# Nowhere to Go: Automation, Then and Now

Jason Smith, *Brooklyn Rail*, March–April 2017

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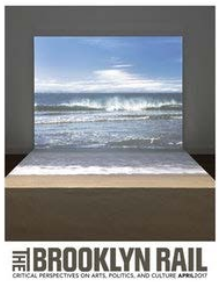
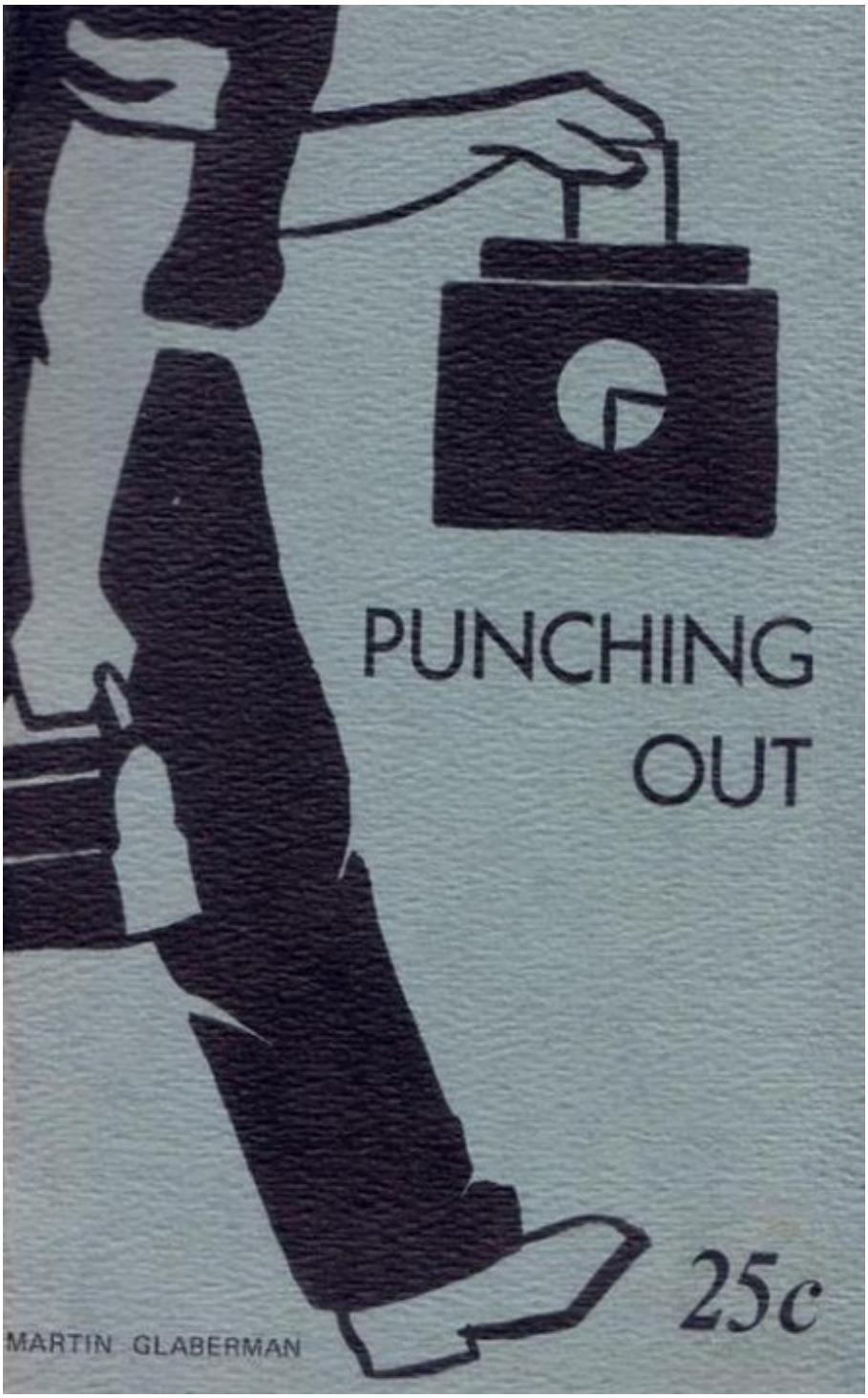



It is in this serious light that we have to look at the question of the growing army of the unemployed. We have to stop looking for solutions in pump-priming, featherbedding, public works, war contracts, and all the other gimmicks that are always being proposed by labor leaders and well-meaning liberals.

– James Boggs, *The American Revolution*

In 1963, James Boggs, a black autoworker employed for over two decades at a Chrysler plant in Detroit, published a short book focused on the nefarious effects of automation on class struggle in the United States. The story told in *The American Revolution: Pages from a Negro Worker's Notebook* begins with the early 1930s, the decomposition of the old craft unions, and a global economy in the throes of an unprecedented near-collapse; it arrives at a high point with the late 1930s, with a now-forgotten wave of sit-down strikes that tore through the tire and auto industries between 1933 and 1937, most famously at the Flint General Motors plant in early 1937.[1] This was, in Boggs's estimation, the "greatest period of industrial strife and workers' struggle for control of production that the United States has ever known." But this period also gave rise, under the reformist efforts of the New Deal and in a climate of mass unemployment, to the Wagner Act and the institutionalization of class struggle. The UAW, which just a few years earlier organized the sit-down strikes in the auto industry, had by 1939 banned the tactic in the plants. In the cast shadow of imminent war, the union's no-strike pledge, along with the inevitable encrustation of a bureaucratic stratum more at home in the offices of management than on the workbenches, left workers to wildcat their way through the war. The Second World War witnessed thousands of work stoppages: an astonishing 8,708 strikes implicating over four million workers took place, according to Boggs, over one two-year period while war production was in full swing. Union pledges of discipline notwithstanding, order did not therefore always prevail. Workers, many of them from the rural South, and new to the world of the factory, consistently bucked against the dictates imposed by management and enforced by their own representatives. The wildcat strikes were not, however, always defections from the dictates of union bureaucrats and the boss. In 1943, a UAW-organized Packard plant was the site of a "hate strike" organized by white workers to push back against the influx of black workers into the factories, and the integration of assembly lines. Soon after, a tumultuous "race riot" broke out in the city, as white workers attacked black workers who now competed with them for housing. Dozens were killed, hundreds wounded; mostly black, and

primarily at the hands of police and the National Guard. The city would be occupied by federal troops for a full half year after. Such was, for better and for worse, the American workers movement at its most militant.[2]




The onset of the post-war economic boom—with its soaring growth, surging wages, and near-full employment—did little to dampen the combativeness of workers on the line. The wildcat waves continued well into the 1950s, with the movement cresting, in Boggs's reckoning, in the middle of the decade. The movement and its off-and-on open conflict with union brass ("porkchoppers" to rank-and-file) was chronicled in a series of broadsides (*Punch-Out*, *Union Committeemen and Wildcat Strikes*) by the irrepressible Martin Glaberman, Boggs's longtime comrade in the Detroit-based Correspondence Publishing Committee. At stake in these struggles was what *The American Revolution*

specifies as “control over production,” the ability of workers on the shop floor to dictate the pace and intensity of work through collective action and novel tactics. Chrysler’s management responded to this volatile situation with a weapon hitherto mostly under wraps: “A new force [...] entered the picture,” Boggs writes, as management, with union blessing, “began introducing automation at a rapid rate.” Where prior efforts to speed up work rhythms met with fierce opposition from thousands of workers concentrated in massive production sites, this capacity for interruption depended upon worker control over the machinery set in motion during production. The stunning productivity gains made possible by the introduction of large-scale machinery and the moving assembly line still depended in large part on worker oversight of the production process. The lure of automation, from the perspective of Chrysler management, was obvious: many tasks performed and decisions made currently by workers could be replaced by programmable computers and cybernetic control systems. The promise of rising productivity in the workplace also entailed compromised worker control over the pace of production, threatening an outright swapping out of labor for capital on the other, with computer-assisted machines replacing potentially tens of thousands of works almost overnight. It was precisely this threat of substitution that, Boggs concludes, was decisive in the quashing of the strike movement in the middle of the 1950s: “since the advent of automation there has not been any serious sentiment for striking.”

It may be that the history of capitalism is the history of automation. Warnings about the perils of automation are as old as the capitalist mode of production. The first revolts of workers’ movement produced the myths of General Ludd and Captain Swing, and the insurrectionary forays of the canuts of Lyon. In their wake were left wrecked shearing frames and looms; barns, buildings, and goods were targeted by proletarian arsonists. Yet the development of the productive forces, and the implementation of large-scale machinery in capitalist factories, never quite made workers purely and simply redundant. To the contrary, over the course of more than a century, the demand for labor had grown exponentially, even as millions of peasants poured into cities, and entered into the wages system and the urban cash nexus. But this time, Boggs warned, was different: “Automation replaces men. This is of course nothing new. What is new is that now, unlike most earlier periods, the displaced men *have nowhere to go*” (my emphasis). These men and women, many of whom, like Boggs, had left the deep South for the industrial North and its factories and great cities, were loath to return to the countryside, to Jim Crow, rural isolation, and hardscrabble miseries. And the countryside wouldn’t have them: advances in mechanized farming across the South dramatically augmented agricultural productivity during the 1920s and after, in a matter of a few decades eliminating what jobs were left in the field. There was no turning back, in any case; these workers would not dare leave the cities, unless it was to “get away from the Bomb.”

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Over the past hundred years or so, laments over an impending purge of workers by technological innovation have come in cyclical pulses, once every third decade. James Boggs's variant of this complaint—to which I will return at the end of this essay—remains something of an exception: such concerns have largely been voiced, in the 20th century, by the emissaries of the dominant class charged with implementing automation, rather than by those at risk of replacement. Lord Keynes notably wrote, in 1930, of the "new disease" of "technological unemployment" visited upon a society otherwise enjoying the productivity gains reaped from a cluster of breakthroughs: the wholesale electrification of industry (Lenin's definition of communism as "soviets with electrification" was no idle quip), the widespread use of internal combustion engines and newly paved road networks, the marvels of indoor plumbing, and the availability of cheap, plentiful steel. Another round of hand-wringing commenced in the mid-'50s—Boggs was far from alone—as technological leaps broached in the 1930s began to come online, the prospect of atomic power loomed, and primitive computers were coupled with large-scale machine production. Essays, studies, and books devoted to the marvels of "cybernation" abounded. The fascination with technological forces, typical of the capitalist class, was spoiled only when distracted by the fate of those potentially expelled from production. A booming industry in popular sociology speculated with optimism on the just-out-of-reach society of leisure delivered by these technological advances. Many worries, however, centered on a future of mass unemployment, with an attendant widespread immiseration, and even an uptick in class antagonism. Above all, those viewing this situation through the lenses of the capitalist class feared a crisis of under-consumption, as workers, deprived of the wage, would not be able to buy up all of the cheap commodities produced by such wonderful machines.

Within a decade, however, by the late 1960s, many of these same commentators would herald a coming post-industrial society and its rapidly expanding service sector, which would quickly soak up the vast majority of those Boggs claimed would have "nowhere to go" (he spoke of "surplus" people). In the 1970s, tens of millions of women began pouring into labor markets in the U.S. alone, often finding work in clerical and business services. One effect of this wholesale entry of women into workplaces was to accelerate the commodification of personal services as well, previously carried out in the form of unwaged, domestic or socially reproductive labor. Then, again, in the mid-1990s, just as the "New Economy" was said to be taking off—and the dot com bubble began to swell—another wave of worry washed over the chattering classes, with impeccable timing. Typical was this 1994 article from *The Wall Street Journal*, which breathlessly recycled the old tune: "technological advances are now so rapid that companies can shed far more workers than they need to hire to implement the technology or support expanding sales."[3] Jeremy Rifkin's 1995 book, *The End of Work*, which counted on a "nearly automated" service sector (in 1995, almost seventy percent of unemployment by the economists' calculations) by the mid-21st century, was as ubiquitous in the discourse of intellectuals as in the business papers. Since its publication, millions more workers have entered the service sector in high-income countries, as manufacturing has contracted

still further. In the meantime, a hundred million Chinese peasants have made their own Great Migration, moving into mushrooming cities across that vast country, exchanging their labor-power day in and out for *yuan*.

Since the global economic meltdown of 2008, and especially over the last five years, there has once again been—in perfect sync with the cyclical pattern—an outpouring of articles and books detailing the wonders and pitfalls of an imminent rise of the robots. It is held we are living through a "second machine age" (cf. Erik Brynjolfsson and Andrew McAfee's 2014 *The Second Machine Age*), dawning half a century after what was already, in the 1960s, called the "third industrial revolution." But where *that* promised technological leap, to be unleashed by the conjoining of automation and atomic power, was proffered in the midst of a veritable explosion of economic growth, here the hyperbole comes on the heels of a near-fatal financial crisis, and at the end of a decade that registered "the slowest growth in productivity of *any decade in American history*."[4] Recent trends suggest this torpor has not been shaken. Indeed, since 1999, the height of the dot com bubble, private investment in software and computer equipment has fallen precipitously, by a full quarter: it is, today, as low as it was in 1995. This state of affairs is not lost on many commentators, who struggle to reconcile the marvels and menace of machine-learning algorithms (able, it is said, to "write their own programs") with the prevailing conditions on the ground. Unemployment rates have only begun to ease in the U.S. as millions simply drop out of the labor market.[5] Abroad, especially in southern Europe, they remain historically high. But these job losses are due less to the revenge of the robots than to a plethora of capital idling on the sidelines.

The presumption held by most contemporary discussions of automation is that new digital technologies constitute a revolutionary innovation on a par with electricity, whose cheap, networked availability by the 1920s spurred a half-century round of economic expansion. A handful of skeptics (such as Robert Gordon) contend that whatever IT-induced productivity gains are to be had were already reaped during a short period in the 1990s, tailing off by the end of the decade. The stakes of such a claim are sizable, since the implementation of any "truly general purpose technology" across the economy —not only in manufacturing, but in the massive service sector as well, a point I return to at length in part two of this essay—should, through the productivity gains they promise, bring the global economy out of its doldrums. If this new explosion in productivity were to follow the pattern set in the middle of the 20th century, we should expect not a crisis of employment but rising demand for the cheap commodities (goods or services) pumped out by newly automated production processes, with corresponding bumps in both demand for labor and wage levels: such was the "Golden Age" of the post-war boom. Ford is hardly sanguine about the effects of new automation technologies on labor markets. In *Rise of the Robots*, he claims that older automation technologies "tended to be relatively specialized and to disrupt one employment sector at a time, with workers then switching to a new emerging industry"; today, we are warned, information technology is spreading across all sectors simultaneously, including a huge swath of service sector occupations in health, education, and retail, leaving displaced workers—as Boggs put it fifty years before—*nowhere to go*.

Despite these imagined threats of a new round of technological employment hovering on the horizon, Ford, like most commentators on the subject, is at pains to explain the lag in the implementation of this "truly general purpose technology," even as he bemoans its potential fallout. And yet at one point late in *Rise of the Robots*, he puts his finger on a peculiar inversion characteristic of the ongoing global recession—an inversion that could provide a key to understanding the puzzle of the present moment. While in most economic slumps productivity tends to drop off rapidly, with output falling faster than jobs can be shed, in the opening round of the recent crisis something else happened entirely. Firms on average registered modest *gains* in productivity, despite the hostile climate. Yet they did so despite rapid *drop-offs* in output: total output was shrinking, but payrolls were being slashed even faster. The uptick in productivity, in this case, was likely due not to technical innovations, but to longer, more stressful, days on the job for those who kept them. Ford: "during the Great Recession. [...] productivity actually increased. Output fell substantially, but hours worked fell even more [...] The workers who kept their jobs (who certainly feared more cuts in the future) probably worked harder and reduced any time they spent on activities not directly related to their work; the result was an increase in productivity." Lest we imagine these patterns to be those of a cyclical if atypical downturn, a 2014 study by a group of researchers at MIT—like the authors of *The Second Machine Age*, though in this case, tellingly, not from the department of management, but from economics—detected a similar, longer-standing pattern in IT-intensive industries. Backdating this trend to the pre-crisis period, they find "little evidence of faster productivity growth in IT-intensive industries after the late 1990s"; when this evidence does appear, it is traced not to rapid productivity gains through the implementation of automation, but is instead said to be "driven by declining relative output accompanied by even more rapid declines in employment."[6] Lackluster performance like this is surely one reason investment in IT has fallen off so precipitously since the late 1990s; it rhymes, moreover, with Gordon's claim that the period between 2004 – 14 exhibited the slowest productivity growth over a decade in U.S. history. It also gives us a hint as to why, even with central banks holding the choke open on the global economic engine, flooding it with free money, surplus capital has been shunted into short-term, speculative fixes—real estate, finance—rather into new lines of production.

This is the forbidding environment in which firms today operate. Predictions of rapid replacement of millions of jobs by machines must contend with these longer-term tendencies. Under such conditions, it is hard to imagine a sudden surge of growth in the manufacturing sector itself, even if certain lines find ways to undercut their competitors with temporary technological fixes. The 2014 MIT study just cited – the authors' express purpose was to refute Brynjolfsson and McAfee's 2011 book, *Race Against the Machines*—bears the pointed title "Return of the Solow Paradox?," invoking the notorious comment offhandedly made by economist Robert Solow in a 1987 *New York Times Book Review* article: "what everyone feels to have been a technological revolution [...] had been accompanied everywhere by slowing-down of productivity growth, not by a step up. You can see the computer age everywhere but in the productivity statistics." Thirty years later, the needle hasn't moved. If it is true that the staggering productivity gains of the 1920s and after can be attributed in part to the widespread use of electricity and the

internal combustion engine, the real revolution was in the networking of these technologies, through the expansion of power grids and paved roads. Yet in a world in which seven in ten Haitians has a cell phone, the unimaginable density of global communication networks—even the planet's poorest inhabitants are now "networked individuals"—has yet to put a dent into what many mainstream economists are calling a long-term, even "secular," capitalist stagnation. Seen in this light, the anxious exhilaration surrounding contemporary machine-learning algorithms can feel hyperbolic. Measured against the potentially terrifying forces tapped by nuclear energy in the mid-20th century, Google Glass might seem a modest venture. Google's parent company Alphabet speaks in exalted tones of technological moonshots, but ninety percent of its revenue and almost all of its profits still come from advertising, most of it via search engines. It is buying up smaller robotics and AI firms, but not necessarily to ramp up investment: it is to establish monopoly conditions that will guarantee super-profits and higher market share within these stagnant conditions. Today, high profits are assured for firms able to disrupt market dynamics and price signals. Such firms are often "more adept at siphoning wealth off than creating it afresh"; they thrive less through innovation than through exorbitant market shares, and streams of technological rent.[7]

A cursory look at the global economy over the past four decades indicates that, after the deep recession of the early 1970s, promised returns to levels of growth typical of Boggs's time never materialized. Growth rates not only in the U.S. but in most OECD countries have on average remained listless for over forty years, expanding at less than half the rate of the so-called "Golden Years." What accounts for this sluggishness? Many analysts point to declining profit rates for capitalist firms throughout this period. As profit rates fell, beginning as early as the mid-1960s, less capital was available for investment, both in existing and new lines of production; this blockage led in turn to job losses and high rates of unemployment. Explanations vary on why the initial decline in profit rates occurred. Some accounts suggest a high level of worker militancy in production account for the initial downturn, as full employment and high wages "squeezed" profit margins from below, leading to dwindling returns and a subsequent shakeout. Under these conditions, private firms set about restoring their profit rates through a variety of fixes, but above all by slashing wages, which have remained on average stagnant for this entire period, buoyed temporarily by a dizzying rise in consumer debt over this same period. And yet the "profit squeeze" theory cannot account for a crucial detail. If wages were slashed beginning in the 1970s, and have flat-lined since, why hasn't the aggregate profit rate been restored to pre-1970s levels, relaunching in turn productivity gains (as rising profits are reinvested in production) and expanding employment? Robert Brenner and Fred Moseley, among others, have attempted to respond to this question in different ways (global overcapacity in manufacturing, a rising ratio of unproductive-to-productive labor, and so on). In the current climate, and in certain sectors, monopoly-like conditions for specific firms can engender abnormally high returns for firms and their shareholders. In other sectors, select companies can invest in technologies to win competitive advantage long enough to capture a larger market share, even as that market, and total output in a given sector, remains static, or even declines. This is not soil in which new shoots will grow.

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Most of those ringing alarms over the course of the 20th century regarding the perils of automation have been torn between a fascination with technological development, which promises a tendential spread of worklessness to the whole of society, and a shopkeeper's anguish over just who might consume the mountains of cheap commodities disgorged by the machines. Historically, many approaches to automation on the Left have emphasized the way the deployment of technological breakthroughs, and the substitution of capital for labor, constitute strategic moves in a raging war at the point of production. Boggs's observation that the capitalist use of automation allowed plant owners to recapture control over production, putting paid to a long wave of strikes, is just one example in a rich vein of analysis that emphasizes the specifically capitalist nature of the complex machinery and organizational refinements characteristic of contemporary production processes. Writers as varied as Raniero Panzieri, Harry Braverman, David Noble, and Moishe Postone have all made important contributions to this strain of thought, emphasizing the way patterns of technological development increasingly reflect capitalist value-relations, making any future "socialist use" of much of this machinery onerous at best.[8]

Some recent examinations on the Left of the structural drive toward the replacement of labor by machines have taken a different tack. Writers like Antonio Negri have seen changes in the composition of capital in an altogether positive light, reading the rising organic composition of capital through the lens of Marx's 1858 "Fragment on Machines": the "monstrous disproportion" between the productive capacity of large-scale, computer-controlled machinery and the diminishing quantities of labor time required to set this system in motion.[9] A common version of this position imagines an automation-induced "abolition of work" that would, as this worklessness initially takes the form of mass unemployment, be offset by the implementation of a state-administered "guaranteed basic income"; such payments supposedly would, as they stimulate effective demand and keep capitalist production ticking over, gradually sever the sacred tie between income and the time of work.

Nick Srnicek and Alex Williams's recent *Inventing the Future*, heralding a post-capitalist "world without work," takes up this legacy in its way, putting forth as its core programmatic demand the total automation of the "economy" (a term they leave unexamined). They, like the mainstream accounts they are reproducing, are compelled to grapple with the "return of Solow's paradox": for all of the hype about big data, the internet of things, and workerless factories, aggregate growth rates remain as we saw lackluster at best, especially compared with their mid-century peak. It is for this reason that the substitution of machines for human labor *should* be, they write, "enthusiastically *accelerated* [. . .] as a political project of the left" (my italics). Here we hit the rub in their vision of the future. They make a half-hearted stab at accounting for automation's "diffusion lag," but twist themselves into knots in doing so.[10] "It is highly likely," they write, that "low wages are repressing investment in productivity-enhancing technologies."[11] This is undoubtedly one factor that must be considered: why would

business owners invest in fixed capital that depreciates over years, when loose labor markets allow cheap labor to be picked up and dropped at a moment's notice? Following this line of reasoning, Srnicek and Williams argue that "in the effort to bring about full automation, fighting for higher global wages is a crucial complementary task." Leaving aside the Herculean task of organizing a struggle across the planet for higher "global wages"—narrowing wage differentials on a global level might be a more plausible objective, but this would require *lowering* wages of U.S. workers, as those in east Asia rise to meet them—this proposition is a puzzling one. Rather than considering why low-wage jobs and the people compelled to work them are so plentiful in the first place, or why these workers are incapable of organizing these low-wage sectors in order to demand higher wages, the authors suggest that higher wage levels must be implemented by political fiat, or bureaucratic decree. But this would, according to this logic, be an intermediate step: since compelling employers to raise wages will require them to deploy automation, imposing higher wages on employers will have as their "desired" effect mass unemployment: putting those who've just won bigger paychecks out of work. Such is the strategic vision offered by social democratic accelerationism.

We must stand this problem back on its feet. The lag in implementing wholesale automation across all sectors of the economy, with the corresponding and long-standing lag in productivity gains, must be considered from the perspective of the dynamics of global capitalism as a whole. Current speculations on both the promise and threat of automation are confronted with an ongoing crisis of accumulation. In this climate, a fragmentary implementation of automation is unlikely either to liberate large fractions of humanity from work, or produce mass unemployment of the sort envisioned over and again by commentators for the past century. The conviction held by many on the Left, here following tech enthusiasts like Martin Ford, is that the technical capacity to automate most if not all occupations is virtually present. Any lag in implementation is, by this reckoning, due to "failures of government policy": with the right cocktail of social democratic adjustments (shorter work weeks, higher minimum wage, basic income, etc.), with the correct "political choices," a world of "tight labor markets" and a decent standard of living for all could be won.[12] My own investigation starts from a different place. I want to ask why, for all of the froth churned up around the productive potential lurking in test labs, the pattern exhibited over the past fifteen years has been one of declining investment in information technology, and falling output for IT-assisted manufacturing? Why has almost all growth in employment—ninety-six percent—since 1990 "come from sectors known to have low productivity [...] and sectors where low productivity is merely suspected in the absence of competition and proper measurement techniques"? Why has some ninety-four percent of new employment in the U.S. since 2000 been in education, healthcare, social assistance, bars, restaurants, and retail, that is, in the vast, motley, and above all technologically stagnant service sector?[13]

In the second part of this essay—to appear in the April 2017 Field Notes—I will examine the nature of the service sector in some detail. Doing so will present new challenges to the assumption made by many recent publications on automation, which take for granted the possibility of automating this enormous and poorly conceived dimension of

the contemporary capitalist world, making up some four-fifths in high-income countries like Britain and the U.S. Why do we see such tepid productivity growth is so many economic sectors, especially key service sectors such as education and health care? Why has the last forty years witnessed an explosion of the low-wage service sector as a whole, as employment shifted, in high-income countries, from manufacturing to the services, the latter comprising now close to eighty percent of employment in the U.S.? Why do many of these occupations continue to entail low capital-to-labor ratios, with profit margins directly impacted by the fluctuation of wages, as employers' outlay consists primarily of labor costs? Why is an overwhelming share of employment, in other words, shunted into sectors of the economy that are, perhaps by their very nature, technologically stagnant, and not subject to technological and organizational refinements on the order of those that have taken place in manufacturing and industry? How does the complexity and fragmentation of the so-called service sector affect workers capacity to organize themselves across occupational types, and in view of building anew forms of worker power appropriate to the 21st century?

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Endnotes

1. James Boggs, *The American Revolution: Pages from a Negro Worker's Notebook* (New York: Monthly Review Press, 1963).
2. In his *Riot.Strike.Riot* (London: Verso, 2016), Joshua Clover—who also discusses Boggs at some length— emphasizes that "the history of race riots in the United States begins with whites disciplining insubordinate other populations." Oddly, Boggs makes no mention of these white supremacist race riots, even as his account focuses in large part on the fate of the "Negro" worker, and anticipates the "coming explosions" of the mid-to-late 1960s.
3. Cited in Jeremy Rifkin, *The End of Work: The Decline of the Global Labor Force and the Dawn of the Post-Market Era* (New York: Putnam, 1995), 141.
4. Robert Gordon, *The Rise and Fall of American Growth: The US Standard of Living Since the Civil War* (Princeton: Princeton University Press, 2016), 529; my italics.
5. "The unemployment rate is not wrong, but it does not tell us much about the festering crisis of worklessness in America. For that, you need to look at the rising share of people in their prime years (between twenty-five and fifty-four) who are neither working nor looking for work: a figure that now stands—as it happens—at about twenty percent." "America's 'jobs for the boys' is just half the employment story," *Financial Times* (February 7, 2017). I thank William Clare Roberts for this reference.
   Little more than half of working age adults in the U.S. are employed full-time or are part-time employees "voluntarily."
6. Daron Acemoglu et al., "Return of the Solow Paradox? IT, Productivity, and Employment in US Manufacturing," *American Economic Review: Papers & Proceedings* 104: 5 (2014) 394, 399.

7. “Too Much of a Good Thing,” *Economist* (March 26, 2016). Isabelle Kaminska has even spoken of tech monopoly conditions in tongue-in-cheek terms as “Gosplan 2.0”: Technology conglomerates (from Tesco to Google) on the other hand tend to use the information they collect to subjectively interpret or presume our consumption patterns on qualitative grounds so as to *stretch* existing output amongst more people, rather than to encourage its growth. This in turn leads to the n the market, the loss of price signals and the unintended support of uneconomic ventures on the hope that one day, perhaps—by driving out all ‘at cost’ competition—they’ll be the last man standing, with rights to monopoly rents.”
8. Recently, Jasper Bernes has made an important contribution to this important if relatively marginal tradition, with specific reference to contemporary logistics “revolution.” See his “Logistics, Counterlogistics and the Communist Prospect,” *Endnotes 3: Gender, Race, Class, and Other Misfortunes* (September 2013).
9. See Notebook VII of Karl Marx’s *Grundrisse*.
10. An important historical account comparing the “diffusion lags” entailed in full-scale implementation of electricity and that with computers is Paul A. David’s “The Dynamo and the Computer: An Historical Perspective on the Modern Productivity Paradox,” 80:2 (1990): 355-61. This essay is very rich in historical information, and is a valiant attempt to solve the puzzle of Solow’s paradox. While it makes quite convincing arguments about the delay in the diffusion of electricity (the technology for which had been available for decades), it is worth noting that David’s paper was written in 1990: 25 years later, we are still waiting on the productivity explosion. Gordon argues, to the contrary, that the modest gains registered in the 1990s is all we’ll get.
11. Nick Srnicek and Alex Williams, *Inventing the Future: Postcapitalism and a World without Work* (London: Verso, 2015), p. 112. Other important “left” discussions of automation are found in Peter Frase’s *Four Futures* (London: Verso, 2016) and Paul Mason’s *Postcapitalism: A Guide to Our Future* (London: Verso, 2016).
12. Frase, *Four Futures*, 17.
13. Matthew C. Klein, “The Great American Make-Work Programme,” *Financial Times* (September 8, 2016).

# Part Two

brooklynrail.org/2017/04/field-notes/Nowhere-to-Go-Automation-Then-and-Now-Part-Two

By Jason E. Smith

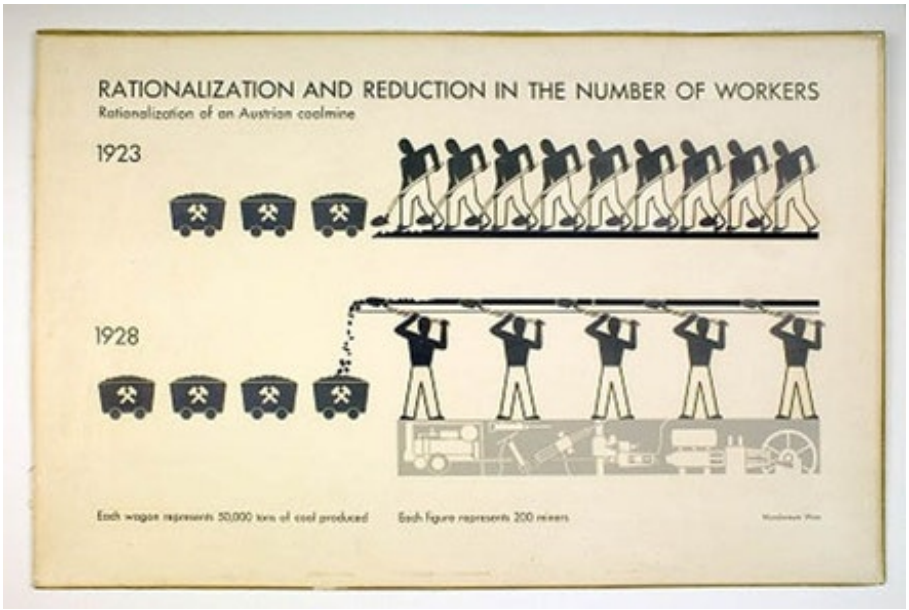
Arithmetically, the problem is a combination of collapsing productivity

and nsufficient capital investment.

— *Financial Times*, November 3, 2015[1]

On February 19, 2017, the *New York Times* ran a feature story on recent changes in the United States oil industry.[2] The focus was on the recent "embrace" of technological innovation in the industry after the 2014 plunge in the global oil market. This was just one of a rash of such pieces in the popular press, relying, as is typical of such writing, on a smattering of skewed, decontextualized data, a healthy serving of the anecdotal, and a host of the worst tech journalism clichés ("a few icons on a computer screen," "a click of the mouse," video game marathons as job training, a compulsory reference to drones). Zeroing in on the effects of these changes on workers in west Texas, the article's upshot is unobjectionable enough: as oil prices recover, output rises, and production becomes more capital-intensive, many workers who lost jobs in the downturn will be replaced by machines. These workers, often Latino, are sure to be forced out of these semi-skilled, relatively well-paid jobs into other sectors of the labor market, where their skills and experience will serve little purpose. At first blush, the situation seems dire. We are told that some 30% of jobs in the industry were lost after the oil market crash of mid-2014, when employment in the industry was at its peak. But dating these losses from 2014, at the height of a boom in the industry, crops the picture too dramatically. Employment in the oil and gas sector exploded between the turn of the century and the oil market collapse—a historic one, by all measures—a few years ago: by some estimates, employment in the industry shot up by 150% during this period.[3] What is more, while the paper of record warns of "jobs left behind" as prices rise and output picks up again, other reports anticipate another surge in employment in the field, and even a dearth of qualified workers ("oil and gas industry could hire 100,000 workers—if it can find them," warned one headline late last year).[4]

Otto and Marie Neurath.




My intention is not to adjudicate these matters, but only to make the following points: first, the effects of automation on employment are never straightforward, but depend on the relationship between output and job replacement. If output rises more quickly than jobs are replaced, the rising ratio of capital-to-labor will nevertheless result in a growing demand for jobs, rather than their scarcity. More important, for my purposes, is the atypical character of the oil sector, with respect to the relation between automation and the larger labor market. Whereas the *Times* insinuates there is something exemplary about the situation it describes ("as in other industries"), other commentators argue that the domestic oil industry is in many ways singular. In an October 24, 2016 post on the *Financial Times*'s excellent *Alphaville* blog with the title "The robot revolution may be exaggerated, globalization edition," Izabella Kaminska insists that "*aside from the oil industry* [...] there is little evidence" that we face the "loss of millions of middle-class jobs [in the near future,] as algos and robots displace not just blue-collar workers but middle management and intellectual jobs as well."[5] It need not be emphasized that the oil industry is unique in still other, more self-evident, ways: it is subject to monopoly-like conditions, as oil cartels artificially raise or lower global crude prices by releasing or holding back reserves. It is, moreover, highly politicized, as even the most casual observer might conclude, and as the devastating attack on Iraq in the interest of commanding this sector—just the latest in a long litany of 20th-century wars with this objective—attests. The political pressure to ramp up domestic production undoubtedly had effects on the changing composition of oil production, as directional drilling and hydrofracturing techniques were refined by U.S. producers. The oil industry is undeniably a key strategic node in the global economy, with the rising and falling prices of energy inputs affecting almost all other economic sectors. But, perhaps for this very reason, patterns of technological change and employment characteristic of this subsector are hard to generalize.

Even more pertinent for our purposes is this: according to the occupational employment statistics compiled and published by the Bureau of Labor Statistics, the Oil and Gas Extraction subsector currently employs 178,000 workers. Of these, only about 90,000 employees are characterized as holding "production and nonsupervisory" positions: a crowd small enough to fit easily in Pasadena's Rose Bowl. Put more pointedly, this same agency pegs the total number of workers making up the current U.S. labor force at 152

million (not accounting for the many millions who have dropped out of the workforce entirely): all employees in this subsector, including supervisors, constitute .001% of the current U.S. workforce. By contrast, the number of U.S. workers employed in "leisure and hospitality" jobs, per 2014 statistics, was 15 million; yet another 15 million were working in the so-called retail sector. The arithmetic is as simple as it is grim: the size of the American workforce serving as cooks, waiters, bartenders, and cashiers is roughly 170 times that of the total number of workers employed in the oil industry; if we consider just those workers in oil production, the blue-collar semi-skilled laborers featured in the *Times* article, the ratio of restaurant and retail jobs to those in oil and gas extraction rises to 333:1.

There is nothing surprising in this disparity. Currently some 80% of the labor force in the U.S. is classified as working in what are commonly called "services." While employment in manufacturing declined between 2004 and 2014 at a rate of 1.6% annually, 96% of net employment gains in the U.S. since the turn of the century have come in the broadly-defined service sector: a hotchpotch of occupations that lumps together retail and restaurants with other, vast sectors like education and healthcare. The trend will remain relentless. BLS projections predict that 19 of 20 jobs added between 2014 and 2024 will be in "services." The preponderant majority of these jobs will be the least attractive ones, requiring few if any skills, and paying poverty-level wages. Under the heading "Occupations with the most job growth" for the period 2014 – 24, U.S. statisticians list fifteen job profiles, eleven of them requiring less than a bachelor's degree, and the majority—including *four of the top five*—requiring "no formal education credential" at all. Not surprisingly, the average median income for these positions peaks at $31,000 per year, with the lowest dipping to $18,000, with most in the low-$20,000 range. Since 1990, the U.S. economy has registered a net gain of 34 million jobs. But these jobs are almost universally poorly paid and precarious, pooling at the very bottom of the labor market.[6]

Thus perennial fears of mass unemployment have once again been refuted by the facts, as wealthy, complex economies such as the U.S. and the U.K. continue to add jobs to the payroll. The United Kingdom, in particular, has shown incredible facility in job creation since the Great Recession of 2007, when the bottom last fell out of the job market. But real wages have lagged far behind 2007 levels, and "many of these additional workers are doing little to boost real living standards [...] their continued employment effectively the product of subsidies extracted to provide make-work, rather than the result of competitive market conditions."[7] These "subsidies" take the form of government payouts and what remains of the social wage, as food stamp programs and meager tax credits allow large firms to hire unskilled workers at cut-rate compensation. Many of the fasting-growing occupations in the U.K. as in the U.S. are not in what the *Financial Times* writer calls "make-work"—state-subsidized employment in retail, restaurants, sales, and security—but in the least desirable forms of care work, often involving cleaning, washing, and disposing of waste, or simply standing watch over the elderly, the idle, or small children. A recent report by Deloitte, a consulting group surveying labor market shifts in deindustrialized Britain, notes a nine-fold increase in nurses' assistants in the past ten years, and a six-fold jump in teachers' assistants. On the U.S. side of the Atlantic, the two

occupations expected to have the highest rate of growth over the next decade are "home health aide" (projected to grow at a 38% clip) and what is euphemistically called a *personal care aide*. This is the capitalist labor market of the early 21st century: a world of domestic servants, resembling, in this way, the archaic world of the mid-19th century. For many, often women, and more often still women of color, the employment on offer can truly be called *abject*.

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Productivity gains are still to be had in agriculture and manufacturing, but—as in the example of the oil sector—these sectors make up a tiny fraction of employment in high-income countries, and a declining fraction even in otherwise industrializing nations. As a result, the impact on jobs of still further automation in these shrinking sectors will be minimal by comparison. So it is not surprising that the core claim made by all recent commentators on the coming wave of automation is that those jobs that stand to be replaced *en masse* are almost entirely located in the service sector. This sector can in fact almost be defined as that mass of occupations and labor processes that, whatever the disparity in wages and skill level among them, have as their common trait that they are *technologically stagnant*, to use William Baumol's useful term: they exhibit, unlike capital-intensive manufacturing and agriculture, consistently anemic productivity growth.[8] As a result, what all the recent writing warning of the imminent automation of massive chunks of the economy presume is that the pattern witnessed with the manufacturing sector in the 20th century will return to ravage services in their turn: in other words, that a sector resistant to technological innovation and perennially registering minimal growth in labor productivity, will be transformed into dynamic, technologically progressive lines of production.

Jeremy Rifkin's late 20th-century prediction of an almost fully automated service sector by mid-century is received as near gospel not only by most popular writing on this theme, but also by the many on the left who have picked up on the theme: "The service sector, while slower to automate, will probably approach a nearly automated state by the mid-decades of the next century [...] Hundreds of millions of workers will be permanently idled by the twin forces of globalization and automation."[9] Peter Frase's 2016 book *Four Futures*, a social-democratic exercise imagining the social effects of near-full automation, throws up its hands and simply "takes for granted the premise of the automation optimists, that within as little as a few decades we could live in a Star Trek-like world where [...] a large amount of the labor currently done by humans is in the process of being automated away."[10] And yet Frase, like Nick Srnicek and Alex Williams in their *Inventing the Future*, devotes little energy to examining the specificity of the service sector itself. Along with most commentators on the subject, these writers rely on a single 2013 study put out by Oxford University's Martin School predicting that some 47% of U.S. jobs are "at risk" of automation.[11] Other studies pile on with even more dramatic prognostications, raising the bar closer to 80% in the not-too-distant future.[12] These accounts, which are shared by almost all commentators whatever their political

orientation or ambition, all rely on a single unexamined assumption: that the sector in which nearly all new job creation over the past quarter century has taken place will soon be decimated by a gathering legion of "intelligent" machines.

The leap in productivity and dynamism required for such a conversion of stagnant labor processes into technologically progressive ones would, moreover, take place in the midst of an epoch of historically low growth in labor productivity. A January 2017 report issued by the Bureau of Labor Statistics notes that growth in labor productivity in the U.S. for the current business cycle—dated back to the fourth quarter of 2007—is the lowest in the post-World War II era. To give a sense of how deep the damage really is, the author of the report indicates that since 2011, labor productivity has grown at an historically low level of 0.7%. Put in perspective, this would mean that in order for productivity levels to return to the historical pre-crisis trend rate over 60 years— a rate that already incorporates a steady decline in productivity over the past forty years—it would have to register an astronomical surge of 7.7% over the next two years: *eleven times the growth rate seen over the past half-decade*.[13] A full half of the overall productivity gains seen in this cycle occurred in a single year, between late 2008 and late 2009. But this modest bump in productivity did not result from an uptick in investment, or the coming online of long-promised innovations. As I have already indicated in the first part of this essay,[14] the short spurt in productivity seen during this slim interval actually resulted from *rapidly falling output* (the greatest since the 1930s) combined with an even more precipitous collapse in hours worked (a full 10% drop). In the U.K. the pattern has been slightly different, but with the same results. Employment has recovered to pre-2007 levels, but wages have remained stagnant, and productivity gains are non-existent.

Much hay has been made of this among British politicians and economists, who speak of a "productivity puzzle" for which there is, as yet, no solution. The *Financial Times* has nevertheless emphasized that since almost all of these new jobs are in low-productivity, low-wage occupations—in short, the "service sector"—the aggregate productivity rates for the economy as a whole are dragged down by the addition of so many unproductive hours to the denominator of the ratio defining labor productivity (output in money terms divided by labor hours). Many of these jobs, as mentioned, have been created with the help of strategically distributed state subsidies, allowing companies to quickly hire—but also release at the drop of a hat, or a market downturn—workers with few appropriate skills and for poverty-level wages. But the alternative is daunting in its turn. For the same article notes that the U.S. did indeed register a modicum of growth for a spell during the recovery, but only by means of "*savage* cuts in employment"; Spain has continued to raise output per hour since 2008, but this remarkable upturn comes at the price of "its *horrific* drop in employment," to the tune of over 50% unemployment among young people.[15] In the U.S., flatlining labor productivity is undoubtedly due in large part to the staggering number of workers parked in low-productivity service work, exchanged against sub-subsistence wages. And even this picture is a distorted one. For to truly grasp "the festering crisis of worklessness in America," one would also have to account for the full fifth of those proletarians in their prime working years who are out of work, or not looking anymore.[16]

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Any honest reckoning with the so-called service sector must begin by underlining that the category itself barely stands up to scrutiny. Said to comprise four-fifths of employment in the U.S. and similar high-income countries, it lumps together an enormous number of economic activities that differ in wage and skill level, location, size of enterprise, and capital-to-labor ratios. Its definition is largely negative, including anything deemed neither agriculture (farming, but also forestry and fishing), nor industry (manufacturing, but also construction and mining). A deep rift runs through the vast range of service sector occupations, between so-called business or professional services, on the one hand, and consumer or personal services on the other. The former are "intermediate inputs" provided directly to businesses, often manufacturing firms; the latter are sold to consumers able to afford them. Among the first we find an array of activities, be they design, accounting, custodial, or clerical activities, not to mention transportation services. Historically, these tasks were organized "in-house" by large manufacturing firms, rather than contracted out to autonomous firms specializing in them. Over the past forty years or so, capitalist enterprises have tended to refine the detail division of labor in ways that allow them to externalize these tasks. (Thus Apple, to take a major example, owns no factories; only a tiny fraction of the retail cost of its products is derived from their outsourced assembly in China from parts produced elsewhere.) This leads statisticians who collect these data to assimilate these activities to services, though many of them—research and design are prime examples, but so are trucking and shipping—are part and parcel of an extended manufacturing process.[17] If a significant fraction of what are counted as services by economists are in fact externalized segments of manufacturing, the statistical shift toward employment in services must be seen as at least in part an effect of an ever more ramified global division of labor.[18]

On the other hand, many nominally manufacturing firms—like Apple—today outsource production while focusing on the provision of consumer services related to these products, since the rate of return on such services is often higher than that associated with the manufactured good itself. As such examples suggest, the statistical segregation of manufacturing from services prevents us from understanding how they form an articulated whole. The history of automation suggests a complex dynamic between these two sectors, whose cyclical or spiral-type pattern requires that we think them in strict correlation with one another. This can be seen also if we look closely at the other side of the divide within "services," those aimed at individual consumers. If we remember that in the 19th century personal service occupations were more numerous than those in manufacturing, we can observe that the diminution of this sphere of personal service over the course of the 20th century can be attributed in large part to the fact that many of those services were "automated" in a very peculiar sense: they were transformed into discrete manufactured goods.[19] But this substitution of manufactured goods for services —dishwashers for domestic servants, individual automobiles for collective train service (in addition to the cart or carriage), mass-produced hamburgers for home-cooked meals —gave rise to a profusion of closely-related service occupations: jobs in sales, marketing, and repairs, not to mention insurance and consumer credit. Much of what we know as

the service economy is a direct, complementary, effect of an earlier automation of services: one might even speak of a dialectical pattern, in which a primary term (personal services) passes over into its opposed pole (manufactured good), giving rise to a new, transformed variant of the first term (new or expanded field of services). Only now, these new service occupations are organized, as they were typically not in the 19th century, along properly capitalist lines.

It is in this light that we can return to the Oxford Martin School study, cited wide-eyed by so much of the writing around automation today. Cooler heads have parsed this study's methodology and arrived at dramatically different conclusions. Distinguishing between tasks and jobs—that is, between discrete activities and occupations, which are made up of changing groupings of tasks—they have calculated that a mere 9% of current occupations in OECD countries (all of 6% in South Korea) are likely to be automated away in the years to come.[20] The meaning of this crucial distinction elided by the Oxford report is spelled out in another recent study of the effect of introducing ATMs on bank tellers: their numbers rose, if modestly, as their job responsibilities shifted from routine to more "relational" tasks.[21] In this case—although this pattern is borne out by the history of automation as well—machines displace rather than replace workers as occupations are redefined. Indeed, as the example of the ATMs suggests, the automation of services might expand the market for them: rising productivity may mean falling prices and increased demand, which might require more rather than fewer workers. This "virtuous cycle" was typical of many industries of the 20th century, as they became increasingly capital-intensive: up to a certain point in this development, the rising productivity of these lines of production and the corresponding cheaper products widened the market for them. As long as output rises faster than labor is replaced, the effect of automation will paradoxically be to draw in more labor, rather than expelling it. In the case of personal services, in particular, there is another wrinkle to be accounted for. Unlike manufactured goods, the demand for which is said to be income *inelastic* —meaning that a diminishing share of income is spent on these goods, even if incomes rise—the demand for services such as education, healthcare, and entertainment will generally rise in step with the share of income available to purchase them. Even in a world of stagnant real wages, the cheapening of some services through automation would permit more of these services to be consumed, especially as the price of manufactured goods continues to fall in its turn.

What is a service? Most accounts restrict themselves to the most formalistic of responses: a service is a commodity that is produced and consumed in the same instant or interval of time. What this often means is that a service produces no discrete or detachable object that can be kept and, say, sold in turn at a later time. Think of a massage: there is no discrete object exchanged, nor even a visible material change in my body; its consumption is inseparable from its production on the part of the masseur. In the case of a haircut—always the example in the literature on services—we have a material transformation exacted by the haircutter (the removal of hair), but the "object" thus produced is not detachable from my body: I cannot subsequently sell my haircut to a stranger, or even offer it as a gift to a friend. Because my haircut, even if it conforms to

a prevailing style, must adhere to the specific dimensions of my head and its shape, it is difficult to standardize its production. The rationalization of such a service has material limits: it cannot be automated or mass-produced without the quality of the product suffering considerably. More pertinent examples of services that resist such capitalist rationalization—labor processes not subject to intricate divisions of labor, economies of scale, or the substitution of machines for labor—are found in education and health care. Teaching tends to involve one or at most two teachers per classroom, with no complex parsing of the labor process. Productivity gains are hard to achieve without undermining the nature of the service itself. More children can be added to the classroom, but at the expense of the quality of the instruction; the time of teaching cannot be sped up beyond certain rigid limits without a similar, deleterious, effect. Think, alternately, of a nurse specializing in physical therapy: here, too, the quality of the service will be diminished severely once the number of patients reaches a certain threshold, or the time of treatment is reduced beyond a bare minimum.

Karl Marx's account of capitalist development was rooted in the assumption that labor processes would be progressively taken over by capitalist firms and, through organizational and technological innovations, rationalized in the manner I've indicated above (standardization, division of labor, automation). This increasing subordination of labor processes to the demands of capitalist valorization entailed, in Marx's term of art, a rising organic composition of capital: as capitalists reorganize the production of use-values in order to bend them to the imperatives of profit-making, machinery takes the place of human labor. As labor processes become more machine-intensive, the ratio of what Marx calls surplus labor to necessary labor (i.e. the labor necessary to reproduce the worker's existence) rises in turn, because in society as a whole less labor is required to produce workers' consumption goods. This changing composition of capital means, Marx's theory tells us, that the *rate* of surplus value thrown off by the production process steadily rises as work is increasingly automated. But, and here is the rub: Marx notes that since the total amount of labor incorporated in the production process must necessarily taper off in this scenario, the *mass* of surplus value generated, measured against total capital investment, will in turn decline, even as the rate of surplus value—the amount thrown off per unit of labor—rises. Such a scenario, Marx hypothesized, would mean that as production becomes more and more mechanized, and productivity rises in turn, the general rate of profit for the capitalist economy as a whole would paradoxically (paradoxically because bourgeois political economists, having no conception of the distinction between surplus value and profit, assumed that rising productivity meant rising profit rates) diminish over some indeterminate amount of time. This declining profit rate would, at a certain point, produce a crisis of accumulation, as capitalist firms find the return on investment too low to initiate new rounds of technological innovation.

As it turns out, the capitalist mode of production has experienced a slowly unfolding crisis of accumulation over the past forty years, punctuated by sudden, and near lethal, collapses: since the early 1970s, we have witnessed diminishing productivity, falling profit rates, and stagnant and even declining real wages. And yet where Marx imagined the

rude disciplining of social production to the tune of capital's drive to self-valorization, and thereby the eventual rationalization—even automation—of labor processes in order to serve the needs of this expanding mass of value, ours is a world in which the vast majority of labor market-dependent proletarians are compelled to perform tasks that resist what Marx called "real subsumption" under capital, their re-shaping through mechanization to meet the productivity requirements of capital. This is the world of services such as I have defined them above. These labor processes can only be *formally* organized along capitalist lines: personal services that were formerly offered by self-employed domestic servants, or performed without compensation by women in the home, are incorporated into profit-making enterprises, and performed by workers for wages. Fast-growing occupations like the home health aide, or the personal care aide, are particularly refractory to the productivity increases promised by capitalist refinements. These types of labor processes, which are increasingly the norm for the majority of the population of rich countries like the U.S. and Britain, can generate higher output solely by longer working days, or the hiring of more workers. Because they are so labor-intensive, with little capital spent on machinery, plant, or raw materials, capitalist profits in this sector are inversely correlated with wage levels: any rise in the latter squeeze the former. It is for this reason among others that most of the fastest growing occupations in the high-income countries pay so poorly: any rise in wages would either raise prices, eating into demand, or come directly out of capitalists' pockets.[22]

Accordingly, if we return to the rift within the service sector at which we started, we can speculate that it is those occupations in business and professional services (accounting, finance, the treatment of data, etc.) that are most likely to suffer the direct effects of a new wave of automation. Whether these fields can experience sizable gains in productivity is another question entirely. But if we assume that innovations in machine-learning and artificial intelligence will make headway in these lines of work, those whose jobs are usurped by the machines will be forced into the provision of low-paid, precarious consumer and personal services. If the Bureau of Labor Statistics's projections are to be believed, this migration might already have been triggered. Most contemporary speculation concerning the automation of the service sector not only neglects this sector's specific features, they also implicitly assume that the number and type of occupations are finite or fixed. To the contrary: the colonization of human activity by the service sector has most likely only begun. In principle, the entire range of human activity is subject to segmentation; these segments can be transformed into occupations, which in turn can be organized along capitalist lines. Responding to the Oxford Martin School report on the "computerization" of current occupations, Paul Mason notes that should half of these jobs indeed be wiped out, the result might be less mass unemployment than a vertiginous explosion of the "human services sector":

We would have to turn much of what we currently do for free, socially, into paid work. Alongside sex work we might have "affection work": you can see the beginnings of it now in the hired girlfriend, the commercial dog-walker, the house cleaner, the gardener, the caterer and the personal concierge. Rich people are already surrounded by such post-modern servants, but to replace 47% of all jobs this way would require the mass

commercialization of ordinary human life [This would] push commercialism into the deep pores of everyday life, [and] make resisting it a crime. You would have to treat people kissing each other for free the way they treated poachers in the 19th century.[23]

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How does the complexity and fragmentation of the vast, motley service sector affect workers' capacity to organize themselves across occupational types, in view of building anew forms of worker power appropriate to the 21st century?

A widely cited paper from the late 1990s on the causes of deindustrialization, written under the auspices of the International Monetary Fund, sizes up in its conclusion the potential effects of the growing concentration of employment in the slow-growth, technologically stagnant service sector of the economy. The co-authors, Robert Rowthorn and Ramana Ramaswamy, emphasize how the fragmentation of this sector, riven by cleavages in skills and wage levels, combined with the material disparity of the concrete labor processes lumped together under this label, will undoubtedly pose insurmountable obstacles to rebuilding powerful trade unions like the UAW of the late 1930s sit-down strikes. "Trade unions," they warn, "have traditionally derived their strength from industry, where the modes of production and the standardized nature of the work have made it easier to organize workers."24 The historical workers' movement and the industrial unions of the mid-20th century endeavored, through the institution of collective-bargaining agreements, to reduce wage differentials across industries. This objective was formulated not simply on the basis of infra-class solidarity among workers, but on the tendency, driven by competitive pressures among firms, for technological innovations to spread across lines of production and eventually sectors. As firms across the economy adopt similar techniques, the different working conditions of various class segments are smoothed out and over. The rising ratio of machinery and raw materials to labor employed assures a tendential material density of the class. Comparable skill levels, wages, and working conditions prevail in massive plant facilities bringing together thousands of workers at each individual site. The workers' movement itself was at once the product and reflection of this convergent material unity of the capitalist mode of production: if worker struggles of the 19th century in part impelled the development of the forces of production (compared with the conflicts over the length of the working day), the generalization of this development across lines of production in the early twentieth century shaped the class into a compact and often militant mass. This is what James Boggs, the militant auto worker I cited in the first article of this series, had in mind when he spoke of the "embryo of a socialist society" gestating within this one, "united, disciplined and organized by capitalist production itself."

In her magisterial study of the history of the workers' movement, Beverly Silver underlines the way the objective splintering of the service sector outlined by Rowthorn and Ramaswamy is reflected in the isolation of these workers from one another, and their distance from the strategic leverage points enjoyed by workers in fields as different as manufacturing and education. Those who work in the automotive industry (as with

Boggs, her key example) are imbricated in a tightly articulated detail division of labor: a work stoppage at one point in the production sequence can bring the entire process to a halt. Teachers, on the other hand, operate with relative autonomy in their classrooms, less affected by a ramified technical division of labor. At the same time, a large-scale strike by educators might reveal their crucial place in the so-called social division of labor, causing widespread disruption at least at the local level, as parents scramble to find someone to care for their children. Workers in the oil sector, however tiny it may be, are able to disrupt the entire functioning of the capitalist economy at least the national level, as recent struggles in France (in 2010 and 2016) have shown. Workers who find themselves stranded in low-wage service occupations in retail or hospitality (together, one fifth of the work force) have no such leverage: their workplaces are often dispersed and small in comparison with the great industrial concentrations of the past, and they have little fixed capital to idle. Silver can point to important if modest recent victories by workers in these fields, but avers that such successes have come despite the distance of these workplaces—in the case of retail, restaurants, and similar types of work—from the levers of production and social reproduction. They have instead had to "follow a community-based organizing model rather than a model that relies on the positional power of workers at the point of production."25 It is, however, these pre-existing community ties—neighborhoods, languages, religion—that the ever-expanding ambit of the personal services sector threatens. If these were the foundations of the old workers' movement, whose forms of mutuality and self-aid often relied on affinities derived from ethnic, cultural, and geographical proximity, they are today everywhere in tatters, as the social fabric is chewed through by the corrosive effects of money and markets, and communities dissipate into warring, atomized, dysfunction.

In the early 1960s, Boggs foresaw a day when a large number of those expelled from the factories of northern industry would have "nowhere to go": these were the "surplus people," "the expendables of automation." Today the children and grandchildren of these surplus people remain trapped in collapsing cities, far-flung suburbs, and rural ruins. They scrape by on part-time precarious work and tenuous lines of extortionate credit, commuting to and from work an hour each way, surveilled by heavily armed cops as they make their way home from the bus stop. Some run rackets and hustles, while others sink into depression, or drugs. For many, prison is always near.

Boggs foresaw a world of outsiders, on the margins of the wage relation, yet whose every move was hounded by money. To those who imagined rebuilding the AFL-CIO of the two decades prior, he could only say, dream on. The union was lost, he wrote with *sangfroid*, the moment the bosses brought in the computer-controlled machines. The cause of unionism was lost before that: never setting out to attack the bases of capitalist society, it became part of it. "Historically, workers move ahead," Boggs wrote, in imaginary retort to those who want to reactivate older figures of organization. "*That is, they bypass existing organizations and form new ones uncorrupted by past habits and customs*." Boggs was careful not to venture details about what shapes these organs might take; he did not promise they will reconcile the class fractions churned out by changes in the composition of capital. American workers (a term ample enough to envelope his

"surplus people") would, should they take command again over their own lives, have to launch a "revolt powerful enough to smash the union, the company, and the state." But Boggs's accent was less on negation than discovery. Surrounded by "labor leaders and well-meaning liberals" proposing gimmick upon gimmick in hopes of saving the reigning social order, Boggs wagered on these "outsiders," who will have to compose, and soon, a "new way to live." What he said then is just as true now:

*The means to live without having to work are all around them, before their very eyes. The only question, the trick, is how to take them*.[26]

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Endnotes

1. Matthew C. Klein, "Osbourne's unorthodox solution to the U.K. productivity puzzle," *Financial Times*, November 3, 2015.
2. Clifford Krauss, "Texas Oil Fields Rebound from Price Lull, but Jobs are Left Behind," *New York Times*, February 19, 2017.
3. BLS data indicates a 65% increase from 2004 – 14; with support activities, the increase is closer to 150%.
4. Tom DiChristopher, "Energy jobs: Oil and gas could hire 100,000 workers—if it can find them," CNBC, July 8, 2016.
5. Izabella Kaminska, "The robot revolution may be exaggerated, globalization edition," *Financial Times*, October 24, 2016.
6. See the summary table published by the BLS at BLS.gov.
7. See Matthew C. Klein, "Osbourne's unorthodox solution to the U.K. productivity puzzle," *Financial Times*, November 3, 2015.
8. On the distinction between technologically progressive and stagnant sectors, see William J. Baumol, *The Cost Disease: Why Computers Get Cheaper and Health Care Doesn't* (New Haven: Yale University Press, 2012).
9. Jeremy Rifkin, *The End of Work: The Decline of the Global Labor Force and the Dawn of the Post-Market Era* (New York: Penguin, 1995), 291.
10. Peter Frase, *Four Futures: Life After Capitalism* (New York: Verso, 2016).
11. Carl Benedikt Frey and Michael Osborne, "The Future of Employment: How Susceptible Are Jobs to Computerisation?," Oxford Martin School, September 2013.
12. Stuart W. Elliott, "Anticipating a Luddite Revival," *Issues in Science and Technology* 30:3 (Spring 2014).
13. Shawn Sprague, "Below trend: U.S. Productivity slowdown since the Great Recession," Bureau of Labor Statistics, January 2017, 6:2.
14. See "Nowhere to Go: Automation, Then and Now, Part One," *Brooklyn Rail*, March 2017.
15. "Osbourne's Unorthodox Solution to the U.K. Productivity Puzzle."
16. Sarah O'Connor, "America's 'jobs for the boys' is just half the employment story," *Financial Times*, February 7, 2017.

17. This trend, sometimes awkwardly called “servitization,” is a key contemporary trend that would require a separate treatment to explore its genesis and its implications. I hope to do so elsewhere. Nick Srnicek’s recent *Platform Capitalism* (Polity, 2016) offers important insights into this ongoing mutation.
18. Richard Walker, “Is there a service economy? The changing capitalist division of labor,” *Science & Society* 49:1 (Spring 1985), 42 – 83. A version of this article was republished as the second chapter of *The New Social Economy: Reworking the Division of Labor* (Blackwell, 1992). I thank Paul Mattick for this reference, and for his salutary criticisms of earlier drafts of (both parts of) this essay.
19. Jonathan Gershuny’s *After Industrial Society?: The Emerging Self-Service Economy* (Palgrave, 1978) theorizes this replacement of personal services with consumer appliances. Here I should note my debt to the essay “Misery and Debt” published in the second issue of the journal *Endnotes*, and more specifically the section “Surplus Populations under Deindustrialization: Service Work and Slums,” *Endnotes* 2 (April 2010): 37 – 42. My own modest contributions to the discussion of automation, unemployment, and the service sector could be seen as a long footnote to this important essay.
20. M. Arntz, T. Gregory, and U. Zierahn, “The Risk of Automation for Jobs in OECD Countries: A Comparative Analysis,” *OECD Social, Employment and Migration Working Papers*, 189 (Paris: OECD Publishing, 2016).
21. James Bessen, “Toil and Technology,” *Finance & Development*, March 2015, 52:1, 16 – 19.
22. Some readers will note that much so-called service work might be better called “circulatory labor,” whose function is less to produce value (and surplus value) than to secure the exchange of commodities against money in the sphere of circulation. Here the concepts of productive and unproductive labor, such as they are criticized and reworked by Marx in a number of places in his later work, would offer a more coherent categorical framework for understanding what bourgeois economists refer to as the service sector. I hope to tackle this in a short book on the subject.
23. Paul Mason, *Postcapitalism: A Guide to Our Future* (New York: Farrar, Straus and Giroux, 2015), 174 – 75.
24. Robert Rowthorn and Ramana Ramaswamy “Deindustrialization–Its Causes and Implications,” IMF Working Paper, April 1997, 22.
25. Beverly Silver, *Forces of Labor: Workers’ Movements and Globalization since 1870* (Cambridge: Cambridge University Press, 2003), 113 – 22; 172.
26. James Boggs, *The American Revolution* (New York: Monthly Review Press, 2009), 52.

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