt>.

10. Benita Matofska, "What Is the Sharing Economy?" September 1, 2016, <http://www.thepeoplewhoshare.com/blog/what-is-the-sharing-economy/>.

11. "Get Involved," *The Collaborative Economy*, accessed November 24, 2017, https://ouishare.net/about/collaborative_economy.

12. Michael Hartnett, Brett Hodess, Michael Hanson, Francisco Blanch, Sarbjit Nahal, and Garrett Roche, "Creative Disruption," Bank of America Thematic Investing Paper, April 30, 2015, <https://d3gxp3iknbs7bs.cloudfront.net/attachments/b728a11b-d8c9-444f-9709-9955e7d4eb4b.pdf>.

13. Beiji Ma, Sarbjit Nahal, and Felix Tran, "Robot Revolution: Global Robot and AI Primer," Bank of America Thematic Investing Paper, December 16, 2015, http://www.bofamf.com/content/dam/boamlimages/documents/PDFs/robotics_and_ai_condensed_primer.pdf.

14. Ma et al., "Robot Revolution."

15. Klaus Schwab, "The Fourth Industrial Revolution: What It Means, How to Respond," World Economic Forum, January 14, 2016, <https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/>.

16. "50 Years of Moore's Law," Intel, accessed November 24, 2017, <http://www.intel.com/content/www/us/en/silicon-innovations/moores-law-technology.html>.

17. John Markoff, "The Future of Work: With Us, or against Us?," *Pacific Standard*, August 15, 2015, <https://psmag.com/the-future-of-work-with-us-or-against-us-1fa533688d59#.b9ma8mjt4>.

18. Markoff, "The Future of Work."

19. Markoff, "The Future of Work."

20. Nils J. Nilsson, "The Future of Work: Automation's Effect on Jobs—This Time Is Different," *Pacific Standard*, October 19, 2015, <https://psmag.com/the-future-of-work-automation-s-effect-on-jobs-this-time-is-different-581a5d8810c1#.ud5yra91r>.

21. Andy Stern with Lee Kravitz, *Raising the Floor: How a Universal Basic Income Can Renew Our Economy and Rebuild the American Dream* (New York: Public Affairs, 2016).

22. "Who We Are," Economic Security Project, <http://economicsecurityproject.org/who-we-are/>.

23. Heidi Hoechst, personal communication with the authors, June 28, 2016.

24. In addition to universal basic income, another suggestion to remedy the obsolescence of the worker has been taxation of robotic workers.

25. Chris Hughes, "The Time Has Come to Design, Develop, and Organize for a Basic Income," *Medium.com*, December 9, 2016, <https://medium.com/economicsecproj/the-economic-security-project-1108a7123aa8>.

26. Hughes, "The Time Has Come."

27. Issy Lapowsky, "Free Money: The Surprising Effects of a Basic Income Supplied by Government," *Wired*, November 12, 2017, <https://www.wired.com/story/free-money-the-surprising-effects-of-a-basic-income-supplied-by-government/>.

28. Lapowsky, "Free Money."

29. For example, “Thomas Malthus’s lectures and essays on population while a professor at the East India Company College in England promulgated the idea that India had a surplus of reproductivity, and that this reproductivity could be a source of material wealth for colonizers. The discourse of race and India, and particularly of Indian workers as numerous, easily replaceable, and best suited for reproduction, becomes transformed in different settings of labor, but Malthus’s argument for the need to manage India’s reproductivity and harness it for profitable production is sedimented into the industries that transmit vital energy from India’s workers to its consumers. See Kalindi Vora, *Life Support: Biocapital and the New History of Outsourced Labor* (Minneapolis: University of Minnesota Press, 2015), 9.

30. Roy Cellan-Jones, “Stephen Hawking Warns Artificial Intelligence Could End Mankind,” BBC, December 2, 2014, <http://www.bbc.com/news/technology-30290540>.

31. “About the Office of Jeremy Rifkin,” Office of Jeremy Rifkin, accessed November 25, 2017, <http://www.foet.org/JeremyRifkin.htm>.

32. Jeremy Rifkin, *The Zero Marginal Cost Society: The Internet of Things, the Collaborative Commons, and the Eclipse of Capitalism* (New York: St. Martin’s Griffin, 2014), 69.

33. Rifkin, *The Zero Marginal Cost Society*, 70.

34. Rifkin, *The Zero Marginal Cost Society*, 121.

35. Rifkin, *The Zero Marginal Cost Society*, 132.

36. See Grace Hong, “Existential Surplus: Women of Color, Feminism and the New Crisis of Capitalism,” *GLQ: A Journal of Lesbian and Gay Studies* 18 (2012): 87–106.

37. Silvia Federici, *Caliban and the Witch: Women, the Body, and Primitive Accumulation* (New York: Automeia, 2004).

38. With 3D printing, open-source software “directs molten plastic, molten metal, or other feedstocks inside a printer to build up a physical product layer by layer, creating a fully formed object” that comes out of the printer (Rifkin, *The Zero Marginal Cost Society*, 89).

39. Rifkin, *The Zero Marginal Cost Society*, 94.

40. Rifkin, *The Zero Marginal Cost Society*, 93.

41. Rifkin, *The Zero Marginal Cost Society*, 124.

42. Rifkin, *The Zero Marginal Cost Society*, 124.

43. Rifkin, *The Zero Marginal Cost Society*, 65.

44. Rifkin, *The Zero Marginal Cost Society*, 127.

45. “Will a Robot Take Your Job?,” BBC, September 11, 2015, <http://www.bbc.com/news/technology-34066941>.

46. “Will a Robot Take Your Job?”

47. In one exemplary 2004 *Wired* magazine cover story, the author tells US audiences what it expects and desires to hear: that no matter how many jobs move to India, someone will still need to invent things for Indians to improve (something Indian labor cannot do). The author profiles a US programmer whose position was outsourced, but who consequently found a job “more complex than merely cranking code . . . more of a synthesis of skills” (Daniel H. Pink, “The New Face of the Silicon Age,” *Wired*, February 1, 2004, <https://www.wired.com/2004/02/india/>). This creative and inventive labor is opposed to the commodified South Asian labor that can be replicated almost

anywhere, and that is merely reproductive of prior invention. See Vora, *Life Support*, which describes outsourcing as an ideological and economic system that has inherited the colonial global reorganization of production and consumption. This system genders the labor of reproduction so that some work becomes that of merely reproducing life and culture, whereas other work is deemed creative, innovative, and productive in itself.

48. “Baxter with Intera 3,” *Rethink Robotics*, accessed November 25, 2017, <http://www.rethinkrobotics.com/baxter/>.

49. Margaret Rouse, “Collaborative Robot (Cobot),” *WhatIs.com*, March 2011, <http://whatis.techtarget.com/definition/collaborative-robot-cobot>.

50. Rodney Brooks, “More Robots Won’t Mean Fewer Jobs,” *Harvard Business Review*, June 10, 2014, <https://hbr.org/2014/06/more-robots-wont-mean-fewer-jobs/>.

51. Bernadette Johnson, “How Baxter the Robot Works,” *Science: How Stuff Works*, accessed November 25, 2017, <http://science.howstuffworks.com/baxter-robot1.htm> (emphasis in the original).

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55. “Baxter with Intera 3.”

56. Tim De Chant, “Navigating the Robot Economy,” *Nova Next*, October 15, 2014, <http://www.pbs.org/wgbh/nova/next/tech/automation-economy>.

57. De Chant, “Navigating the Robot Economy.”

58. Kalindi Vora, “The Transmission of Care: Affective Economies and Indian Call Centers,” in *Intimate Labors: Cultures, Technologies, and the Politics of Care*, edited by Eileen Boris (Stanford, CA: Stanford University Press, 2010), 33.

59. “Meet Baxter: Rethink Robotics’ Next-Gen Robot,” *Robotics Business Review*, September 18, 2012, https://www.roboticsbusinessreview.com/meet_baxter_rethink_robotics_next_gen_robot/.

60. “Customer Success Story: Steelcase Inc.,” Rethink Robotics, September 22, 2015, YouTube video, <https://www.youtube.com/watch?v=8jGA7JWgEyg>.

61. “Customer Success Story.”

62. Karl Marx and Friedrich Engels, “Communist Manifesto,” *Marx/Engels Selected Works*, vol. 1 (Moscow: Progress, 1969), 98–137.

63. Luis Martin-Cabrera brings this concern forward to the contemporary left celebration of the commons of knowledge, care, and general immaterial labor forwarded by Italian postautonomous intellectuals. Martin-Cabrera argues that “the ‘communism of the common,’ as Hardt calls it, relies on the substitution of politics and potentiality with an immanent logic of contradictions.” Luis Martin-Cabrera, “The Potentiality of

the Commons: A Materialist Critique of Cognitive Capitalism from the Cyberbracer@ to the Ley Sinde,” *Hispanic Review* 80, no. 4 (2012): 583–60, 589.

64. Constance Penley and Andrew Ross, “Cyborgs at Large: Interview with Donna Haraway, Constance Penley and Andrew Ross,” in *Technoculture*, edited by Constance Penley and Andrew Ross (Minneapolis: University of Minnesota Press, 1991), 163.

65. Sophie Lewis argues that in the *Cyborg Manifesto*, “Black, Indigenous and Chicana feminisms (e.g., bell hooks, Audre Lorde, Barbara Smith, Cherrie Moraga, and Gloria Anzaldúa), lesbian and ‘deconstructive’ feminisms (e.g., Monique Wittig), and queer, anticolonial afrofuturisms (e.g., Octavia Butler) were all treated as though they were *always already* inextricably linked to conversations in biology about genes, computer-chips, symbiogenesis, and cybernetic matrices (in particular the critiques of science of Sandra Harding, Richard Lewontin, Hilary Rose, Zoe Sofoulis, Stephen Jay Gould et al.).” Sophie Lewis, “Cthulu Plays No Role for Me,” *Viewpoint*, May 8, 2017.

66. Donna Jeanne Haraway, *A Cyborg Manifesto: Science, Technology and Socialist Feminism in the Late Twentieth Century* (New York: Routledge, 1991), 298.

67. For critiques of this work, see Kalindi Vora, “Limits of Labor: Accounting for Affect and the Biological in Transnational Surrogacy and Service Work,” *South Atlantic Quarterly* 111, no. 4 (2012): 681–700; and Martín-Cabrera, “The Potentiality of the Commons.”

68. Haraway, *Cyborg Manifesto*, 298.

69. Haraway, *Cyborg Manifesto*, 299.

70. Haraway, *Cyborg Manifesto*, 307.

71. Haraway, *Cyborg Manifesto*, 307.

72. Martín-Cabrera, “The Potentiality of the Commons,” 591.

73. Martín-Cabrera, “The Potentiality of the Commons,” 595.

74. Martín-Cabrera, “The Potentiality of the Commons,” 586.

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76. Tyler Koslow, “Decolonizing the Female Body with the Biohacking of GynePunk,” *3D Printing Industry*, August 25, 2015, <https://3dprintingindustry.com/news/decolonizing-the-female-body-with-the-bio-hacking-of-gynepunk-56324/>.

77. Ewen Chardronnet, “GynePunk, the Cyborg Witches of DIY Gynecology,” *Makery: Media for Labs*, June 30, 2015, <http://www.makery.info/en/2015/06/30/gynepunk-les-sorcier-es-cyborg-de-la-gynecologie-diy/>.

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80. Murphy, *Seizing the Means of Reproduction*, 5.

81. J. K. Gibson-Graham, *A Postcapitalist Politics* (Minneapolis: University of Minnesota Press, 2006), 2.

82. Gibson-Graham, *A Postcapitalist Politics*, xxiv.

83. Gibson-Graham, *A Postcapitalist Politics*, xxviii.

84. Gibson-Graham, *A Postcapitalist Politics*, xxii.

Surrogate Humanity

Race, Robots, and the Politics of Technological Futures

NEDA ATANASOSKI AND KALINDI VORA

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COVER ART: Peter William Holden. “Vicious Circle,” *Choreographed Robots*. Courtesy of the artist. Photograph by Medial Mirage / Matthias Möller.

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