

Automation and the Future of the American Workforce

By DWIGHT D. MURPHEY

Jeremy Rifkin's *The End of Work* (1995) was the first book this reviewer read about automation's impact on jobs. Since then, a great deal has been written about both automation itself and its effects on industry and employment, including by Martin Ford in his 2009 book *The Lights in the Tunnel*. Readers who are not already well versed in the gale-force winds caused by automation will find his new book's review of the broad range of recent developments compelling and informative. It would seem, however, that this book's most important feature lies in his joining the many thoughtful observers who point to how America's market economy (and, more broadly, society in general) must be restructured to meet the realities of what can only be described as a radically changing world.

By way of summary, he reminds us that "the hollowed-out middle of the already polarized job market is likely to expand as robots and self-service technologies eat away at low-wage jobs, while increasingly intelligent algorithms threaten higher-skill occupations." As this occurs, "the bulk of consumers may eventually come to lack the income and purchasing power necessary to drive the demand that is critical..." If so, "it is difficult to see how a modern mass-market economy

could continue to thrive." If this is allowed to happen, not only will that economy lose its foundation, but other consequences are bound to follow: the innovation that at present offers so much promise for a near-utopian future will wither with it; there will be social chaos with all its horrific dangers and costs; and even the very wealthy, despite hunkering down in gated communities, will find their lives greatly affected.

RISE OF THE ROBOTS

Technology and the Threat of a Jobless Future

By Martin Ford

Basic Books, 2015

352 pp., \$28.99



Much of the book recounts the more recent developments. We will want to review that information before discussing what Ford says about what society must do now. Understanding the technical revolution is a necessary prologue.

RECENT DEVELOPMENTS

The computerization

Ford reminds us that "Moore's Law" posits that "computing power roughly doubles every eighteen to twenty-four months." Amazingly, computing power has doubled 27 times since 1958, and Ford tells us that it is likely to continue through such things as "3D flash memory chips" and "exotic carbon-based materials" that will replace silicon.

This increase in power has made many things possible, including "big data collection," the "cloud," and "artificial neural networks." GPS (the Global Positioning System) relies on "vast amounts of extremely detailed mapping data." The cloud calls into play "massive collections of servers connected to the Internet." And artificial neural networks, which Ford tells us were first "conceived and experimented with in the late 1940s,"

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have led to “deep learning” systems that “already power the speech recognition capability in Apple’s Siri and are poised to accelerate progress in a broad range of applications that rely on pattern analysis and recognition.”

Ford devotes a chapter to the efforts to expand “artificial intelligence” beyond the “narrow” form now used in virtually all cybernetics. This chapter is unlike the others, which are firmly rooted in present realities, by introducing us to what is perhaps the most futuristic of the Silicon Valley infatuations. There are dreamers, so to speak, who talk of a “Singularity.”¹ They anticipate the development of a “true thinking machine” that will (in the words of John von Neumann, who in the 1950s first used the term in connection with computers) reach a point “beyond which human affairs, as we know them, could not continue.” The speculation extends to the merging of computers with people and to possible immortality through our reaching “longevity escape velocity.”

Be all that as it may, the developments already here (and the many that are coming soon) are rapidly changing all sorts of activity. “Significant inroads” have been made in the aerospace industry, for example, with the expectation that by 2020 “General Electric’s aviation division [will use] 3D printing to produce at least 100,000 parts.” 3D printers are coming into use in food preparation to produce foods of all kinds, some totally unique, with

the prospect that “someday 3D food printers will be ubiquitous in home and restaurant kitchens.” “Bio-printing” involves the creation of human body parts through “3D-printing material containing human cells.” Ford thinks some of the most striking changes will come in the construction industry, where a “massive 3D printer” is being built “capable of fabricating a house in just twenty-four hours.”

It’s not surprising that *Rise of the Robots* tells a lot about robotics. Here’s a fact that may nevertheless surprise readers: “In 2012, Foxconn — the primary contract manufacturer of Apple devices — announced plans to eventually introduce *up to a million robots* in its factories” (our emphasis). The technological revolution that has for many decades transformed agriculture has accelerated: “Robotic milking machines are in common use on dairy farms, and... chickens are grown to standardized sizes so as to make them compatible with automated slaughtering and processing.” Ford says “one

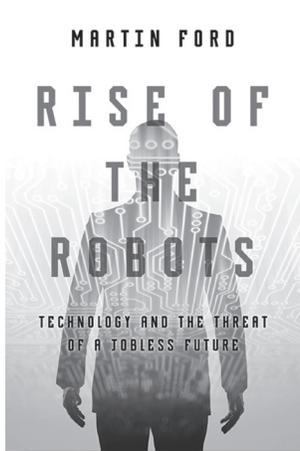
of the most important propellants of the robot revolution may turn out to be ‘cloud robotics,’” which calls upon “powerful, centralized computing hubs... [that will give] individual robots access to network-wide resources.” Ford devotes several pages to the “astonishing progress” that is being made toward “autonomous cars” (robotic vehicles). In the United States, the Defense Advanced Research Projects Agency (DARPA) has taken giant steps toward autonomous military vehicles. Google has been especially active: “As of 2012, Google’s autonomous fleet had driven over 300,000 accident-free miles on roads ranging from freeways jammed with stop-and-go traffic to San Francisco’s famously convoluted Lombard Street.”² Most car companies, Ford says, are now innovating in this area, with Mercedes-Benz in the lead as he wrote.

The impact on jobs

As exceptions to the general trend, Ford says, higher education and health care “have, so far, been highly resistant to... disruption,” but even in those areas he tells of recent developments that will soon shake things up. In *higher education*, elite universities are offering online courses with expensive graphics and top professors. Among these are MOOCs (“massive open online courses”), low-cost (or even free) courses which are to be made available to large numbers of students worldwide, and are receiving generous support from universities and companies like Google. In *health care*, artificial intelligence is introducing computer diagnostics, which causes Ford to surmise that a new medical specialty of computer diagnosticians may develop. Radiologists will likely be displaced by “image processing and recognition technology.” Pharmacies are moving into automation, as illustrated by what’s happening at the University of California Medical Center in San Francisco, where “a pharmacist never touches a pill or a medicine bottle” as 10,000 prescriptions are filled daily. Robots are increasingly used in hospitals, where “machines already cruise the hallways delivering drugs, lab samples, patient meals, or fresh linens.” (One of this reviewer’s summer jobs while in college was doing precisely those things at Denver General Hospital.) Robotics for the care of the elderly has been slow to develop, but the aging of Japan’s population is causing that country’s government to sponsor innovation to address a fast-growing need.

Although Ford says those areas have been slow to change, here’s a quick review of some where the changes are faster:

White-collar, college educated: Ford writes that “employment for many skilled professionals — including lawyers, journalists, scientists, and pharmacists — is already being significantly eroded by advancing infor-



mation technology.” Many knowledge jobs have been offshored to low-wage workers who serve in call-centers or do such things as IT work, tax preparation, and legal research. Artificial intelligence can write automated articles (said to be of quite acceptable quality) in “a variety of areas, including sports, business, and politics.” Language translation is now provided free by online algorithms. In business, “layers of middle management will evaporate” (and already have). In 2012, the London Symphony Orchestra played the “artistic and delightful” *Transits — Into an Abyss*, which is “music composed entirely by... a cluster of computers running a musically inclined artificial intelligence algorithm.”

Manufacturing: Ford cites a study that reports that “about 22 million factory jobs disappeared worldwide between 1995 and 2002” — even as “manufacturing output increased 30 percent.” We think of China as having an over-abundance of cheap labor, but, spurred on by the rapid aging of its population caused in part by its one-child policy, it has turned toward technology, so that “Chinese factories are moving aggressively to introduce robots and automation.” In the United States, there has been “a relentless sixty-year collapse in manufacturing employment.” (Ford ascribes this to “advancing technology,” but that is too simple; we know that import-driven trade imbalances in the hundreds of billions of dollars, outsourcing and offshoring, have coincided with the technology.)

Mining: “Employment in the mining industry has been decimated,” Ford says, “not by environmental regulation but by mechanization.”

The service sector: It is common to say that the jobs lost in manufacturing will be replaced by others in the service sector, but that is not to say that those jobs will not themselves see the impact of automation. Americans have long become accustomed to ATMs’ doing some of what bank tellers have traditionally done, and self-service checkout lanes reducing the number of employees needed in supermarkets. In food service, automation is beginning to replace hamburger flippers, and touch-screen ordering systems are cutting back the need for wait-staff. Even though home health care aides are poorly paid, we saw above how Japan is hoping to have that work done by robots.

Finance: Automated trading algorithms and other automation, Ford says, have enormously affected employment in finance. “At the turn of the twenty-first century, Wall Street firms employed nearly 150,000 financial workers in New York City; by 2013, the number was barely more than 100,000 — even as both the volume of transactions and the industry’s profits soared.”

Retail sales: “Salesperson” is one of the types of employment most expected to grow, but online retailers are knocking out one large retail chain after another. Ford

points, also, to the “explosive growth” of “intelligent vending machines and kiosks.” The “automats” at which this reviewer often ate while he was a graduate student in New York City were good then, but we had little thought that “sophisticated machines” would come into being that would sell “consumer electronics products” and, with “video screens and targeted point-of-sale advertising,” almost anything else that can be sold. Few employees are needed even for a fleet of thousands of kiosks.

Construction: “Untold millions of jobs” stand to be displaced by automation in this huge, labor-intensive industry. Ford especially anticipates the impact of “3D printers scaled up to construction size” (such as the one referred to earlier for building a house in just one day).

THE SOCIAL, POLITICAL CONSEQUENCES

A famous person is often introduced as “a man who needs no introduction.” After all that has been written about them, it would seem unnecessary to do more than point to the consequences of what we have been describing. Adjusted for inflation, the average American worker’s wages, Ford tells us, have fallen by 13 percent since their high point in 1973. Wives’ working has kept many families afloat. The income earned by people with bachelor’s degrees is declining, even as student loan debt climbs astronomically. Ford says MIT economist James Poterba has “found that a remarkable 50 percent of American households aged sixty-five to sixty-nine have retirement account balances of \$5,000 or less.”

The growing polarization of income and wealth is often noted. “Between 1993 and 2010 over half of the increase in U.S. national income went to households in the top 1 percent... Since then, things have only gotten worse.” One of the possible effects is “political capture by the financial elite,” a phenomenon much in evidence in recent years and one that in 2016 has contributed to a populist revolt in both major American political parties.

It has long been a truism in economic thought that wages go up when productivity rises. Ford says this link has collapsed. “The nearly perfect historical correlation between increasing productivity and rising incomes” [has broken down]. We might add that because the link was both empirically evident and postulated by economic ratiocination, the disappearance of that link should make economic thinkers go back to their theoretical drawing boards. It should cause a major rethinking of the ideology that currently undergirds the market economy.

‘BASIC INCOME GUARANTEE’

It is really quite an old insight that much wealth is acquired as an “unearned increment,” with additional value being added by human effort. The unearned incre-

ment comes when something of value exists in nature or is caused by the growth of population, of accumulated science and technology, or of civilization itself. The work, innovation, and organizing skill of individuals and firms are of vital importance, but the insight perceives that it is a mistake to think that they alone are the creators of wealth.

This has long been brushed aside by the main flow of conventional thought about private property. That one's income and property holdings are one's own, although not entirely unconditionally, has been considered a fundamental principle of a free society with its capitalist (i.e., market) economy. Neo-classical economics and the classical liberalism of which it has been a part have historically chosen to ignore, for example, such a thinker as Henry George, who, though adamantly pro-free market, believed the unearned increment from land and minerals should be taxed as a source of funds that could be applied to general public purposes. Opponents of socialism have considered that any such deviation from the exclusivity of claims to private property must be inspired by the critics of private ownership. It is likely that one of the main reasons classical liberalism turned its back on George was precisely the worry that socialists would run with the concept of unearned increment, making it a vehicle for abolishing the private ownership of wealth.

The idea could in fact be used in that way. But that isn't the whole story. The case for private property and a market economy would have been immeasurably strengthened, and many of the Left's criticisms preempted, if the unearned increment had been seen as a legitimate source for a common fund. Certainly any element of "class struggle" would have been muted. The choice to pass over Henry George was not a wise one.³

Moreover, there have been several prominent thinkers who, though definitely not socialists, have seen what George saw. The train of such people goes back so far that it is in fact misleading to attribute the ideas exclusively, or even mainly, to George. We saw in our review of economist Michael Hudson's book *Killing the Host* (in this year's Summer issue) that Hudson traces the idea back to the French Physiocrats. Of "Adam Smith, David Ricardo, John Stuart Mill, and their contemporaries," he says that "their major aim was to prevent landlords from 'reaping where they have not sown.'" He quotes a passage from Mill's *Principles of Political Economy* supporting a "general land-tax" against the part of the land-value that was not due to the "industry exerted by the proprietor." Hudson devotes pages to the late nineteenth century American economist Simon Patten on the same subject.

In a recent book that itself argues for a citizen's dividend,⁴ Peter Barnes tells of Thomas Paine's proposal in the late eighteenth century for a "National Fund" based

on taxes on "ground rent" paid by landowners. He cites similar views by Nobel-Prize-winning economist Herbert Simon; "liberal" economists Robert Theobald, James Tobin, Paul Samuelson, and John Kenneth Galbraith; and ("free market" thinkers take note) "conservative" commentators Bill O'Reilly and Lou Dobbs. The distribution of a "citizen's dividend" has been in operation since 1980 in Alaska, where the "Alaska Permanent Fund," derived from revenues from the state-owned North Slope oil field, pays a "universal dividend" to each Alaskan. Barnes says "the most spectacular addition occurred in 2008 at the behest of Republican governor Sarah Palin." In a year of "soaring gasoline prices and unprecedented oil company profits," Palin put on an excess profits tax that increased each citizen's dividend by \$1,200.

In the book we are now reviewing, Martin Ford tells of other examples. He mentions "conservative [actually, "libertarian"] social scientist Charles Murray's 2006 book *In Our Hands: A Plan to Replace the Welfare State*," which endorsed a guaranteed annual income. Perhaps most significantly, because of the pre-eminence assigned to Friedrich Hayek by contemporary market thinkers, he tells of Hayek's support for a "basic income guarantee." In *Law, Legislation and Liberty*,⁵ Hayek wrote that "the assurance of a certain minimum income for everyone, or a sort of floor below which nobody need fall even when he is unable to provide for himself, appears... to be a wholly legitimate protection against a risk common to all...."

Even this recital of supporters is by no means exhaustive, and listing them does an unavoidable injustice to those not mentioned. For our purposes here, it is enough to make it clear that the ideas of unearned increment and of a citizen's dividend are by no means socialist.

Martin Ford concludes *Rise of the Robots* with a chapter entitled "Toward a New Economic Paradigm" that joins this intellectual tradition. He sees that the convenient call for more education, especially in vocational work, falls far short of what will be needed to address technology's displacement of industries and employments. "In my view," he says, "the most effective solution is likely to be some form of basic income guarantee." He sees such a guarantee not as a way to have "government intrude in personal economic decisions," but as a way to "give everyone the means to go out and participate in the market." Martin believes many now-existing government programs — "the minimum wage, food stamps, welfare, and housing assistance" — would become unnecessary. A great advantage would be that "extreme poverty and homelessness in the United States might effectively be eradicated." Moreover, the market economy, its productivity and innovation, would not dry up through an ever-diminishing level of

consumer spending; in an age when employment ceases to provide a livelihood for large numbers of people, the consumption made possible by a basic minimum income would provide an essential component of the economy's successful operation. Martin sees, too, that a "consistent flow of purchasing power streaming to consumers" would help against the business cycle, acting as "a powerful economic stabilizer." His chapter discusses a number of additional aspects, including some inquiry into how the income guarantee might best be administered and funded. A point he does not make, perhaps because he doesn't want to introduce anything that might appear overly dramatic, is one this reviewer believes should be taken very seriously: the need to prevent the social chaos and even revolution that are almost certainly going to happen if people, through no fault of their own, have no replacement for their loss of access to income.

The insight shared by Thomas Paine, Henry George, John Stuart Mill, and others about unearned increment and the benefits from a common fund had merit long before our age of cybernetics and robots made the displacements from "non-labor-intensive" technology so critical. In that earlier time, the insight was mainly one about fairness and what would make a free society work best. This reviewer was jolted into the insight much later, most strikingly through Rifkin's *The End of Work*. The need for a "basic income guarantee," a "citizen's dividend," or a "DemoGrant" (all of which are names for pretty much the same thing) has by now become critical. So long as the market economy produced a broad middle class there was no crisis. As it increasingly ceases to do so, however, the time has come for, as Martin says, a "new paradigm."

This reviewer has offered his own approach to the subject in his book *A Shared Market Economy* (now available on Kindle). It is worth mentioning here because it suggests some additional dimensions. As with Martin's and Barnes's books, he reviews at length the marvelous new technologies — and both the utopian possibilities and whirlwind of displacement they bring in their wake. He adds, however, a detailed explanation of free market ideology and of how each premise within it should be questioned and reformulated, not to overthrow it but to make it sounder and more serviceable, precisely to those who are most devoted to a market economy. That reexamination of the intellectual foundations of a market economy is something all free market advocates should examine closely.

A further addition is one he especially does not want to have lost sight of as more and more people come to realize the necessity of a citizen's dividend. This raises a point that goes to the heart of individual liberty under the new dispensation. It is that the mechanism for funding and distributing the grant be structured in such

a way as not to give government directive power over economic activity and over people's choices as consumers. This is important when we realize that a massive system of income distribution creates a center of potentially great power.⁶ The proponents of every perceived social good will have an intuitive temptation to "attach strings" as part of the system. No doubt "strings" can be well intended and even beneficial. They can also, however, be the means by which ideology, fads, real or bogus science, or special interests take control over what would otherwise be a society founded on voluntary interaction and individual choice. Let there be no doubt about it: this will be one of the decisive places where the timeless conflict between individual liberty and the various forms of paternalism will have to be resolved. Instead of allowing the income-distribution system to become the great regulator, a free society will do better to call upon its ordinary processes of legislation, law, culture, and ethics for decisions on the society's many issues.

Rise of the Robots is a book that deserves every reader's serious attention. It's a fascinating, easily readable, and important work. ■

Endnotes

1. Ford explains that "singularity" is a word used in astrophysics when speaking of "the point within a black hole where the normal laws of physics break down." As with so many words in the English language, the computer world has appropriated it, making it one of its own.
2. In May 2016, *Bloomberg Business Week* reported that Google's total miles has grown to 1.4 million.
3. We should mention, too, that since the late 1950s socialist thought has moved away from the idea of abolishing private property, preferring to control the "commanding heights" of an economy. This in itself lessens the danger thought to be posed by Henry George's idea.
4. See Peter Barnes, *With Liberty and Dividends for All* (2014), which we reviewed in our Fall 2014 issue, pp. 376-386. The review may be accessed free of charge at www.dwightmurphey-collectedwritings.info as BR178 (i.e., book review 178).
5. Friedrich Hayek, *Law, Legislation and Liberty, Volume 3: The Political Order of a Free People* (Chicago: University of Chicago Press, 1979, pp. 54-55).
6. A principle of American government has long been a "division of powers." This suggests that it may be desirable to split the distribution mechanism, with each state administering its own. There will no doubt be many details to be worked out as the citizen's dividend idea comes into widespread debate.