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Cover Photo: Courtesy Honda Motor Co.



It's Stupid Season. Have You Been Vaccinated?

How the press turned a local issue into the first controversy of the 2016 presidential campaign.

IT'S NEVER TOO EARLY to be reminded how willfully awful the political press can be during presidential campaign season.

In early February, some 11 months before the 2016 Iowa caucuses, a four-day foofaraw over vaccines provided a template for the tendency of the Fourth Estate and the partisans who game it to direct coverage away from government policy and toward a falsely Manichean separation between Team Science and Team Stupid.

It all started innocuously enough, with President Barack Obama going on the *Today* show February 2 and being asked by Savannah Guthrie whether, in the wake of increasing measles outbreaks near Disneyland and elsewhere, “there should be a requirement that parents get their kids vaccinated.” The president then said three things that just about everyone on allegedly opposing sides of the resulting debate would also stress over the coming week: that “measles are preventable,” that “you should get your kids vaccinated,” and—through his spokesman Josh Earnest the following day—that “it shouldn’t require a [federal] law for people to exercise common sense and do the right thing.”

Given the volume and tenor of the ensuing brouhaha, you’d be forgiven for thinking that vaccine policy is largely determined by Washington. “The measles vaccine,” wrote *Los Angeles Times* columnist Robin Abcarian, in a sentiment shared widely among the political press, “has become the first important controversy of the 2016 Republican presidential primary.”

Yet when my second daughter was born in late January, it wasn’t the White House or the Centers for Disease Control and Prevention (CDC) that dictated which shots would be given

and recommended at the hospital, it was the city and state of New York. In January of this year, for example, New York City took the unusually aggressive step of mandating not just a measles or whooping cough vaccination but a flu shot for any child entering a city-licensed preschool or day care facility. (Parents can apply for medical or religious exemptions.) This despite reports from the CDC that this year’s flu shot has an anemic effectiveness rate of 23 percent.

But journalists were not very interested in the areas of vaccine policy that are actually debatable. They just wanted to find fools and laugh at them. “The vaccination controversy is a twist on an old problem for the Republican Party: how to approach matters that have largely been settled among scientists but are not widely accepted by conservatives,” wrote *The New York Times* in its news pages. Lefty commentators were more direct: “Republican Party Comes Out Against Basic Hygiene, For Freedom,” went one headline in *Wonkette*.

Observers with memories longer than one week may recall that the anti-vaccination movement arose largely (though certainly not exclusively) from the progressive left, through celebrities such as Robert Kennedy Jr. and Jenny McCarthy and in publications such as *Rolling Stone* and *The Huffington Post*. The current measles outbreak is centered in the Democratic-dominated state of California, where local anti-vaccination rates correspond well with progressive concentration. There is some heavy-breathing skepticism from the fringes of libertarianism (sample 2014 headline from LewRockwell.com: “The CDC’s Cover-Up On Autism and the MMR Vaccine”), but as a matter of overall policy and politics the American mainstream continues to be heavily pro-

vaccine, and the anti- side is distributed pretty evenly across the political spectrum.

So why were Republicans in the cross-hairs over immunization? Because presidential hopefuls Gov. Chris Christie of New Jersey and Sen. Rand Paul (Ky.) expressed their fundamental policy agreement with the president while using language that raised alarm bells among political reporters.

Christie, while traveling in London, was asked whether Americans should vaccinate their kids. He replied: “All I can say is that we vaccinated ours. That’s the best expression I can give you of my opinion. It’s much more important, I think, what you think as a parent than what you think as a public official. And that’s what we do. But I also understand that parents need to have some measure of choice in things as well so that’s the balance that the government has to decide. But I can just tell people from our perspective, Mary Pat and I have had our children vaccinated and we think it’s an important part of making sure we protect their health and the public health.”

To make this statement controversial, you have to assume that Christie is referring *only* to comparatively no-brainer vaccinations, like those against measles, rather than more questionable interventions, such as mandatory flu shots and infant immunizations against the comparatively less communicable Hepatitis B. Indeed, the governor clarified the next day that the measles mandate makes perfect sense. It also helps to be ignorant of the fact that 48 of the 50 states already allow parents at least “some measure of choice,” in the form of opt-outs for religious and broader philosophical reasons.

Christie also pre-contributed to the controversy through his statement in 2009 that he will “stand with” parents of autistic kids in “their concern over New Jersey’s highest-in-the-nation vaccine mandates,” thus seeming to lend credibility to a linkage that by then had already been discredited, and would soon thereafter be retracted by its source. (Though that didn’t stop Hillary Clinton and John McCain from making similar statements the year before, for which their careers did not suffer.) In a world of politicized science, do-something journalism, and the structural incentives for the continuous expansion of recommended shots, worrying about the prevalence of vaccine mandates in an outlier state is healthy, not crazy. But linking it to autism is profoundly unhelpful.

That’s what partly ensnared Rand

Paul, when the journalism swarm moved his direction. In the course of agreeing with President Obama and Gov. Christie that vaccines are “one of the biggest medical breakthroughs that we’ve had” but should not be forcibly mandated, the senator said, “I’ve heard of many tragic cases of walking, talking normal children who wound up with profound mental disorders after vaccines.” This is literally true—autism typically manifests at some point *after* the vast majority of infants receive vaccinations. But the implied linkage and resulting outrage was enough to prompt a quick clarification from Paul that he “did not say vaccines caused disorders, just that they were temporally related—I did not allege causation.”

Let it be resolved that putting the words *autism* and *vaccines* in a sentence without the connective tissue of *is not caused by* is inadvisable

at best. Now then: Should public schools refuse to admit children not inoculated against Hep B, a disease correlated strongly with high-risk behavior such as unprotected sex and intravenous drug use, and typically transmitted not through casual contact but via blood? Because that’s the law in most of the land. Should state governments require annual flu shots for school kids? They do in New Jersey and Connecticut.

When commentators weren’t busy congratulating themselves in February for being on the right side of science, they were writing agonized think-pieces about, in the words of Kelly Wallace at CNN.com, “How to persuade the anti-vaxxers to vaccinate.” One suggestion that did not, to my knowledge, come up: Make damned sure every vaccine mandate makes scientific and philosophical sense, so as not to breed distrust over the ones that are more necessary.

You don’t have to be paranoid to observe that the federal government has lied for decades about the medical properties of marijuana while changing its mind constantly about the food pyramid and the cost/benefit of salt. If you want less skepticism, stop earning it. And you don’t have to be a crazed libertarian (or progressive!) to be creeped out by the government telling you what to inject into your child. The real debate isn’t science vs. Jenny McCarthy, it’s the scope and terms of the available exemptions at the state and local level, far away from presidential politics. That’s a much harder question, one that the political press is uniquely ill-equipped to handle. ■

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ELIZABETH NOLAN BROWN is a staff editor for **reason**, where she covers issues related to reproductive rights, free speech, food policy, and more. Prior to that, she was an editor and blogger with Defy Media and AARP publications. In “Sex, Love, and Robots” (page 26), Brown, 32, explores the future—and present—of intimate human-android relations. When not covering sex, politics, or the politics of sexy robots, she says, “I love reading and writing about nutrition, psychiatry, and neuroscience.”

“How to Survive a Robot Uprising” (page 60) is the George Mason economist ROBIN HANSON’s review of *Rise of the Robots: Technology and the Threat of a Jobless Future* (Basic), a book by Martin Ford. Hanson, 55, who worked for nearly a decade as an artificial intelligence researcher, is skeptical of the book’s claim that robots will soon take over all, or even most, of the work human beings currently do. Asked why he decided to make the jump from hard science to economics, he says, “When you spend a lot of time looking for technology solutions to problems, you realize that they are often really social problems that need social solutions.”

JIM PAGELS, 23, is **reason**’s spring 2015 Burton C. Gray Memorial Intern and the lucky young man tasked with transcribing our interview with MIT economist Andrew McAfee (page 36). A Dallas native, Pagels graduated from Columbia University in 2013 with a bachelor’s degree in American studies and English. He has been published at *Forbes*, *Bloomberg*, *The Atlantic*, and *FiveThirtyEight*. He hopes to carve a niche for himself at the intersection of sports and public policy, and he says he’s “excited to use data analysis to highlight liberty-minded concepts” during his time with **reason**.

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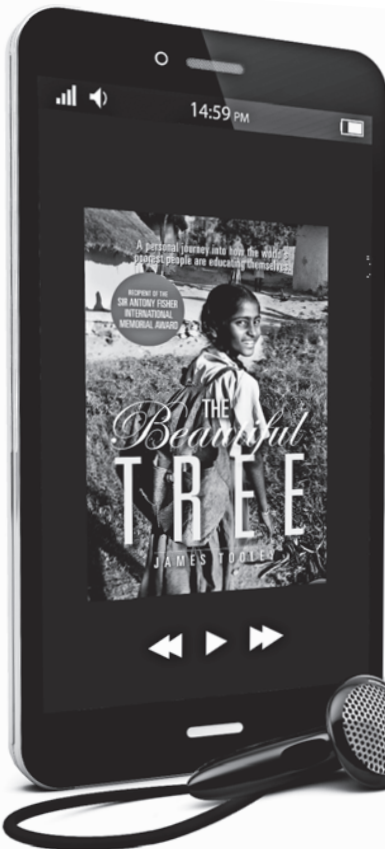
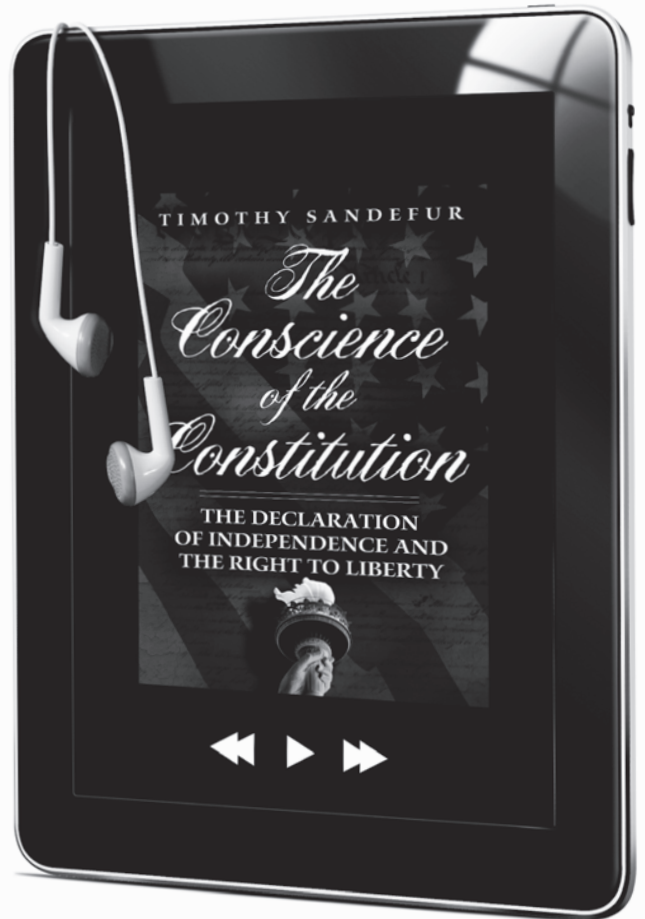
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Pot asset forfeiture

Green Seized

Robby Soave

WHEN STATE police raided Wally Kowalski's southwest Michigan farm in September, they took a bunch of Kowalski's stuff. But they didn't take Kowalski, putting him in the odd position of wishing he had been arrested.

Kowalski, a licensed grower of medicinal marijuana, first drew police attention when cops spotted his plants during a flyover. They contended that he had broken the rules by growing out in the open, even though his garden is enclosed by a fence. During the raid on Kowalski's property, cops destroyed his marijuana plants and seized his power generator. They left his shovels behind, however. He told a local free market think tank, the Mackinac Center for Public Policy, that the authorities only seemed interested in taking items that would fetch a good



price at auction.

The police also froze the man's bank accounts, which left him unable to pay his student loans and finish the administrative process of bringing his wife from Africa to the United States. Since the police never charged Kowalski with a crime, he found he had no way to clear his name and recoup his possessions. He says he'd have preferred to take his chances before a judge or jury.

Months after the raid (and mere days after the Mackinac Center and **reason** publicized his plight), Kowalski got his

“wish.” Police returned in the dead of night and arrested him. He now faces drug charges carrying a seven-year sentence and a \$500,000 fine. **r**

Mandatory equality failure Eternal Wage Gaps

Ronald Bailey

EQUAL PAY for equal work seems only fair. So when governments encounter a difference in the average wages of men and women, they often assume invidious discrimination. In 1988, Ontario passed the most comprehensive pay equity legislation in the world, requiring employers to proactively devise and implement programs to eliminate the gender wage gap.

In the Fall 2014 issue of *Contemporary Economic Policy*, two Lehigh University economists seek to answer the counterfactual question: What would have happened to the wage gap in Ontario if the act hadn't been passed?

To answer it, they employ an algorithm that uses data from other Canadian provinces, including Gross Domestic Product per capita and employment

Police (Creative_Outlet/Thinkstock)
Farm workers (liquidlibrary/Thinkstock)



20 years ago in reason

“A new form of activism is shaking the political establishment....By using broadcast faxes, satellite television programs, radio talk shows, and electronic forums like those on CompuServe and the Internet, grassroots activists like the Hartmans can bypass traditional media outlets. The rather anarchic nature of computer culture suggests that the infomedia revolution will tend to erode the statist foundations of the political establishment.”

—Rick Henderson, “Cyberdemocracy”

“So far, no American politician has been willing to say that if stopping illegal immigration requires repealing the 13th Amendment, then by God that's what we need to do. But just about anything else goes. National ID cards, computerized federal databases, doctors arresting their patients on the operating table, requiring teachers to rat on their students and encouraging the students to rat on their parents, pitching newborn babies back across the border: The Cold War had nothing on this new battle against immigration.”

—Glenn Garvin, “No Fruits, No Shirts, No Service”

—April 1995

rates, to construct a “synthetic” version of Ontario before and after the law was passed. The only difference between the real Ontario and the synthetic one is the wage gap law. They find that in both Ontarios, the wage gap narrows from 35 percent in 1988 to 30 percent in 2005. In fact, the latter wage gap was slightly smaller in synthetic Ontario.

The researchers conclude that the law “failed to affect women’s pay relative to men’s in Ontario in any clear, discernible way.”

U.K. Internet filtering

Click Yes for Porn

Peter Suderman

AT THE end of 2014, subscribers to the major U.K. Internet services were interrupted by a government-mandated request asking whether network-level filtering of smutty content should be turned on. This happened if they were attempting to access *any* website, no matter how anodyne. The idea, British Prime Minister David Cameron explained, was to present citizens with an “unavoidable choice” about whether to accept a top-level porn filter or not.

The messages made the government’s position on the matter clear. They informed users that the state hoped to encourage a “family friendly environment on the Web,” one “free from pornography, gambling, extreme violence and other content inappropriate for children.” Cameron has accused online smut of “corroding childhood.”

The nation’s largest Internet provider, BT, indicated that users would be blocked from further browsing until they answered the question. Others are likely to be opted in. Sky, another major ISP, told *Wired UK* that users who don’t respond might eventually be shuffled into the program automatically.

Those who opt for a porn-free Internet may be blocking off other sites as well. Multiple reports indicate that the filters have restricted access to nonsexual content, including websites

for a Porsche car dealership and a popular political podcast.

Stingray surveillance

Cellphone Tracking

Jim Pagels

THE FBI has declared its right to use devices—called “stingrays” or International Mobile Subscriber Identity catchers—that act like fake cell towers to monitor cell phone locations, calls, and texts, all without a warrant. The claim, made during private briefings with Senate Judiciary Committee staff, comes on the heels of a November *Wall Street Journal* report that small Justice Department aircraft could collect identification and location data from tens of thousands of phones per flight.

Nine states have passed laws requiring police to obtain a warrant before using a stingray to track a phone. It is unclear, however, whether citizens will know when the authorities use such devices. The Harris Corporation, a Florida-based company that manufactures the snooping tools, requires police departments to sign a non-disclosure agreement that explicitly warns them not to mention stingrays.

Sens. Chuck Grassley (R-Iowa) and Patrick Leahy (D-Vt.) wrote a joint letter to Attorney General Eric Holder voicing concern about the FBI’s position. That opposition is unlikely to gain much traction in the Obama administration, which has previously argued that the feds have the right to place GPS trackers on cars and cameras outside residences without warrants, and which has also stated that Americans have “no

reasonable expectation of privacy” in cell phone use.

Normalizing relations

Cuba Libre

Stephanie Slade

“IT IS clear that decades of U.S. isolation of Cuba have failed to accomplish our enduring objective of promoting the emergence of a democratic, prosperous, and stable Cuba,” reads a White House fact sheet released December 17. With that, President Barack Obama announced the result of months of secret negotiations: an official effort to normalize relations between two long-estranged countries.

Policy changes will include reopening an embassy in Havana and allowing increased remittances to be sent from the U.S. to Cuban nationals. The State Department will also be reviewing Cuba’s formal designation as a state sponsor of terror.

The changes fall short of ending the embargo, which would require an act of Congress. Nor will they completely eliminate the travel ban. Pure tourism by Americans—a stay at one of the Caribbean nation’s beach resorts, for instance—remains prohibited. People who wish to go to Cuba will still have to qualify under one of 12 “existing categories,” such as journalism, religious activities, or humanitarian projects, although larger numbers are expected to be approved within those designations.

The Obama administration says the changes are aimed at further empowering the Cuban people. The island nation’s president, Raul Castro, insists that Communist rule will continue and has called on Obama not to meddle in his country’s sovereign affairs.

Federal racial profiling

A Modest Proposal

Scott Shackford

IN DECEMBER, Attorney General Eric Holder gave a speech at a church in Atlanta declaring that the Department of Justice

“I think the nation needs to realize that when we tell you to do something, do it.”

—Jeffrey Follmer, president of the Cleveland Police Patrolmen’s Association, interviewed on MSNBC about the police killing 12-year-old Tamir Rice, December 15

“I regret that I was unaware that the phrase/hashtag ‘all lives matter’ has been used by some to draw attention away from the focus on institutional violence against Black people.”

—email from Smith College President Kathleen McCartney apologizing for saying that “all lives matter,” December 2

“I admire Hillary [Clinton], she’d be a great president, but you know, she isn’t my first choice I guess.”

—Jennifer Herrington, chair of the Page County Democrats in southwest Iowa, *The Wall Street Journal*, January 5

“Senator @marcorubio is acting like an isolationist who wants to retreat to our borders and perhaps build a moat. I reject this isolationism.”

—tweet from Sen. Rand Paul (R-Ky.) responding to Rubio’s objections to normalizing relations with Cuba, December 19



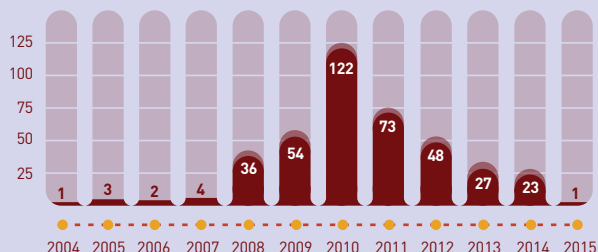
PREDATOR BOTS

U.S. DRONE STRIKES IN PAKISTAN

Info on where and how often American drone strikes happen—not to mention the number and types of casualties they inflict—can be hard to come by. Official statistics are often classified. A few sources of data about drone strikes in Pakistan do exist, however. Here is some of what we know about how the U.S. uses drones to make war abroad.

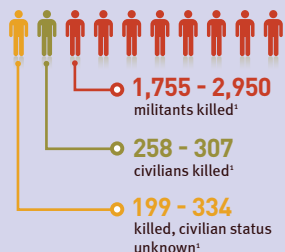


DRONE STRIKES IN PAKISTAN BY YEAR:



Strikes in Pakistan have declined in recent years as the U.S. has turned its attention to other countries, including Syria.

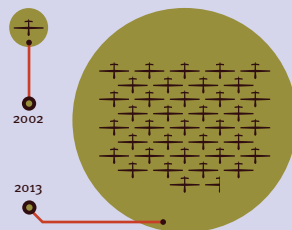
393 TOTAL STRIKES | **2,212 to 3,591 PEOPLE KILLED**



Over 168 children have been killed in drone strikes since 2004.²

3,650% increase in drones

In 2002 the Pentagon had fewer than 200 drones. By 2013 that number was over 7,500.³ That's 37.5 times as many drones.



\$2.4 billion

requested by the Pentagon for unmanned aerial vehicles in FY2015⁴



BY JASON KEISLING AND STEPHANIE SLADE
For links to sources visit reason.com/predatorbots

SOURCES: (1) New America Foundation. (2) Bureau of Investigative Journalism. (3) USA Today. (4) Department of Defense.

would be introducing new policies to “help end racial profiling once and for all.”

The reality turned out to be less grandiose. The department did introduce new policies regarding racial profiling. But they were significantly less ambitious than Holder claimed. The new guidelines prohibit FBI agents from considering national origin, sex, sexual orientation, or religion when opening a case, adding those to existing prohibitions against considering race and ethnicity. Similar prohibitions were implemented for domestic activities by federal law enforcement officers.

But the new policies will not affect state and local law enforcement agencies, only the feds. Furthermore, the Transportation Security Administration and those who handle inspections at ports or border crossings—arguably the two areas where citizens are most likely to interact with federal officials—are exempt.

As such, activist praise was muted for Holder’s changes. Laura W. Murphy, director of the American Civil Liberties Union’s Washington, D.C., legislative office, told *The Washington Post*, “The release of this revised guidance is an important signal of progress, but it does not completely address the need for reform of police tactics on a state and local level.”

Operation Choke Point Stealth Bank Bans

Katherine Mangu-Ward

THE JUSTICE Department and the Federal Deposit Insurance Corporation (FDIC) have been exploiting a secretive federal anti-fraud initiative to deter banks from doing business with disfavored industries, such as payday lending, a December report from the House Committee on Oversight and Government Reform found.

The program, called Operation Choke Point, was supposed to be targeted at reducing banking fraud. But internal documents showed regulators taking

advantage of a lack of due process to squelch a variety of legitimate transactions by legal but potentially unsavory businesses.

One of the most striking documents released by the committee was this comment in an email from the head of the FDIC in Atlanta: “I literally can not stand payday lending. They are abusive, fundamentally wrong, hurt people, and do not in any way deserve to be associated with banking.” The report also noted that the FDIC likely misled Congress about its level of involvement in the program, playing a much more active role than initially advertised.

“It’s appalling that our government is working around the law to vindictively attack businesses they find objectionable,” Rep. Darrell Issa (R-Calif.) said in a statement. “Internal FDIC documents confirm that Operation Choke Point is an extraordinary abuse of government power.”

Other legal businesses caught in the regulatory crossfire include cigar shops, ammunition sellers, fireworks vendors, and porn sites.

Doctor pay cuts Managing Medicaid

Peter Suderman

WHEN OBAMACARE passed in 2010, roughly half of the projected increase in health insurance coverage was expected to come through expanding Medicaid, a health care program for the poor and disabled jointly run by the states and the federal government. Some 16 million



Americans were supposed to get coverage through the program by 2019, according to Congressional Budget Office estimates.

A 2012 Supreme Court decision had the practical effect of making the Medicaid expansion optional for individual states, muting the potential impact somewhat. But Medicaid remains a major vehicle for coverage expansion under the health care law. Between October 2013 and December 2014, the program saw its overall enrollment increase by 9.7 million, much of which is directly linked to Obamacare.

Yet new Medicaid enrollees may have trouble using their coverage. Fee formulas vary by state, but on average the program has historically had the lowest physician reimbursement rates of any health insurance scheme in the United States. Obamacare temporarily inflated rates to match Medicare payments, but the temporary bump expired at the end of 2014.

Rates in some states changed little, and Medicaid managed-care programs may set different rates. But on average, primary care reimbursements through the program dropped by 42.8 percent, according to a December study by Stephen Zuckerman, Laura Skopec, and Kristen McCormack of the Urban Institute.

Some members of Congress, as well as the administration, proposed extending the fee hike. Doctors certainly weren't pleased by the cuts. One New Jersey physician, Dr. George J. Petrucio, told *The New York Times* in December that the rate changes amounted to a bait and switch. "The government attempted to entice physicians into Medicaid with higher rates," he said, "then lowers reimbursement once the doctors are involved." ■

Bad building codes

Energy Inefficient

Brian Doherty

BUILDINGS constructed according to supposedly strict energy



The signs in North Hempstead, New York, say the fine for not picking up your dog's poop is \$250. That was an error: The actual fine is just \$25. Rather than correct all of the signs, local officials are working on increasing the fine.

The British Advertising Standards Authority has ordered Urban Outfitters to remove an ad for women's polka dot mesh briefs from its website. According to the agency, the model's "thigh gap" indicates that she's too thin, so the photo could fuel anorexia and body image problems.

In Beloit, Wisconsin, the police chief is asking residents to volunteer to let his officers search their homes for guns. He says they should think of gun violence as an infectious disease and home inspections as a vaccine.



Burmese police have charged three people with violating the nation's religion law. The accused own a nightclub that allegedly had an image of the Buddha wearing headphones on its Facebook page. They face up to two years in prison if convicted.

Since starting in Norway last year, men's underwear maker Comfyballs has introduced its product to Australia, New Zealand, and the United Kingdom with no problem. But when it applied for a U.S. trademark, the government refused to grant it, ruling that the company's name is vulgar.

(Illustrations: TerryColon.com)

Think there's a problem in South Pittsburg, Tennessee? Keep it to yourself. The City Commission has banned all city officials, employees, vendors, contractors, volunteers, and anyone else with any connection to the local government from posting anything negative about the city or its employees online. Commission members explain that they're tired of people asking them about things they read about the town on the Internet.

Just 19 of the 594 students in Paterson, New Jersey, schools who took the SAT this year scored at the level considered college-ready by the College Board. Last year, just 26 students had a college-ready score on the test. The school district has responded by saying they'll no longer use SAT scores to measure a student's success.



Japanese prosecutors have charged artist Megumi Igarashi with distributing "obscene data"—computer code that would allow 3D printers to create a kayak shaped like her genitalia.

Llanfynydd Primary in Wales has no students. The last of its 11 pupils departed months ago. But it is still open and has most of its staff. The Welsh government requires a formal review before any school can be closed, and that process is expected to take a few more months.

At 2 a.m. on Christmas morning, a D.C. police detective knocked on Karen Robinson's door and asked to see a photo of her son Raymond. After studying it, he told her Raymond had shot at police officers and they'd returned fire, killing him. At around 10 a.m. that same day, Robinson got a call from Raymond, who evidently wasn't dead. Police have apologized for their mistake.



Charles Oliver

North Korea vs. Art

Peter Suderman

Kim Jong-il, dictator of North Korea from 1994 to 2011, always fancied himself an artist. Throughout the 1970s—while his father, Kim Il-Sung, ruled the nation—he ran the country’s culture ministry, and he was both a theorist and practitioner of the dramatic arts.

In 1974, Kim Jong-il published a treatise titled *On the Art of Opera: Talk to Creative Workers in the Field of Art and Literature*, arguing that conventional opera was too abstract, with “clumsy” acting and “tedious” dialogue.

As *reason*’s John Gorenfeld noted in “Dear Playwright” (January 2005), Kim’s book describes the way he and his father “discovered the husk of a tired art form and gave it a much-needed shot of North Korean communism.”

The younger Kim put his revisionist notions about theater into practice with productions of *Sea of Blood*, one of the regime’s “Five Great Revolutionary Operas.” In the early 1970s, he even directed a three-hour movie version of the show.

Today, his 31-year-old son Kim Jong-un leads the country. He seems to prefer geopolitical drama to theater.

At the end of 2014, Sony Pictures Entertainment was hacked. Final cuts of several unreleased films, including *Annie*, were leaked online. The hackers also began posting packages filled with private information about Sony employees, including salaries, Social Security numbers, and executives’ internal emails.

The hackers eventually demanded that Sony not distribute *The Interview*, a stoner comedy scheduled for a Christmas Day release. In the movie,



James Franco and Seth Rogen play American journalists tasked with assassinating Kim Jong-un during an interview. The hackers’ demands culminated with threats of violence at movie theaters showing the film; for a while it looked like the movie would never see the light of day. Sony eventually opted for a limited theatrical release and digital distribution.

The FBI fingered North Korea, which had denounced the movie, as the party responsible for the hack. The Obama administration then announced sanctions, although several tech experts have cautioned that the evidence against North Korea was weak.

Either way, the attack on Sony ended up calling attention to a widely panned movie that otherwise would likely have been forgotten. By the first week of January, *The Interview* had earned \$31 million through digital distribution. North Korea’s young leader may be a patron of the arts after all.

efficiency codes may not be terribly green after all, a new study finds. The research, conducted by the Georgetown economist Arik Levinson and published by the National Bureau of Economic Research, might well drain the batteries of energy-efficient building code advocates.

Levinson compared homes built under California’s post-1978 energy

building codes to California homes not built to those standards, and to buildings of various ages in other states not built



to California codes, while controlling for factors such as home size and weather.

Proponents of the codes predicted reductions of up to 80 percent in energy use. But Levinson found “no evidence that homes constructed since California instituted its building energy codes use less electricity today than homes built before the codes came into effect.”

New and old build-

ings might use similar amounts of energy because older homes made similar upgrades even without the codes forcing them to do so. Or perhaps owners of the “energy-efficient” homes responded to lowered lighting or air conditioning costs by using more energy. But if you advocate such codes because they in and of themselves cause less energy to be consumed, this study suggests you ought to get your mental wiring examined. ■

Spanish search fight Google Tax Backlash

Scott Shackford

LAST OCTOBER, Spain’s parliament passed a law, pushed by the country’s big publishers, that revised copyright regulations to require payments for quoting even snippets of writing from media sources online. The law further gives news publishers an “inalienable right” to these payments that cannot be surrendered, even by the publishers themselves.

Some observers called it the “Google tax,” as it was obviously designed to try to wring money out of online services that link to media outlets and include short excerpts of text, much like the service Google News provides. Thus, not allowing publishers to refuse the money made a certain sort of sense. If nobody is allowed exemptions, Google can’t include in its news aggregation only those publishers who let them excerpt their stories for free. Google and other search services would have to pay everybody, so the publishers pushing this payment scheme couldn’t be punished through market choices.

Alternatively, Google could decide not to aggregate any Spanish news at all, defeating the purpose of the tax. That is exactly what it did. In December, the tech giant announced it would be shutting down its news aggregation service in Spain entirely. No publishers would be getting money from Google, nor would their sites be getting the page view boosts that come from

Google's links. Now the same groups that attempted to require payments from Google are trying to get the Spanish government to somehow prevent the company from closing up shop. ■

Medical device fees

Small Biz Burden

Elizabeth Nolan Brown

OREGON SEAMSTRESS and mother Denelle Philemon makes reusable cloth menstrual pads. Her company, Mother-MoonPads, takes pride in “making things that will last” with high-quality, natural materials. But her business almost didn’t survive 2014, after the U.S. Food and Drug Administration (FDA) announced it would step up enforcement of regulations that treat reusable pads as “medical devices.”

The pads, which are simply pieces of sewn-together cloth worn in women’s underwear, have officially been classified as medical devices since 1996. As a result, the FDA can force pad manufacturers to register and pay an annual fee. For 2015, it was \$3,646—more than \$1,000 higher than for 2013. The FDA’s cut will rise again in 2016, to \$3,872.

“I need to make the decision whether to...give up on this portion of my dream and transition into selling other products,” Philemon posted on Mother-MoonPads’ Facebook page in December, with 2015’s deadline looming and funds running low. Ultimately, she pushed enough product to make the money and register. But Philemon’s case illustrates the burden such regulatory fees place on small business owners—and customers. This year, “there will be a slight increase in pad prices to help absorb the yearly FDA registration fee,” notes the Mother-MoonPads sales page.

Asked one mommyblogger, “Are...cloth diapers therefore also medical devices? And what about cloth breast pads that protect against leakage during lactation?...Where exactly does the regulation end?” ■

Computers That Can Learn

Interview by Stephanie Slade



Jeremy Howard

Jeremy Howard is the founder and CEO of Enlitic, a company that uses “machine learning” to improve medical diagnostics. In December, he gave a TED Talk on “the wonderful and terrifying implications” of an algorithm known as “deep learning,” which processes huge amounts of data in order to teach itself to understand pictures, read words, speak foreign languages, and more. Deputy Managing Editor Stephanie Slade spoke with Howard in January.

Q: Are computers that can learn a good or a bad thing?

A: In the last five years [deep learning] has become about 10,000 times faster and about 10 times more accurate at understanding the content of images. We’re just starting to see it go down the same path at understanding human language. Overall, my expectation is that computers are on their way to becoming very good at a full range of perceptual capabilities.

Is this a good thing or a bad thing? It just depends how it’s used. It could be a wonderful thing, because it could allow us to spend our time doing the things we want to do rather than the things we have to do, which is, I think, what humanity has been aiming at for thousands of years. But on the bad side, that by definition puts people out of jobs. Eventually, it puts everybody out of a job.

Longer term, when you have machines that are extremely capable, they can be either misused intentionally or misprogrammed unintentionally and create great harm.

Q: What would you say is the most exciting application of this technology?

A: For me, the most immediate one is in medicine. Medicine is currently more art than science. We describe it as the practice of medicine, not the science of medicine. Which is fine, but there is a lot of data that people have to bring together in order to make an appropriate diagnostic and treatment recommendation. With computers that can see and read, computers could potentially bring tens of millions of pieces of data together and make a good diagnostic or treatment decision. Not only could this make medicine far more accurate, but most excitingly for me, it could bring modern medicine to the billions of people in the world who currently don’t have access to it because there’s a huge shortage of expertise right now.

The other very exciting short-term opportunity is robots. If you take the machine-learning algorithm and use it in software attached to some kind of “actuators”—engines and grippers and wheels and so forth—that’s what we call a robot. And that has the ability to automate some of the most tedious and dangerous and unpleasant jobs.

Q: You mention that at some point many if not all people will not be able to contribute economic value to society anymore.

A: If we remove the idea of the soul, at some point in history [there’s nothing that] computers and machines won’t be able to do at least as well as us. We can argue about when that will happen. I think it will be in the next few decades.

Q: No one will have to work anymore?

A: Some very large percentage of the world. The vast majority of things that are necessary will have been automated.

The question that is actually much more interesting is: What happens when we’re halfway there? What happens when the amount of things that can’t be automated is much smaller than the amount of people that exist to do them? That’s this point where half the world can’t add economic value. That means half the world is destitute and unable to feed themselves. So we have to start to allocate some wealth on a basis other than the basis of labor or capital inputs. The alternative would be to say, “Most of humanity can’t add any economic value, so we’ll just let them die.”



Charlie Hebdo in the Dock

Despite its stand against the terrorist's veto, France treats offensive words and images as crimes.

ON JANUARY 11, as more than a million people marched through the streets of Paris in support of the right to draw cartoons without being murdered, the French Ministry of Culture and Communication declared that “artistic freedom and freedom of expression stand firm and unflinching at the heart of our common European values.” It added that “France and her allies in the EU safeguard these values and promote them in the world.”

In the wake of the massacre at the satirical weekly newspaper *Charlie Hebdo*, perpetrated by men who saw death as a fitting punishment for the crime of insulting Islam, these were stirring words. If only they were true. Sadly, France and other European countries continue to legitimize the grievances underlying the barbaric attack on *Charlie Hebdo* by endorsing the illiberal idea that people have a right not to be offended.

It is true that France does not prescribe the death penalty for publishing cartoons that offend Muslims. But under French law, insulting people based on their religion is a crime punishable by a fine of €22,500 and six months in jail.

In addition to religion, that law covers insults based on race, ethnicity, national origin, sex, sexual orientation, or disability. Defamation (as opposed to mere insult) based on any of those factors is punishable by up to a year in prison, and so is incitement to discrimination, hatred, or violence.

In 2006 the Paris Grand Mosque and the Union of French Islamic Organizations used the ban on religious insults to sue *Charlie Hebdo* and its editor at the time, Philippe Val, over its publication of three cartoons depicting the prophet Muhammad, including two that had appeared in the Danish newspaper *Jyllands-Posten* the previous year. Although *Charlie Hebdo* won the case and Val escaped prison, the potential for such inquiries inevitably has a chilling effect on freedom of expression.

Since the mid-1980s, French courts have rejected religious-insult complaints against books, movies, movie posters, and written and oral commentary (including novelist Michel Houellebecq's 2001 description of Islam as “the stupidest religion”). They have been more receptive to complaints about a billboard lampooning *The Last Supper*, a newspaper essay on the purported connection between Catholic doctrine and the Holocaust, and remarks by the actress Brigitte Bardot and the comedian Dieudonné M'bala M'bala, whose shows have been banned as anti-Semitic.

The point is not that the government has done a bad job of distinguishing between legitimate art or commentary and gratuitous offensiveness. In a free society, that is simply not the government's job. When courts are asked to draw this line, artists and commentators must try to anticipate whether their work

will pass muster, which promotes self-censorship.

Worse, this system teaches people that the use of force is an appropriate response to words and images that offend—a principle that is poisonous to free speech and conducive to violence. Since the French government has announced that offending the wrong people by saying the wrong thing in the wrong context can be treated as a crime, it would not be surprising if some people, convinced that their rights had been violated and that they could not count on the courts to vindicate them, resorted to self-help.

Other countries that criminalize “hate speech,” including Germany, the Netherlands, the U.K., Sweden, and Canada, are likewise sending the dangerous message that offending people with words or images is akin to assaulting them with fists or knives. Instead of facilitating censorship by the sensitive, a government truly committed to open debate and freedom of speech would make it clear, in no uncertain terms, that offending Muslims (or any other religious group) is not a crime.

Sacrilege may upset people, but it does not violate their rights. By abandoning that distinction, avowed defenders of Enlightenment values capitulate to the forces of darkness. ■

Senior Editor Jacob Sullum (jsullum@reason.com) is a nationally syndicated columnist. Copyright © 2015 Creators Syndicate Inc.

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Do you long for a new world? One with no conflict, no jealousy, no threatening words. One

in which people's behavior is caring, trustworthy, and productive. In this new world of people, their activities need no supervision. They do what reality calls for.

There are no locks on doors or windows, no legal contracts to assure honest compliance, no addictions, no crime, no poverty, no lack of any rightful thing or opportunity, no scoldings or punishments.

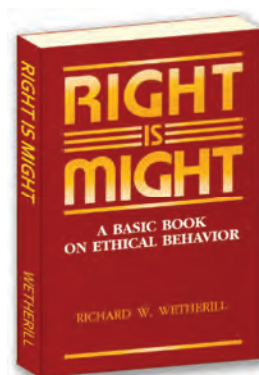
There is liberation from the tyranny of prejudice. There is plentiful food and shelter. There is full employment with unique opportunities for all.

More important, there is fellowship among people. There are neither strangers nor anybody to fear. There is stimulating activity so that daily life becomes an interesting adventure.

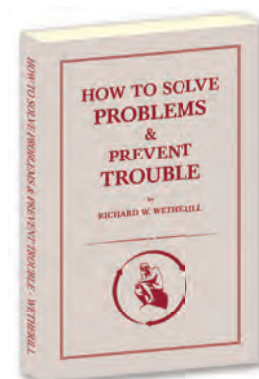
What creates a new world? Obedience to a natural law identified by Richard Wetherill that he called the Law of Right Action. It defines right action as thoughts, words, and deeds that are rational, honest and morally right. Unfortunately, people today are still blocking the birth of that *new world* by acting on *their* noble and ignoble motives.

Otherwise, by their obedience, people would function in the way it is still envisioned for the human race by the creator of that precious natural law!

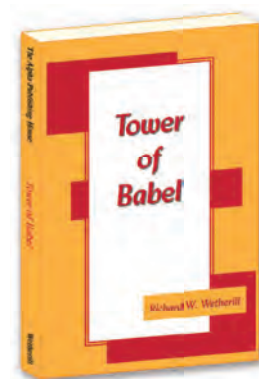
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Regulatory Robophobia

We don't need a federal commission to govern things that go beep in the night.

THE FUTURE IS here. Driverless vehicles, drones, machine learning, and other emerging technologies offer programmable assistants able to handle mundane tasks and critical life-saving interventions alike. But not everyone is pleased. The digital Arcadia that awaits us is being fettered by the rise of the robophobes.

Robophobia exists on a continuum. At the extreme end are reactionaries who indiscriminately look to stifle all that goes beep in the night. They call for swift and pre-emptive regulations to address any imagined safety or privacy concerns, however unlikely. To the extent that they can enact their ideas, their mind-set is guaranteed to slow the pace of innovation, resulting in countless lost opportunities for economic and social progress—and, yes, even consumer safety and privacy. You'd almost suspect that this is their unstated goal.

Other cases of robophobia are milder, manifesting, for instance, in proposals for new government agencies. In a white paper published by the Brookings Institution last September, Ryan Calo, an assistant professor at the University of Washington School of Law, calls for a Federal Robotics Commission (FRC). Older agencies, he argues, don't have the expertise to "deal with the novel experiences and harms robotics enables." Furthermore, there are "distinct but related challenges that would benefit from being examined and treated together." Robots, he says, "may require investment and coordination to thrive."

Calo does not have a surreptitious desire to stifle new technologies hidden behind his policy proposals. He rightfully criticizes the Federal Aviation Administration (FAA) for its ham-handed drone policies, calling them "arbitrary and non-transparent." But Calo is no pro-

ponent of permissionless innovation, a term for totally unfettered freedom to experiment with new technology and business models coined by my technology policy colleague at the Mercatus Center Adam Thierer, either. He wants to regulate drones; he just thinks the FAA is doing it the wrong way. In his mind, a FRC would have the narrow focus and specialized expertise needed to effectively protect us.

Really, Calo is too kind to the FAA. He doesn't mention most of the questionable drone regulations the agency has proposed. The FAA has practically stopped innovation in its flight path by proposing to ban all but a handful of private-sector drones while the agency completes rules to govern the rest. Another doozy was its proposal to require drone pilots to obtain the same license as old-school airplane pilots, even though they never need set foot on an aircraft to do their jobs. The FAA's actions are badly hindering this exciting new technology, and for not-altogether-altruistic reasons. A January 15 story in *The Wall Street Journal* quotes Jim Williams, the head of the FAA's unmanned-aircraft office, bragging about his agency going to bat for the aerial surveyors, photographers, and moviemaking pilots who frequently lobby him to put the kibosh on commercial drone activity. "They'll let us know that, 'Hey, I'm losing all my business to these guys. They're not approved. Go investigate,'" he explains. "We will investigate those."

Would a robot commission be any better? History suggests that it won't. This is not the first time a scribbler has proposed a new agency to oversee an emerging technology. Robophobia is only the most recent incarnation of a timeless reaction to scientific developments: the desire to control them.

Calo cites the Federal Railroad Administra-

tion (FRA) as a successful response to the scary new phenomenon of travel by train. But actually, the Interstate Commerce Commission was created first, in 1887; it was promptly captured by railroad companies and began promulgating anti-consumer regulations on their behalf. The FRA was established far later, through the same 1966 legislation that brought us the Department of Transportation (DOT). It is strange but telling that Calo offers the FRA and DOT as prototypes for a future Federal Robotics Commission, since both bodies suffer from rather extreme amounts of regulatory zealotry, waste, fraud, and abuse.

But there is a more fundamental reason to object to an FRC. Calo himself claims to favor something more akin to a supervisory body than a formal regulatory agency, yet he leaves the door wide open for agency power grabs and ever-expanding regulation. Bureaucrats almost always act to maximize their spheres of influence. Why wouldn't this be the case for an agency tasked with overseeing a lucrative new technology like robotics? On the flip side, what makes us think the robotics industry itself would refrain from doing what so many other industries have before and working to influence FRC regulations for its own ends?

Regulatory capture is real. Consider the Federal Communications Commission (FCC) and its war on cable television. A recent paper by Thierer and another technology policy scholar at the Mercatus Center, Brent Skorup, is a must-read for anyone interested in how robotics might fare in Calo's world. Titled "A History of Cronyism and Capture in the Information Technology Sector," the paper

documents the many ways the FCC has mostly served the private interests it was supposed to regulate rather than the "public interest" promoted by the likes of Calo.

When cable TV came about in the 1960s, the agency moved quickly to quash it—a naked effort to protect entrenched television broadcasters. Regulatory creep became a serious problem as the commission expanded its authority into almost every new telecommunications and media service that emerged. Predictably, the "independent" FCC eventually succumbed to the very problems that Calo's FRC ostensibly aims to rectify, such as being slow and arbitrary and constantly encroaching on areas it isn't equipped to regulate.

Calo is correct that our existing collection of regulatory agencies is ill-qualified to handle robotics policy. But adding another group of eggheads to the mix is doubling down on the problem rather than offering a solution. At a minimum, as Thierer writes, "when proposing new agencies, you need to get serious about what sort of institutional constraints you might consider putting in place to make sure that history does not repeat itself."

Innovation doesn't flourish at the hands of bureaucrats—even knowledgeable, benevolent, non-robotophobic ones. It's simply impossible to anticipate what will happen when engineers, developers, and consumers take new technologies and begin to apply them in novel ways. Department of Defense engineers and early users of the agency's internal ARPANET system never dreamed that the simple packet switching network used in a handful of university research laboratories would one day be

credited as the precursor to the Internet. In fact, ARPANET's administrators actually banned many of the core functions that you and I enjoy today, such as online commerce. Thierer, in his 2014 book *Permissionless Innovation*, quoted from the 1982 handbook at MIT's artificial intelligence lab, which stated: "It is considered illegal to use the ARPANet for anything which is not in direct support of Government business...Sending electronic mail over the ARPANet for commercial profit or political purposes is both anti-social and illegal. By sending such messages, you can offend many people, and it is possible to get MIT in serious trouble with the Government agencies which manage the ARPANet."

The modern Internet does not owe its success to a brilliant policy wonk, a series of white papers, or a federal agency tasked with developing a new technology and protecting people from any conceivable harm that might arise from it. The opposite is true: It's because the Clinton administration decided to break with tradition by rejecting top-down, command-and-control regulations that the Internet as we know it was born—a product of human action, not merely of human design.

Things could easily have been different. If the overly cautious had gotten their way, the commercial properties of the Internet may well have been squelched before we ever knew what we were missing. The same would be true under a Federal Robotics Commission. Progress requires us to reject robotophobia and feel the digital love. ■

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Let Slip the Robots of War

Lethal autonomous weapon systems might be more moral than human soldiers.

LETHAL AUTONOMOUS weapons systems that can select and engage targets do not yet exist, but they are being developed. Are the ethical and legal problems that such “killer robots” pose so fraught that their development must be banned?

Human Rights Watch thinks so. In its 2012 report, *Losing Humanity: The Case Against Killer Robots*, the activist group demanded that the nations of the world “prohibit the development, production, and use of fully autonomous weapons through an international legally binding instrument.” Similarly, the robotics and ethics specialists who founded the International Committee on Robot Arms Control want “a legally binding treaty to prohibit the development, testing, production and use of autonomous weapon systems in all circumstances.” Several international organizations have launched a global Campaign to Stop Killer Robots and a multilateral meeting under the Convention on Certain Conventional Weapons was held in Geneva, Switzerland, last year to debate the technical, ethical, and legal implications of autonomous weapons. “We are concerned,” meeting’s organizers say in their Call to Action, “about weapons that operate on their own without human supervision. The campaign seeks to prohibit taking the human ‘out-of-the-loop’ with respect to targeting and attack decisions on the battlefield.” A follow-up meeting is scheduled for April 2015.

At first blush, it might seem only sensible to ban remorseless automated killing machines. Who wants to encounter the Terminator on the battlefield? Proponents of a ban offer four big arguments. The first is that it is morally wrong to delegate life-and-death decisions to machines. The second is that it will simply be

impossible to instill fundamental legal and ethical principles into machines in such a way as to comply adequately with the laws of war. The third is that autonomous weapons cannot be held morally accountable for their actions. And the fourth is that, since deploying killer robots removes human soldiers from risk and reduces harm to civilians, they make war more likely.

To these objections, law professors Kenneth Anderson of American University and Matthew Waxman of Columbia University respond that an outright ban “trades whatever risks autonomous weapon systems might pose in war for the real, if less visible, risk of failing to develop forms of automation that might make the use of force more precise and less harmful for civilians caught near it.”

Choosing whether to kill a human being is the archetype of a moral decision. When deciding whether to pull the trigger, a soldier consults his conscience and moral precepts; a robot has no conscience or moral instincts. But does that really matter? “Moral” decision making by machines will also occur in non-lethal contexts. Self-driving cars will have to choose what courses of action to take when a collision is imminent—e.g., to protect their occupants or to minimize all casualties. But deploying autonomous vehicles could reduce the carnage of traffic accidents by as much as 90 percent. That seems like a significant moral and practical benefit.

“What matters morally is the ability consistently to behave in a certain way and to a specified level of performance,” argue Anderson and Waxman. War robots would be no more moral agents than self-driving cars, yet they may well offer significant benefits, such as better protecting civilians stuck in and around battle zones.

But can killer robots be expected to obey fundamental legal and ethical principles at the level that human soldiers do? Georgia Tech roboticist Ronald Arkin counters that lethal autonomous weapon systems “will potentially be capable of performing more ethically on the battlefield than are human soldiers.” While human soldiers are moral agents possessed of consciences, they are also flawed people engaged in the most intense and unforgiving forms of aggression. Under the pressure of battle, fear, panic, rage, and vengeance can overwhelm the moral sensibilities of soldiers; the result, all too often, is an atrocity.

Now consider warbots. Since self-preservation would not be their foremost drive, they would refrain from firing in uncertain situations. Not burdened with emotions, autonomous weapons would avoid the snares of anger and frustration. They could objectively weigh information and avoid confirmation bias when making targeting and firing decisions. They could also evaluate information much faster and from more sources than human soldiers before responding with lethal force. And battlefield robots could impartially monitor and report the ethical behavior of all parties on the battlefield.

The baseline decision making standards instilled into war robots, Anderson and Waxman suggest, should be derived from the customary principles of distinction and proportionality. Lethal battlefield bots must be able to make distinctions between combatants and civilians and between military and civilian property at least as well as human soldiers do. And the harm to civilians must not be excessive relative to the expected military gain. Anderson and

Waxman acknowledge that current robot systems are very far from being able to make such judgments reliably, but they do not see any fundamental barriers that would prevent such capacities from being developed incrementally.

Individual soldiers can be held responsible for war crimes they commit, but who would be accountable for the similar acts executed by robots? University of Virginia ethicist Deborah Johnson and Royal Netherlands Academy of Arts and Sciences philosopher Merel Noorman make the salient point that “it is far from clear that pressures of competitive **Under the pressure of battle, fear, panic, rage, and vengeance can overwhelm the moral sensibilities of soldiers; the result, all too often, is an atrocity.**

warfare will lead humans to put robots they cannot control into the battlefield without human oversight. And, if there is human oversight, there is human control and responsibility.” The robots’ designers would set constraints on what they could do, instill norms and rules to guide their actions, and verify that they exhibit predictable and reliable behavior.

“Delegation of responsibility to human and non-human components is a sociotechnical design choice, not an inevitable outcome of technological development,” Johnson and Noorman note. “Robots for which no human actor can be held responsible are poorly designed sociotechnical systems.” Rather than focus on individual responsibility for the robots’ activities, Anderson and Waxman

point out that traditionally each side in a conflict has been held collectively responsible for observing the laws of war. Ultimately, robots don’t kill people; people kill people.

Would the creation of phalanxes of war robots make the choice to go to war too easy? Anderson and Waxman retort that such reasoning for banning warbots is itself ethically dubious. To the extent that advanced warbots are better at protecting civilians in a war zone, a ban on those machines “morally amounts to holding those endangered humans as hostages, mere means to pressure political leaders” into desirable policies. The roots of war are much deeper than the mere availability of more capable weapons.

Instead of a comprehensive treaty, Waxman and Johnson urge countries, especially the United States, to eschew secrecy and be open about their robot development plans and progress. Lethal autonomous weapon systems are being developed incrementally, which gives humanity time to understand better their benefits and costs.

Treaties banning some extremely indiscriminate weapons—poison gas, landmines, cluster bombs—have had some success. But autonomous weapon systems would not necessarily be like those crude weapons; they could be far more picky and precise in their target selection and engagement than even human soldiers. A pre-emptive ban risks being a tragic moral failure rather than an ethical triumph. ■

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The Robot Revolution Is Here

They're sweeping my floors, watching my kids,
and stealing my job. Here's why I'm not worried.

Katherine Mangu-Ward

THE SHINY WHITE ROBOT has a stooped, almost deferential stance as it approaches the Honda employees seated around a table. It turns its black faceplate to the humans, makes an open-handed gesture, and asks if they want anything to drink.





The people all speak simultaneously. What initially seems like rudeness turns out to be efficiency: ASIMO, the most advanced humanoid robot on the market, can understand multiple voices at once and uses facial recognition software to match the men with their requests. “Oolong tea, Mr. Ohara?” “Coffee, Mr. Oga?” “Milk tea, Mr. Ariizumi?” it confirms. They nod, and ASIMO heads off to fill the orders.

So far, ASIMO—at least as seen in a 2014 segment on Japanese public television—appears rather more competent than the baristas at my local Starbucks, who frequently ask me to repeat my order and haven’t a clue who I am, despite my semi-regular appearances at the same location for the last six years. But as ASIMO walks away to pick up the drinks, it’s apparent that there’s much work ahead for Honda’s engineers. The gait of the hobbit-sized machine is slow, with the knees-bent, elbows-out posture of a cautious toddler on unfamiliar turf. Honda claims that ASIMO (an acronym for Advanced Step in Innovative Mobility, not a deliberate tribute to the science fiction novelist Isaac Asimov, the company insists) comes equipped with a collision avoidance system, but that too is on par with a 2-year-old—everything is fine when nearby people are moving slowly and making allowances for the fledgling bot, but Mr. Ohara, Mr. Oga, and Mr. Ariizumi would be very thirsty indeed if they trusted ASIMO to pick up their drinks and carry them down a busy city street at rush hour.

Watching Honda’s latest shuffle along creates a kind of vertigo. The robot revolution seems simultaneously upon us—look, a real robot serving coffee!—and eons away. But that dissonance is a clue that we are nestled in the elbow of an exponential curve. All around us, a Cambrian explosion of robotics is taking place, writes Peter Diamandis, chairman of the X Prize Foundation, at *Singularity Hub*, “with species of all sizes, shapes and modes of mobility crawling out of the muck of the lab and onto the terra firma of the

marketplace, about to enter your home and your shopping experience.”

Diamandis is right. Your house, neighborhood, and office are already full of the robots humanity has been waiting for with both anticipation and dread. They may be the equivalent of trilobites now, but they’re multiplying and mutating rapidly. While pessimists fret that a new kind of intelligent automation will mean social, economic, and political upheaval, the fact is that the robots are already here and the humans are doing what we have always done in the face of change: anticipating and adapting where we can, muddling through where we can’t, and trying to enjoy the ride.

Domo Arigato, Mr. Roomba

When it comes to prognostications about the robot revolution—and for the purposes of this article, we’ll take an expansive view of what constitutes a robot, lumping together a wide variety of automated digital and mechanical deputies—Roombas are frequently asked to shoulder more than their fair share of the burden. Semi-autonomous vacuums are the most visible robots on the market, with more than 10 million sold worldwide at the end of last year. They look like the devices science fiction told us to expect: stand-alone machines that perform tasks on behalf of human beings, integrated into everyday life.

But if we’re being honest, they’re also a bit of a letdown. Anyone willing to fork over a few hundred bucks to the iRobot Corporation can have a machine zip out from under his sofa—that’s where mine lives, anyway—and vacuum his house from time to time. It’s oddly hypnotic

A 2013 Oxford study looked at 702 occupations and found that nearly half of U.S. employment faces the risk of being eliminated in favor of computerization. And it’s already underway.

to watch the device in action, as it deftly avoids falling down stairs, extricates itself from rug tassels and tight spots, and handily routes around chair legs. But it's just a vacuum cleaner, after all: a slightly smarter version of the dishwashers, washing machines, and microwaves we take for granted. And like ASIMO, the Roomba seems remarkably capable at some tasks and astonishingly inept at others, as when it accidentally bumps the door of the bathroom closed and then bounces around for hours, mindlessly cleaning the same tiny space until its battery dies.

Then there's the matter of the human maintenance required by our robot servants. The Roomba will go find its charging station when it needs more power (unless it's locked in the half bath, of course). But it requires a person to empty the reservoir when it's full of dirt and to periodically clean the moving parts. I'm terrible at taking care of my Roomba—I haven't changed the filters, well, ever—which generates a vague sense of guilt, as if I am mistreating a pet. In fact, extracting small objects from its bristles when they get caught feels surprisingly similar to the act of yanking a chicken bone from the mouth of a disobedient puppy. Small mammals love Roombas—YouTube offers an entire genre of “Roomba rodeo” videos, in which babies, cats, and small dogs glide around on the backs of the motorized discs—but the expensive machines are not meant to be used as carnival rides and are easily damaged, requiring yet more intervention. These 10 million vacuums don't exactly seem poised to gain sentience and take over the planet.

Still, having a Roomba means that I spend less time cleaning up crushed snack-food items—or less money employing someone else to perform that task. Does the fact that a machine instead of a person is lowering the Cheerio-load in my carpet mean it's time to start freaking out about the future of employment?

The Automation Jobless

When we talk about robots taking jobs, strong hydraulic arms looming over factory assembly lines is what comes most readily to mind. The International Federation of Robotics put the

population of industrial robots at more than 1.1 million in 2013, making robots a well-established component of U.S. manufacturing.

But the more interesting (and less well understood) phenomenon is the advent of robot replacements for jobs long considered immune from mechanization, particularly the service functions that make up a significant part of our day-to-day interactions.

Speaking at the conservative American Enterprise Institute in March, Bill Gates hinted that a little freaking out might be in order: “Software substitution, whether it's for drivers or waiters or nurses, [is] progressing....Twenty years from now, labor demand for lots of skill sets will be substantially lower. I don't think people have that in their mental model.” A September 2013 study from Oxford University looked at 702 occupations and found that 47 percent of total U.S. employment faces the risk of being eliminated in favor of computerization.

But this isn't the stuff of a misty, menacing future. It's already underway. The Botlr robot, deployed in some properties of the Starwood hotel chain, delivers extra towels and forgotten toiletries to hotel guests. Having a robot show up with your missing items sounds much better than awkwardly answering the door with your bare legs sticking out of the bottom of a hotel robe with a couple of crumpled dollar bills awkwardly clutched in your hand.

Singapore's Timbre restaurant group signed a deal in November to bring flying Infinium-Serve robot waiters to their five locations in the labor-crunched country. The robots would deliver food and drink—acting as propellered busboys, but not fully replacing waiters and bartenders, who would continue to be tasked with “higher-value tasks such as getting feedback from customers,” CEO Woon Joonyang said in a press release. The Consumer Electronics Association predicts that commercial sales of unmanned aerial vehicles will reach \$130 million in revenue in 2015, up 55 percent from last year, putting 400,000 units into the skies.

While unemployment rates have fallen to 5.6 percent and financial markets have largely recovered from the recession, ordinary people share the intuition that technology may be to blame for some unpleasant economic undercurrents, including high joblessness rates among young people, record numbers of Americans who say they have stopped looking for work, and expanded disability rolls. A December *New York Times*/CBS News/Kaiser Family Foundation poll of unemployed 25- to 54-year-olds found that 37 percent of those who said they wanted a job believed



technology was a reason they did not have one.

In his 2012 book *Coming Apart*, political scientist Charles Murray charts a widening gulf between the white upper and lower classes between 1960 and 2010. Murray sees some of the few occupations left bridging the gap—low-skilled white-collar jobs, for instance—disappearing thanks to automation. Jobs like phone operators, once upon a time, and tax preparers or travel agents more recently.

Holding back automation is impossible, says Murray: “This is not something where you can artificially subsidize people to become buggywhip makers.” But thanks to our unimpressive education system, he argues, Americans are less well-equipped to flexibly handle change than they once were—and anyway, the latest round of automation isn’t creating new jobs the way previous advances in industrialization once did. The upshot: an even faster social and political bifurcation.

Fretting about the impact of automation on employment is a time-honored tradition. In 1961, after 10 months of recession, *Time* published a story on “The Automation

Jobless.” As economist Timothy Taylor points out on his *Conversable Economist* blog, the text could have been plucked from this week’s issue of the magazine. “While no one has yet sorted out the jobs lost because of the overall drop in business from those lost through automation and other technological changes, many a labor expert tends to put much of the blame on automation,” the 1961 essay intones. “Throughout industry, the trend has been to bigger production with a smaller work force.... Many of the losses in factory jobs have been countered by an increase in the service industries or in office jobs. But automation is beginning to move in and eliminate office jobs too.... In the past, new industries hired far more people than those they put out of business. But this is not true of many of today’s new industries.”

Politicians took up the refrain then, just as they do now. In the famous speech where he vowed to put a man on the Moon, President John F. Kennedy delivered a line that could have been dropped into Obama’s State of the Union this year verbatim: “I am therefore transmitting to the Congress a new Manpower and Training Development program to train or retrain several hundred thousand workers particularly in those areas where we have seen chronic unemployment as a result of technological factors and new occupational skills over a four-year period, in order to replace those skills made obsolete by automation and industrial change with the new skills which the new processes demand.”

Yet the legacy of the 1960s is not one of apocalyptic unemployment and social breakdown. As Taylor notes: “The U.S. unemployment rate had declined back to the range of 5.0 percent by August 1964, but concerns over how the U.S. economy might adapt to technology and automation remained serious enough that President Lyndon Johnson signed into law a National Commission on Technology, Automation, and Economic Progress. The Commission eventually released its report in February 1966. When the unemployment rate had fallen to 3.8 percent.”

I, Babysitter

I’m not leaving my kids with the Roomba when I

go out, no matter how much they love it. But I'm perfectly happy to deputize a robot sitter from time to time. Like so many overanxious yuppie parents, I keep a small video camera in my (very young) children's bedroom. The Dropcam is WiFi enabled, so I can check it from anywhere, including my phone. I can also set it to alert me if there is unusual noise or movement in the room. What that means is that I can stretch the boundaries of being "at home" with the kids to include dinner at the next-door neighbor's house or even the Italian restaurant on the corner—anywhere I can (a) see my house to make sure it's not on fire and (b) get home quickly. This \$99 Internet-enabled, infrared, motion-sensitive digital eyeball has put a sitter out of a job on more than one occasion, when I have happily deployed a machine to keep watch on my kids in marginal circumstances when a human being would previously have been necessary.

People with single-level houses and a little more cash to spare can do more than just watch their kids sleep. They can actually follow them around the house and nag them to do their homework or eat their peas using one of several telepresence robots now on the market. The general phenotype of these machines is something like an iPad mounted on a Segway. Products like the Double, Beam, and Kubi—all of which are currently available for purchase—let a person who is not in the room act like he's there. That means less work not just for babysitters but also for airline pilots, as telepresence becomes increasingly common in offices as well.

Of course, the act of flying a plane is itself

heavily automated. The pilot and first mate are increasingly there just for show, and they may soon vanish as driverless cars acclimate the population to the idea of vehicles without humans at the helm.

Bot, You Can Drive My Car

Driverless cars are often cited as the Typhoid Mary of the coming robot plague. But for now, Uber and other car service apps are great examples of technological change generating *more* jobs, while simultaneously creating a consumer surplus as customers buy superior goods and services for a lower price. Data released by the company in January showed that Uber drivers were earning more than their professional taxi driving counterparts—with take home pay as high as \$17 an hour in Washington and Los Angeles, \$23 in San Francisco, and \$30 in New York.

All of these services may someday be fully automated. Uber CEO Travis Kalanick has made no secret of the fact that he plans to replace human drivers with self-driving cars as soon as possible. But for now, new tech is generating new kinds of human jobs that are arguably better than the similar ones they replaced, even as the supposedly menacing robots crowd in around us.

All 2015 models of the Tesla S come equipped with enough features to constitute an autopilot mode: Thanks to radar, ultrasonic sonar, a camera with image recognition, GPS, and more, the car boasts adaptive cruise control that adjusts to the speed of traffic, the ability to read speed limit signs and stay in its lane, self-parking (both parallel and garage), and self-stopping if a crash is about to occur. Many of these features are already standard in other luxury car brands as well. A significant percentage of cars on the road could pilot themselves much of the time if we let them—and increasingly we are letting them—which makes the hand-wringing about self-driving cars seem both premature and a case of too little, too late.

With the rise of smartphones and broadband, venture capitalist Marc Andreessen says, an unprecedented number of people will be able to do new, impressive, resourceful, economically stimulating things.

Transformers: Robots in Disguise?

Marc Andreessen, who invented the Web browser and is now a leading venture capitalist, has taken to Twitter and his blog to decry automation alarmism. He writes that the fear “robots are going to eat all of the jobs” is a prime example of the “‘lump of labor’ fallacy—the idea that there is a fixed amount of work to be done.” With the rise of smartphones and broadband, he says, an unprecedented number of people have access to the means of production. And it’s crazy to think they won’t do new, impressive, resourceful, economically stimulating things with those tools.

The “this time is different” argument, Andreessen continues, contains the subtext “there won’t be new ideas, fields, industries, businesses, and jobs. In arguing this with an economist friend, his response was, ‘But most people are like horses; they have only their manual labor to offer...’ I don’t believe that, and I don’t want to live in a world in which that’s the case. I think people everywhere have far more potential.” Andreessen isn’t alone. In February, the University of Chicago asked economists if they thought that automation had historically decreased employment. Some 76 percent agreed that it had not.

But Tesla’s Elon Musk and others have pushed back, arguing that the economic threat is compounded by a more serious existential threat from artificial intelligence (A.I.). The Future of Life Institute released an open letter in 2014, with an impressive list of signatories including Musk, physicist Stephen Hawking, and actors Morgan Freeman and Alan Alda, expressing concerns about the rise of A.I. “The potential benefits are huge, since everything that civilization has to offer is a product of human intelligence; we cannot predict what we might achieve when this intelligence is magnified by the tools AI may provide, but the eradication of disease and poverty are not unfathomable. Because of the great potential of AI, it is important to research how to reap its benefits while avoiding potential pitfalls.” The

letter itself is vague, but Musk has called A.I. a “demon” that is “potentially more dangerous than nuclear weapons.” And other Future of Life Institute documents fret about how to ensure that A.I.s use weapons systems or surveillance cameras appropriately.

Laser Eyeballs and Hamburgers

Back in 2002, when LASIK was still in its infancy, I went under the laser to get my atrocious vision corrected—it was a graduation present from my parents. Even then, the surgery itself was almost entirely automated. I realized the doctor wasn’t doing anything even remotely related to the actual procedure when she started chatting with me about the best place to get a burger in New Haven while the smell of burning eyeball filled the air. More than 20 million people have had the same experience, though for many of them the recall of the experience may be blurred slightly by Ativan or other anti-anxiety meds, typically administered to people who are nervous about letting a robot shoot lasers into their eyes.

Medical robots have gotten a whole lot smarter since then. Watson, which you most likely know as the IBM Jeopardy champ, has turned its attention to human anatomy. To kick off its medical education, Watson “read” all of PubMed and Medline, two enormous databases of medical journals. In March 2012, Memorial Sloan Kettering agreed to allow Watson to consume tens of thousands of cancer patient’s records. *Forbes* reported in 2013 that Watson had analyzed 605,000 pieces of medical evidence, 2 million pages of text, and 25,000 training cases

The robot-ridden future may sound vaguely terrifying, but it’s unlikely to be terribly different from the robot-ridden present. You are already the commander of a tiny but powerful robot army.

and had the assistance of 14,700 clinician hours fine-tuning its decision accuracy. Watson's skills as a diagnostician are already outdoing human doctors in some areas, including detecting lung cancer, where Watson's 90 percent success rate is much better than humans' 50 percent.

After Watson diagnoses a problem, using natural language inputs from human clinicians as well as diagnostic images and the patient's medical history, its client could be turned over to one of the more than 3,000 da Vinci surgical robots in hospitals worldwide. The robots are controlled by a human surgeon who is typically in the same room as the patient, but have the precision and extrasensory capacity to make surgeries—particular hysterectomies and prostate removals, where they are most commonly used—less invasive and more accurate.

Working Their Way Up From Getting Coffee

In January, Persado Inc. raised \$21 million in venture capital. The company has created software that replaces copywriters—when Verizon wants to get a customer to renew their contract, for instance, Persado helps craft an email that is calibrated to maximize the chances of success, strategically deploying key words and creating appealing financial deals. But the emails also play on emotion, choosing whether to threaten a customer with a lost opportunity or gratefully thank them for their continued business. And it seems to work: Citi, a Persado customer, told *The Wall Street Journal* that the tool has increased the rate at which emails are opened by 70 percent. The clickrate inside the emails has gone up by 114 percent over human-crafted missives.

Should I fear for my job? After all, it's just a hop, skip, and jump from heart-tugging ad copy to readable magazine features, right? Maybe. But buried in the coverage of the significant investment was this little tidbit: CEO Alex Vratskides says the new V.C. money will be used to expand Persado's salesforce. Which consists of humans who win over other humans as customers by showing them how much better computers can be at the jobs where they are currently employing humans.

As some jobs fall by the wayside, others are

created. Another company, Journatic, offers a different kind of computer generated copy: hyperlocal news. Bots extract information from publicly available data sources, such as real estate transaction records and press releases, and recombine the information into the form of a traditional news article, which can then be reproduced in local broadsheets, neighborhood supplements, and websites. But the company also employs human copy editors to clean up the text, bring it into conformity with Associated Press style, and generally check the computers' work. In 2012, the company got in trouble for putting fake bylines on its content, something it quickly agreed not to do again. We might like to think a person wrote the story we're reading, but when it comes down to it, some newspapers—and readers—are already willing to let that illusion go for the sake of the bottom line.

Welcoming Our Robot Brethren

The robot-ridden future may sound vaguely terrifying, but it's unlikely to be terribly different from the robot-ridden present. You are already the commander of a tiny but powerful robot army. In lieu of hiring human beings or doing the work yourself, your bots do your banking, cleaning, babysitting, letter writing, and more. Perhaps your job will disappear, but a new one—one you probably can't imagine any more than an 18th century farmer could imagine an I.T. support tech—will emerge.

Soon we will find it jarring to discover a flesh-and-blood person doing tasks that were once “impossible to automate.” Is it ever good news when you need to talk to a bank teller in person or “speak to a representative” about something that's not on an automated phone menu? Getting and giving directions has ceased to be a point of tension or confusion; ubiquitous, traffic-savvy GPS has it covered. It's not that people will interact less; it's that we will be forced to transact less. As our machines take care of more business, we will be free to pursue other things. It may be unnerving to talk to someone about all-beef patties while they oversee a surgical procedure on an important body part, but I'd still rather have that procedure done by a competent, consistent machine than by a person. The day is fast approaching when you will sigh with relief to see ASIMO or a drone busboy—not a messy, fallible, inattentive human being—headed toward your table in a restaurant. ■

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Sex, Love, and Robots

Will sexbots make human life better, creepier, or both?

Elizabeth Nolan Brown

HER JOINTS ARE “a bit tight and creaky.” Her head circumference is smaller than expected, and there’s “a slight chemical smell again.” But “Mr-Smith” is mostly proud to introduce Page to other members of the message boards at DollForum.com. And they are happy to meet her, too: “Glad to see such an awesome lady of mystery!” one responds. “Have a fantastic honeymoon,” types another. “Congratulations, she is a beauty,” posts a third. “When you get around to completely introducing yourself to her, you will find that her softness will blow your mind.”

Page is what’s known as a “love doll” or “sex doll.” She is “anatomically correct”—that is, built so people can penetrate her—but she doesn’t move on her own or speak. There are at least a dozen high-end doll makers globally, and many more making cheaper models. “Even China is getting into it...in a year’s time China has gone from being non-existent in the doll market to having like 15 different manufacturers,” artist Stacy Leigh, who styles and photographs these dolls, told *Acclaim* magazine in 2013.

“The world better be prepared, because love dolls are coming.”

Katie Aquino, a futurist and self-proclaimed techno-optimist who goes by the name “Miss Metaverse” online, agrees that sex dolls and sex robots are poised to go big. But Aquino doesn’t think improved industrial tech will be the main force driving the growth. Instead, she thinks hobbyists are the future: “I believe that the first truly lifelike sex dolls won’t be made in factories, they’ll be made in people’s garages. Sex robots will be made by makers,” she says, using a catchall term for the growing do-it-yourself subculture in everything from 3D printing to mead brewing. And she’s mostly on board with this: “New sexual technologies will liberate us, allowing us humans to freely express our desires and fantasies while remaining safe and healthy from the comfort of our homes.”

But Aquino also worries about possibilities like “a population decline because more people will choose synthetic relationships over ‘organic’ human relationships” and human women “comparing themselves to synthetics and therefore choosing to modify themselves, just as we see how Photoshopped models and celebrities affect women today.” Some men are already predicting this day with glee, crowing on blogs and Reddit boards that human women will have to lower their expectations, step up their beauty rituals, or face the fact that many men will find sex robots a “better option.”

On the other end of the spectrum, you have people like Sinziana Gutiu, whose presentation at the 2012 We Robot conference focused on how artificially intelligent sexbots could “foster antisocial behavior in users and promote the idea that women are ever-consenting beings, leading to diminished consent in male-female sexual interaction.” In other words, she thinks sex robots may lead to more rape.

By promoting “lies about women’s humanity,” sexbots present “a danger that builds on and surpasses the harms attributed to pornography,” Gutiu wrote in her conference paper. In this she joined the laments of social conservatives. “Sodom and Gomorrah never dreamed of sexual immorality like this,” Jennifer LeClaire wrote last year in the Christian magazine *Charisma*. Dave Swindle, an associate editor at the conservative/libertarian site PJ Media, asked, “What happens when a bunch of teenage boys pool their money to buy a robot prostitute they can gang rape?...What will our world be when people lose their virginity to a machine?”

Is that last option even possible? Virginity is more a social construct than a physical state; we don’t say someone whose hymen breaks using a Tampax or whose penis enters a Fleshlight have “lost their virginity” to tampons and sex toys. But it’s this rather outlandish hypothetical that gets us to the crux of the issue: Will sex robots be more like vibrators, pets, partners, or slaves?

That question—and how technologists, potential customers, ethicists, and legislators will answer it—is mostly the concern of a few

academics at this point. But in the not-too-distant future it will become much less hypothetical for billions of people. We are drawing ever closer to the era of realistic, affordable, emotionally intelligent robots, including sex robots. These have the potential to change not just how we relate to technology but how we relate to one another. The challenge: How can we make robots part of our social/sexual fabric without letting them remake us?

Meet the Sexbots

Contemporary commercial sex dolls can appear quite lifelike, but they’re mostly non-robotic. The dolls, produced by companies such as California-based RealDoll and Japan’s Orient Industry, tend to be made from silicone and a metal skeleton and weigh as much as 120 pounds. Depending on the company, dolls can be customized in a variety of ways, from hair and eye color to pubic hair style, plus the addition of features like artificial milk glands. Some offer simulated breathing, pulse, and heartbeat.

One of the few existing *robotic* sex dolls appears to be Roxxy, from New Jersey-based TrueCompanion. With an appearance akin to an especially lifelike (yet not especially attractive) store mannequin, Roxxy is in no danger of being mistaken for human. But she has three “inputs” (mouth, vagina, and anus), according to TrueCompanion’s website, and the deluxe model boasts five programmable personalities, including Young Yoko, described on the company’s website as “oh so young and waiting for you to teach her,” and S&M Susan, “ready to provide your pain/pleasure fantasies.” Roxxy and her male counterpart, Rocky, are billed as responsive companions able to “listen, talk, carry on a conversation, and feel your touch.” Owners can purportedly program them with likes, dislikes, and foreign languages, as well as upload their “personalities” to the cloud.

Roxxy’s renown has been wide since her debut at a 2010 adult-entertainment expo, garnering mentions everywhere from tech blogs to the BBC. But many in the love-doll community are skeptical that TrueCompanion has ever sold any robots.

Davecat, 41, is one such person. A “Synthetik advocate,” Davecat is part of a group known as the iDollators, who say they prefer sex dolls and robots to intimacy with “Organiks,” a.k.a. human beings. Davecat lives with three dolls, whom he has named Sidore, Elena, and Muriel. He has made up personalities and created Twitter accounts for each of them.

Davecat was there for Roxxy’s debut, and he was

We are drawing ever closer to an era of realistic, affordable, emotionally intelligent robots. This has the potential to change not just how we relate to technology but how we relate to one another.

not impressed. The product “fell far short of everyone’s expectations,” he says. “Robots by definition are capable of movement, which Roxxy was incapable of.” He and fellow iDollators found Roxxy too heavy and visually unappealing, with “the guts of a laptop.” And though advertised as the “first” sex doll responsive to stimulus, the Japanese doll company Axis Japan was already using the same sort of technology—sensors that trigger various MP3s to play when a doll is touched in different places.

“Essentially, Hines had his prototype and was attempting to catch the eye of potential investors, so he could build more and cash in on the perceived trend of robosexuality,” Davecat says. “None have been sold, TrueCompanion haven’t really existed since roughly 2011, and Hines is a charlatan. The contemporary media picked up on the story, but it was much ado about nothing.” Hines did not respond to requests for comment.

“Today’s sex robot industry is underwhelming,” agrees Aquino. “A new techno-sexual revolution is upon us,” she explains, but it’s currently focused on technologies like teledildonics and virtual reality, which are “converging to bring sexual fantasies to life while allowing users to participate in sexual activities safely and without risk of STDs.”

The main thrust of “teledildonics” has been to combine things we conventionally think of as sex toys with haptic interfaces that allow users to “touch” and be touched remotely. Long-distance lovers, for instance, could use teledildonics to have robot-mediated sex, in combination with such technologies as shared virtual reality, webcams, or even old-fashioned phone calls. Users hooked up to virtual-reality headsets such as Oculus Rift could “participate” in porn or virtual erotic worlds. Simple teledildonics include things like Mojowijo, a set of paired vibrator attachments for the Wii, and OhMiBod, a vibrator that can be controlled remotely via an iPhone app. A website called Kiiroo allows teledildonics users to hook up with other

users (known or unknown) from around the world, the ultimate fulfillment of the ancient promise of the AOL chatroom.

Meanwhile, those whose tastes are more technologically advanced must make do. Aquino says “a significant number of robosexuals, those who are attracted to robots, choose to partner with love dolls like RealDolls because they are limited by today’s embryonic sex robot industry.”

Count Davecat among that cohort. “All told, I’d rather have a Gynoid than a Doll,” he says in an email, using the technical term for a female humanoid robot. “Dolls are fantastic, but realistically speaking, they can only do so much, and with a completely Synthetik lover, I’d have all the opportunities that are afforded in relationships with Organiks, but without all the drama.”

The sex doll company Orient Industry announced in 2014 that it has developed skin “not distinguishable from the real thing.” Sex robots could eventually be imbued with an almost real-time capability to “respond” to touch. Gerhard Fettweis, a professor of communications technology at Dresden University, believes that within 20 years wireless technology will match the speed of the human neural system. Some have proposed the idea of sexbots that mimic humans’ biochemical signaling system, releasing pheromones corresponding to arousal and love at the appropriate times.

At the start of 2015, however, roboticists are still struggling with problems like making autonomous humanoid robots that can walk and move their faces realistically. Last summer, the National Museum of Emerging Science and

Innovation in Tokyo debuted a girl and woman android, Kodomoroid and Otonaroid, to much fanfare. The robots are used to greet and read news to museum visitors and hold press conferences announcing new robots. They can make facial expressions and move their upper bodies, but they can't walk and can only lip-sync recorded speech. Convincingly human, emotionally intelligent androids of the kind seen in sci-fi are, for now, far more fantasy than reality.

How Much Is That Robot in the Window?

In a 2014 paper, the Brown University psychologist Bertram Malle and Matthias Scheutz, director of the Human-Robot Interaction Laboratory at Tufts University, defined *social robots* as “any robots that collaborate with, look after, or help humans.” Kate Darling, a robot ethics researcher with the Massachusetts Institute of Technology (MIT), prefers the wordier “a physically embodied, autonomous agent that communicates and interacts with humans on an emotional level.” Social robots, according to Darling, can also “follow social behavior patterns, have various ‘states of mind,’ and adapt to what they learn through their interactions.” Sexbots, of course, would fall squarely in this category. So would robots designed to interact with nursing home patients and robot pets.

Early examples of social robo-pets include Furbies and Tamagotchi, which lived on tiny screens on key rings and alerted owners when they needed food or bathing. The Roomba, an autonomous robot vacuum cleaner that has sold millions since 2002, is considered a primitive social robot. Robotic puppies, seals, and other animals are now being tested to interact with nursing home residents and autistic children, with promising anecdotal results.

Human beings love their pets, in large part, because of our deep tendency toward anthropomorphism: the imputation of human-like qualities onto animals and nonliving things. Anthropomorphizing a pet doesn't require believing the pet *is* fundamentally human, it just means its personality and behavior inspires humans to treat it like a person with complex desires, motivations, or memories. It is a near certainty

that we will do the same with social robots as they become increasingly commonplace.

The human inclination to anthropomorphize animals “translates remarkably well to autonomous robots,” Darling noted in her 2012 paper, “Extending Legal Rights to Social Robots.” A robot that can mimic human behavior, social gestures, and facial expressions “targets our involuntary biological responses.”

In 2013 Julie Carpenter, a psychology researcher at the University of Washington, interviewed 23 U.S. soldiers working with bomb-disarming robots. While the troops defined the robots as technological tools, they were still given to naming them, gendering them, and talking about them with empathy. “They would say they were angry when a robot became disabled because it is an important tool, but then they would add ‘poor little guy,’ or they’d say they had a funeral for it,” Carpenter explained in a statement about her work.

In a 2007 study from the University of California, San Diego, toddlers introduced to the humanoid robot QRIO quickly lost interest when the robot merely danced continually. But when dancing and giggling were triggered by their touch—when the robot was responsive in a human-like way—“that completely changed everything,” study leader Javier Movellan said in a press release.

It is this illusion of agency that helps endear social bots to human beings. Social robots are *designed* to elicit anthropomorphic reactions. “There are many of us in the robotics community that study not just robots but human psychology,” says Ron Arkin, an American roboticist and roboethicist who teaches at the Georgia Institute of Technology. To Arkin, the central question is: “Can we effectively design robots to interact with people in the way that people want to be interacted with? And that involves understanding the human mind as well as the robotic mind.”

People bond with pets in part because we like things that seem to need us. This trait transcends flesh and blood. “Nurturing a machine that presents itself as dependent creates significant social attachments,” wrote the MIT scholar Sherry Turkle in her 2006 paper “A Nascent Robotics Culture.” Turkle found people are prone both to nurturing feelings toward autonomous robots and to believing, at least on some level, that robots reciprocate these feelings.

So is this something we should worry about? Projection onto traditional objects can be ignored and revived at will, noted Darling. But an artificially intelligent robot “that demands attention by playing off of our natural responses may cause a subconscious engagement that is less volun-

A Japanese anthology published in the late 1600s refers to *Koshoku Tabimakura*, a “traveling pillow” with a “woman substitute” made from thin layers of tortoiseshell lined with velvet, silk, or leather.

tary.” Scientists and ethicists alike are exploring where to draw lines. Is it wrong, for instance, to “trick” dementia patients into caring for robo-pets?

Right now, social robots’ potential benefits for everything from elder care to education seem to outweigh ethical concerns. But right now, intelligent and autonomous robots don’t exist. In “The Inherent Dangers of Unidirectional Emotional Bonds Between Humans and Robots,” Matthias Scheutz raises concerns that robot companions will have the ability to “exploit human innate emotional mechanisms that have evolved in the context of mutual reciprocity...which robots will (not have to) meet.”

What are the potential repercussions of this? “Unfortunately, there is currently very little work aimed at trying to minimize the natural human tendency to anthropomorphize,” Scheutz tells me. “The key question is how to walk the fine line between making robots useful to people without having them fall for robots.”

Before Roxxxy and Roxxy

While coverage of Roxxxy and her sisters tends to focus on the unprecedented nature of “lifesized robot girlfriends,” creating convincing facsimiles of human beings in order to masturbate into them is actually an ancient pursuit. A Japanese anthology published in the late 1600s refers to *Koshoku Tabimakura*, a “traveling pillow,” with an *azumagata* (“woman substitute”) made from thin layers of tortoiseshell lined with velvet, silk, or leather. The dolls were also known as *tabi-joro*, or “traveling whores.” In the 1904 book *Les Detraques de Paris* (which loosely translates as *The Paris Crazies*), Rene Schwaeble quotes “Dr. P,” who sold “fornicatory dolls” (though he had to pretend to police he made balloon animals) for around 3,000 francs apiece in French catalogues. “Every one of them takes at least three months of my work!” said Dr. P. “There’s the interior framework which is carefully articulated, there’s

the hair on the head, the body hair, the teeth, the nails! There’s the skin, which has to be given a certain tint, certain contours, a particular pattern of veins....The only thing these haven’t got is the power of speech!”

In 1908, the German doctor Iwan Bloch wrote of “hommes or dames de voyage,” the “artificial imitations of the human body, or of individual parts of the body” sold in France with “genital organs represented in a manner true to nature.” Dames were equipped with oil-filled pneumatic tubes, the hommes an apparatus by which “the ejaculation of the semen is imitated.” By the 1920s, customizable sex dolls were advertised “fitted with a phonographic attachment, recording and speaking at will.”

Though perhaps some were attracted to the dolls, these were largely considered masturbatory devices, or in some cases a tribute to a dead loved one. Will sex robots be similarly functional, or will they provoke desire in their own right?

“Right now, we’re at an inflection point on the meaning of sexbot,” Kyle Machulis, a systems engineer with Mozilla, told *Aeon* magazine last summer. “Tracing the history of the term will lead you to a fork: robots for sex (idealized version: Jude Law in the movie *AI*), and people that fetishize being robots (clockworks, etc.). There was a crossover in the days of alt.sex.fetish.robots, but I see less and less people fetishizing the media/aesthetics, and more talking about actually having sex with robots.”

In a survey of 61 DollForum.com members —75 percent men who own dolls, 10 percent women who own dolls, and 15 percent men

thinking about purchasing a doll—the psychology researcher Sarah Valverde asked owners what motivated their purchase. Not-mutually-exclusive answers included sexual stimulation (70 percent), companionship (30 percent), and using the doll in sex with a human partner (17 percent). About a third of male owners reported some issues with sexual functioning. Most rated their sex with dolls as “above average” to “excellent.”

None of the respondents were in therapy related to their relationship with the sex dolls. Most were employed, educated, and reported similar anxiety and depression levels as the general population. While the use of sex dolls is often seen as pathological, Valverde makes the case that “a diagnosis of paraphilia would be unwarranted, without significant distress or impairment in functioning. Provided a doll-owner doesn’t need the sex doll in order to achieve sexual satisfaction, a diagnosis of a fetish would not be appropriate” either. “Anecdotal evidence suggests these dolls have brought relief, security, and happiness to their owners,” she concluded.

In his 2007 book *Love + Sex with Robots*, the artificial intelligence specialist David Levy—a former professional chess player and now president of the International Computer Games Association—pinpoints 11 major triggers that inspire emotions humans recognize as love. Many of these factors could presumably be inspired by social robots, including proximity, reciprocal liking (liking things that like us), need-fulfillment, a sense of mystery, and the presence of certain desired characteristics (like red hair or a deep voice). To Levy, it’s not a stretch to imagine some humans falling in love with and even marrying robots within a few decades.

First, Do No Harm

One result of this influx of robots into our bedrooms is that it may “trigger a broader role for the concept of moral harm in law,” suggests University of Washington law professor Ryan Calo in a 2014 paper, “Robotics and the Lessons of Cyberlaw.” Certain uses of robots may be deemed undesirable because they compromise

the actor, rather than a specific victim or society. The fact that a robot itself can’t feel pain or be exploited may not stop pushes to prohibit particular uses of or behavior toward social robots.

“The Kantian philosophical argument for preventing cruelty to animals is that our actions towards non-humans reflect our morality—if we treat animals in inhumane ways, we become inhumane persons,” noted Darling in her paper “The Rights of Social Robots.” “This logically extends to robot companions. Granting them protection may encourage us and our children to behave in a way that we generally regard as morally correct.”

In her We Robot conference paper, Gutiu suggests that, “if regulated,” we may be able to use sex robots “to correct violent and demeaning attitudes toward women.” But this sort of large-scale social-engineering-through-sexbot could quash the potential for their more individualized use in rehabilitation.

Levy imagines a role for sex robots similar to sex surrogates, therapists who use actual sexual intimacy to address clients’ issues. “All of the most common sexual dysfunctions and their cases can be treated by surrogate-partner therapy, including premature ejaculation, nonconsummation of a relationship, erection difficulties, performance anxiety, and fear of intimacy,” he explains in *Sex + Love With Robots*. The book cites the California sex therapist Barbara Roberts, who laments that “we have no traditional rite of passage nor meaningful ceremonies to initiate young people into informed adult sexuality”—a role Levy also envisions for sexbots.

And then there’s the inevitable question of kiddie sexbots.

Last summer, at a Berkeley Law School panel on ethical and legal challenges in robotics, Arkin spawned a flurry of sensational headlines by suggesting that “childlike robots could be used for pedophiles the way methadone is used to treat drug addicts,” potentially reducing recidivism rates for sex offenders. Many people find this idea immediately distasteful. Arkin empathizes with them, he tells me, but he thinks it’s better to investigate the therapeutic potential of such robots “in a controlled way” rather than simply avoiding research because it makes us squeamish. While no U.S. companies are publicly selling them, childlike sex dolls are already available online from foreign makers.

In Canada, child sex robots are illegal, but there are no U.S. laws yet specifically criminalizing them. In fact, there is reason to think the U.S. courts might carve out some legal space for them, as unlikely as that might seem: In 2002,

Convincing oneself that a human sex worker isn't faking it rests on the fact that, technically, she may not be. With robot companions, the fakery is inherent. It's a given.

the U.S. Supreme Court struck down parts of a federal law criminalizing “virtual” child pornography, described as either digitally created images or those featuring young-looking adults pretending to be younger. “I could see that extending to embodied [robotic] children,” said Calo, the law professor, at the panel, “but I can also see courts and regulators getting really upset about that.”

Regulatory concerns notwithstanding, “it’s coming to the time when we start talking about these things,” Arkin argues. “Should the design of [sex robots] be informed by science? Yes. Is anyone doing true scientific study on intimate robots at this time? Not to my knowledge. I would encourage that line of research to be undertaken if we can get past our Victorian taboos.”

One area where academics and journalists seem enthusiastic about the possibilities for sexbots concerns robot prostitution. Love doll brothels can already be found in Japan. In a 2012 paper, “Robots, Men and Sex Tourism,” the New Zealand researchers Ian Yeoman and Michelle Mars enthusiastically predict that robot prostitutes will overtake human sex workers by 2050. Yeoman and Mars paint an elaborate portrait of a posh Amsterdam robot brothel catering to a high-end clientele and niche sexual preferences—a situation the writers see largely as a social good, capable of invalidating all the messy moral concerns that human sex workers present.

Prostitution is illegal in the U.S. and many other countries, and various nations have previously criminalized everything from vibrators to adultery, so lawmakers may well move to block robot brothels also. But should robot prostitution be legalized, would “the oldest profession” find itself, like so many others, vulnerable to technological disruption?

In his 2014 paper “Sex Work, Technological Unemployment, and the Basic Income Guarantee,” John Danaher, a law lecturer with The National University of Ireland, Gal-

way, rejected the idea that sex workers and clients will all go quietly into the good robot night. This is largely due to the fact that people like having sex with other people; even in the presence of a robust robot sex trade, those inclined to pay for sex will still sometimes want to do so with a human being. But we also shouldn’t discount sex-worker resiliency—like the move from streetwalking to advertising on Backpage, those in the sex trade will adjust to suit the times. “Prostitution could well be one of the few forms of human labour that is likely to remain resilient in the face of technological unemployment,” posits Danaher.

Research on why men pay for sex has found, more than any other common denominator (variety, convenience, etc.), a desire for mutuality. Clients want to feel, at minimum, like a sex worker somewhat enjoys her time with them. In a 1997 study of male prostitution clients ages 27 to 52—nearly half of whom were married—a desire for sex was frequently met with “social, courting behaviors that were often flavored with varying degrees of romance.” Interviewing clients at a New Zealand massage parlor, researcher Elizabeth Plumridge found they “all wanted a responsive embodied woman to have sex with. This they secured by ascribing desires, response and sexuality to prostitute women. They did not know the true ‘selves’ of these women, but constructed them strategically in a way that forwarded their own pleasures.”

Read one way, this research could support the future popularity of robot prostitutes, which could theoretically be programmed to portray care and lust sufficiently well that we fall for it.

This, of course, depends in part on how effectively artificial emotional intelligence and sociability is developed. But even if we grant that realistically emo sexbots are possible, will they be “real” enough to afford mutuality? Whether we’re talking orgasms or affection, convincing oneself that a human sex worker isn’t faking it rests on the fact that, technically, she *may* not be. With robot companions, the fakery is inherent. It’s a given. How much that actually matters remains to be seen.

Everyday Ethics

Giving sex toys and sex dolls the illusion of agency will attract new users, Arkin suspects. “Not for everybody—it may go from one-tenth of a percent to 1 percent—but it would grow the demographic exponentially.”

In a June 2014 YouGov poll, Americans were split on whether using a sexbot is moral. Forty-three percent of those surveyed said using sex robots is wrong, and 39 percent said it’s acceptable. Only 10 percent said they would use a sex robot themselves.

Should sexbot use reach the mainstream, couples will have to wrestle with questions like how to handle jealousy over robot companions and whether robot sex counts as cheating. Is having sex with a robot more like using a vibrator or having a fling? Is it uncouth for friends to share a sexbot? What if someone creates a sexbot in your likeness?

Sex robots also present ethical issues for academics. “From a researcher’s point of view, what is appropriate?” asks Arkin. “There are no guidelines for researchers in this particular space.”

The *goal* of many roboticists is to get to a point where robots can successfully manipulate our emotions. To make robots more like sociopaths, able to recognize and use social cues, create an illusion of empathy, and gain trust and intimacy without reciprocity.

Osaka University’s Hiroshi Ishiguro, who supervised last summer’s “Android: What Is Human?” exhibition in Tokyo, has said that “the process of understanding (human) nature is the most interesting part of androids.” And for some, a faith in a quintessential humanness—some-

thing even the most sophisticated and intelligent robots can’t approximate—is one way to mitigate worry over the future of social robots. If human beings bond with robots not for what they *are* but what they inspire in us, perhaps our insurance lies in what they can’t inspire: a sense of mutuality, reciprocity, and genuine agency. To paraphrase David Levy, people don’t fall in love with an algorithm but a convincing simulation of a human being. Yet can any simulation really be convincing *enough*? Enough to have mass appeal? Enough to significantly change the social fabric?

Near the end of *Sex + Love with Robots*—a technoutopian volume if there ever was one—Levy writes that he does not believe for one moment that sex between two people will become outmoded. “What I am convinced of,” he declares, “is that robot sex will become the only sexual outlet for a few sectors of the population—the misfits, the very shy, the very sexually inadequate and uneducable—and that for some other sectors of the population robot sex will vary between something to be indulged in occasionally...to an activity that supplements one’s regular sex life.”

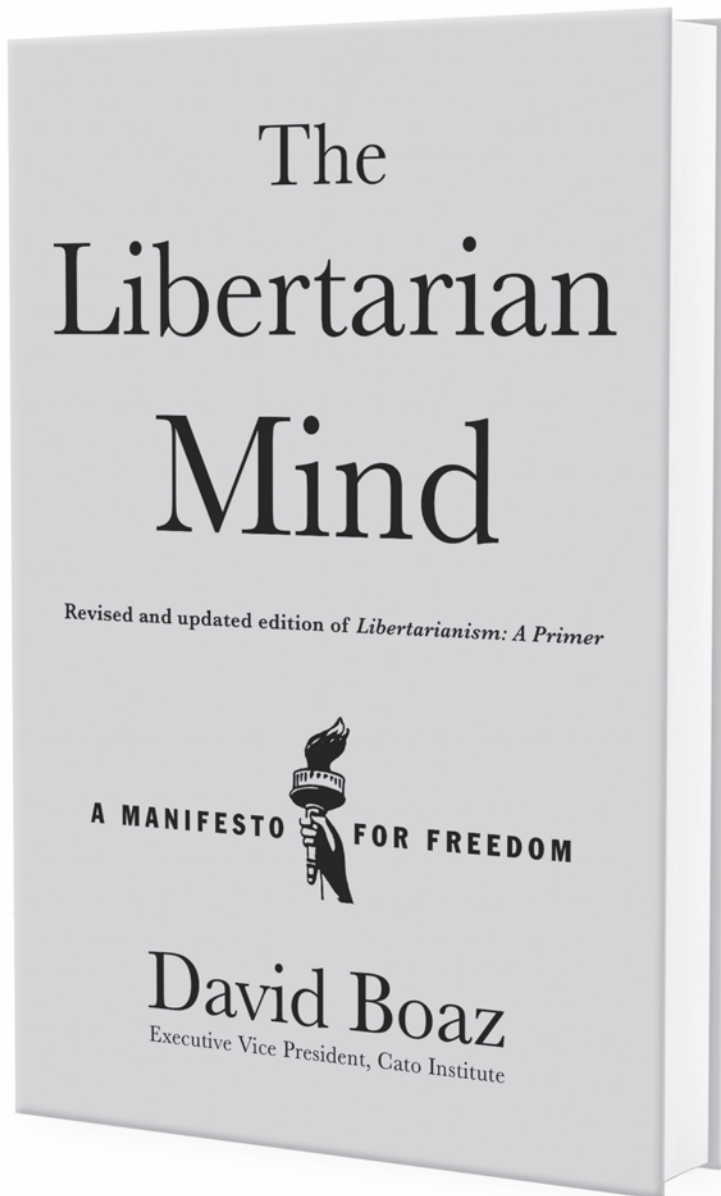
On the margins, sexbots could dissuade some individuals from pursuing human-to-human intimacy and relationships, just as pornography, sex toys, and everything from alcohol to work are also sometimes used to avoid attachments. But it has become clear through countless bouts of cultural and technological change that, for the most part, people see no substitute for knowing and loving another person. To predict sexbots as even moderately widespread stand-ins for sex and relationships reveals a not-insignificant misanthropism.

That isn’t to say that individual use of sex robots is misanthropic. For many men and women, they will remain ancillary to interhuman relationships, more like sex toys than humanity surrogates. For a subset, social robots may provide opportunities for companionship and sexual satisfaction that otherwise wouldn’t exist. When this occurs, we’d all do well to remember that having faith in human institutions and relationships means not panicking over new possibilities. Staying conscientious but open-minded toward the use of social robots, including sex robots, can only enhance our understanding of what it means to be—and to fall for—human beings. ■

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Will They Take Our Jobs?

MIT economist Andrew McAfee on driverless cars, wireless fishermen, and the second machine age

Interview by Katherine Mangu-Ward

MASSACHUSETTS Institute of Technology economist Andrew McAfee hasn't been replaced by a robot just yet. The following interview was conducted between two humans. Neither of the humans needed to bother to remember what was said, however: We recorded the conversation on an iPhone app, essentially outsourcing memory to a computer. Pre-interview research was conducted with the aid of Google—no humans required there either, just well-crafted algorithms pointing in the direction of McAfee's blog, popular TED Talks about automation and unemployment, and Amazon author pages. But the resulting MP3 file? It was transcribed by a human intern. Accuracy was important, and commercially available voice-to-text programs just aren't good enough yet. Which is a bit disappointing. Especially for the intern.

The rapidly shifting interplay between tasks that humans still do and tasks we delegate to our automated servants should feel like a familiar progression. In the first machine age—the Industrial Revolution—we replaced human brawn with steam power. But in so doing, we wound up creating more demand for labor: We needed people to tend to the increasingly complex machines, and to staff entire new industries that arose once humans were freed from the burden of lifting heavy stuff.

We continue to contract out our need for brawn to machines, say McAfee and his co-author Erik Brynjolfs-son, but we have also started replacing human brains with processing power. In their 2014 book, *The Second Machine Age*, the economists describe a new world driven by the relentless doubling of computer processing capacity, known as Moore’s Law. McAfee, who has a Ph.D. from Harvard Business School, cheerily anticipates a fresh profusion of consumer goods from this machine age, similar to the glut produced by the last one. But he says he’s no Candide—like many, he predicts that this time there will be no compensating boom in demand for human labor and he’s worried about the social and economic effects of widespread unemployment. Is he right? Are things really different this time around?

In January, Managing Editor Katherine Mangu-Ward spoke with McAfee about the economics of the robot revolution.

reason: You rode in the Google driverless car. Tell me about it.

Andrew McAfee: The experience went from terrifying to passionately interesting to boring in the space of one ride.

reason: Why was that?

McAfee: When the guy who was driving the car hit the big red button and took his hands off the wheel on the highway, that was a white-fingernail moment.

reason: Is there literally a big cartoon red button?

McAfee: There’s honestly a big cartoon red button on the dashboard.

reason: That’s delightful. So he hits the button—

McAfee: —and takes his hands and feet off the controls, and we’re going at highway speeds in a completely self-guided car. That was a little scary. Very quickly that passed, and then it became super interesting, because I felt like an astronaut. I’m having this really uncommon experience, and after a while, it sunk in that I was in a car that was obeying all relevant statutes, not weaving,



not seizing opportunities in the right-hand lane, going down the road at 55 miles per hour. I mean this as the highest compliment: It was a godawful boring ride.

reason: What are some places in everyday life where people may be undervaluing the extent to which the robots or machines have already taken our jobs or taken over our lives?

McAfee: I won’t say “taken our jobs,” because I still have one. A lot of these changes don’t keep screaming at you. They happen kind of gradually. They’re bit by bit, but then you look up and you’re living your life pretty differently than you did a few years ago.

For me, professionally, if I could sit down and look at what I was doing a decade ago or 15 years ago, I think it’d be night-and-day different. When I sit down to start writing something or to learn something, I basically have 30 tabs open on my browser. I’m searching for a little stat, or I pull up a number from the St. Louis Fed that’s got this great data repository. I don’t go to the library; I don’t fire off requests to research librarians. I use a research assistant for some things, but not for “hunt down this fact for me,” simply because it’s easier and quicker for me to do it myself. When you’ve got the world’s knowledge at your fingertips all the time and you’re supposed to be doing knowledge work, it really does change the way things happen.

reason: And how do you think that applies—if it does—to people who are doing a different kind of job? There are some guys in **reason**'s office right now assembling a million new desk chairs. It looks like their jobs aren't very different. Am I wrong?

McAfee: I think that part of their job is probably not very different, but how they got their day's schedule, how they communicate with the head office, how they alert them that the job is done, the extent to which they're monitored—maybe their truck has a GPS device in it so headquarters knows where they are—I think those things are actually pretty big changes.

In long-haul trucking, for example, the industry has actually transformed itself, and trucking companies started owning trucks again instead of giving them to subcontractors, mainly because they could monitor the drivers so carefully that they didn't have to rely on the fact that people take better care of their own equipment.

Let me give you one from my nonprofessional life. I moved to New York City for the first half of 2015. Let's assume that I didn't have any friends here.

reason: Should we make such a sad assumption?

McAfee: (*Laughs*) No, luckily I've got a lot of people to hang out with and to show me around. But let's say I didn't have any of that but I was still interested in finding a good café to go hang out at, at exploring different parts of the city, at getting around efficiently.

I would do that by trial and error before. I'd make a ton of mistakes. I personally would find it really stressful, because I hate being lost and I hate feeling stupid.

Those problems are basically gone for me. I've got an app called City Mapper on my phone. I'm pretty sure it was free. All I ever do is say, "I'm here in the Upper East Side, I'm going to meet a friend for dinner down here in the West Village. How do I get there?"

And it says, "OK, you walk over to Lex and 63rd, hop on the F train, you'll take it six stops, and get off here." It's incredibly detailed information about how to navigate a very unfamiliar city, so I can get around about as well as somebody who's lived here a long time.

reason: Tell me what this has to do with the fisherman in Kerala.

McAfee: That is probably my all-time favorite and most heartening solid piece of research about what's going on. A guy named Robert Jensen got to observe the economic lives of some systems-level fishermen in Kerala, India, before and after they got mobile phones for the very first time ever.

These folks were living in an I.T. vacuum. They'd go out every day and do their fishing, and they'd come back in and have to pick which local market to go to, to try to sell their fish. And you can imagine all the inefficiencies that would result because you couldn't match supply with demand carefully. Some days they would do great. Some days they would do lousy. Some days they would have to throw their fish away because nobody would pay them anything for it. It was a terrible situation.

In a really beautifully designed study, Jensen got to watch what happened before and after cell phone towers went in at different points along the coast. So he had a bunch of different experiments, and he saw the same thing over and over and over again. Markets start to behave predictably and rationally *immediately* after the new technology becomes available. The first thing these people did was all go and buy a phone, because none of them are stupid, and they would use it to call ahead and say, "What's the price at this market? Should I go over here?" And you just watch the markets regularize and clear in a way they could never do before.

This is an example of what happens, what's hap-

“So [a researcher did] a bunch of different experiments, and he saw the same thing over and over....Markets start to behave predictably and rationally *immediately* after the new technology becomes available.”

pening over and over and over around the world, as these new technologies diffuse. We are greatly improving the lives of people in a lot of ways.

reason: The current education system is almost hilariously unsuited to this universe that you have just described. Tell me why everything is bad and how you can fix it.

McAfee: I think there are a lot of really extraordinarily hard-working people in education, and I don't presume for a second to have all the fixes. But one thing that our primary education system is doing a really good job of is preparing the kinds of workers that we needed 50 years ago in the height of the industrial era. They acquire a suite of skills: They can read, they can write, they can do math at some level. And more fundamentally, they're encouraged to follow instructions and to be obedient. You sit in the same place. You go through this orderly process. People in the front of the room talk to you. It's great training for industrial-era white-collar and blue-collar workers. It's pretty lousy training for the kind of thinking and the kind of people and workers that we're going to need as we move deeper into the second machine age.

reason: So what's better?

McAfee: I was a Montessori kid, and I'm incredibly grateful I was a Montessori kid, because my earliest education bore no relationship to that system I just described. It taught me the world was an interesting place and my job was to go poke at it.

reason: You've said that entrepreneurship is something we should encourage in American kids and welcome in our immigrants. Why that, specifically?

McAfee: I haven't seen a computer that could convince investors to put together a business plan or really spot an opportunity and figure out how to go after it. That still does feel to me like a human skill. But as we mentioned in the book, entrepreneurship, and in particular tech entrepreneurship, has been driven by immigrants to a wild degree, and the people who want to come to this country very often are the kind of tenacious, ambitious, hard-to-satisfy ones. These are exactly the kinds of folks that you want to come in if you're interested in entrepreneurship. So especially at the level of skilled immigration, I find that kind of the biggest policy no-brainer out there. Even at the low-skill levels, we're not displacing tons of native workers from jobs.

reason: "Income inequality," "coming apart," "two Americas." There are lots of names for the ways that rich

people and poor people are economically separating, particularly in the labor market. You call it "the spread."

McAfee: There used to be a bunch of economic measures that all went up and down together, luckily primarily up. They did it in lockstep. They were really tightly coupled. And then, in recent years, we start to see these measures head in different directions and gaps opening up between them.

For example, one of the graphs we draw has four lines on it for the entire postwar period: GDP per capita, labor productivity, raw number of jobs, and median family or median household [income]. For decades after the end of the war, they were all going up, and they were all going up just super, super close together. Around 1980, the average median family income line starts to tail off. More recently, the job growth line starts to tail off before even the great recession kicked in. Job growth was fairly anemic all throughout the 2000s.

We call that phenomenon "the great decoupling." It's an example of this spread. You see it in returns to labor vs. capital. You see it in these four lines. You see it when we look at wealth and income measures. Thomas Piketty certainly sees it [in *Capital in the Twenty-First Century*]. He just looks at a couple aspects of it and labels them *inequality*, but these are all manifestations of a pretty common phenomenon.

reason: People get very emotional about this topic. You can see that in the response to the Piketty book, and you can see it in lots of other peoples' writing, including Tyler Cowen's *The Great Stagnation* and Charles Murray's *Coming Apart*. So before we get to your solutions, give me your "So what?" Why does everyone care quite so much, given that the vast majority of people are doing better, there's just a differential in the gains that seems to be opening up.

McAfee: Let's be careful about that. We are all doing better as consumers—as people who want access to goods and services, and who want more of them, who want higher variety, higher quality, lower prices, all those things. The bounty that comes out of capitalist systems, and in particular technologically driven ones, is just stupefying. It's pretty unbelievable, and I find that unambiguously good news.

The challenge comes when I look at things like the median American household income. Even after we adjust for inflation and for changes in family size,

it's not that it's growing more slowly than it used to, it's actually lower than it was 50 years ago. For me, that's a decent answer to the "So what?" question, because the fact that it's real income means that it represents our best attempts to take into account the fact that flat-screen TVs cost less than they used to, that it is your actual purchasing power. It's not a precipitous decline, it's not that the middle class is starving in the streets, but it is a slow, steady decline.

That's part of the "So what?" answer. Another part is that there are some important categories of stuff that are not getting a lot cheaper over time. Higher education, health care, housing. Now, we can have a really active debate about *why* they're following different trajectories and whether we should head more toward libertarian-style market solutions for that. That's a really important, valid debate. It's a bit of a separate question from the fact that *are* these things getting more or less affordable to the American family at the 50th percentile, and in a lot of cases they're becoming less affordable.

It's also becoming more clear as we get the evidence that social mobility is not where we think it is. The economic circumstances of your birth seem to play a really large role in this country in determining your economic life trajectory, even more so than they do in a lot of these European social democracies that we like to disparage. The low mobility is also part of an answer to "So what?"

Charles Murray has documented that among lower-middle-class Americans, there's been, over the past half-century, a really alarming rise in a bunch of social ills: in drug use, in dropping out of the labor force, in not staying married, in children raised in single-parent homes, in incarceration rates. What's interesting to me is that all those go along with a really sharp decline in work, just being engaged in a

job. Those social ills are almost nonexistent in upper-middle-class Americans, and those upper-middle-class Americans have been working pretty steadily through this period as well. Murray would disagree with the following: My very simple narrative there is that work is a really good thing to have as technology encroaches and takes away some of the classic lower-middle-class job opportunities. I think we see some social ills coming out of that.

And then the last part of the answer is that there's some pretty alarming data that among the lower rungs of the education and income ladder, health outcomes are heading in the wrong direction. Average life span, for some demographic groups, is actually going down recently in America after decades of pretty impressive gains.

I put all those things together, and I don't find it easy to be blasé about the spread.

reason: You've said nice things about work for work's own sake. But actually, people hate work, don't they? Most people hate their jobs, at least some of the time. So why do you want them to keep working?

McAfee: Among people who have looked pretty hard at this, there's a really broad consensus that when work—I won't say jobs—when work goes away from the community, relatively few good things happen and lots of bad things happen. And again, that list, that litany that Murray put together, is pretty telling to me. I don't want to pretend that if everybody had a job, all those things would magically go away, but I do believe that part of the reason that these ills creep in is idleness and not having the sense of purpose and dignity that comes along with the job. I don't think those are just empty things.

reason: So if work has these good effects, and we're concerned about culture and economies coming apart, and meanwhile McDonald's is automating order-taking

“For about 200 years, we had this wonderful phenomenon where, as the capitalist engine progressed, it needed a ton of labor at all different levels of skill....It feels to me like this time might finally be different.”

and burger-flipping and Google is automating driving, then...what?

McAfee: I want to be clear: I don't demonize McDonald's and Google and all these other companies for trying to use technology and use automation. They're trying to keep their costs low. They're a business. They're not a social welfare organization. And they're doing it because they think they deliver better goods and services to all of us. So I'm not saying that companies should take one for the team somehow and just start bringing on lots of labor willy-nilly for the good of the community or the good of society.

But all these companies acting in their own interests are generating, I think, less labor demand than was the case previously. For about 200 years, we had this wonderful phenomenon where, as the capitalist engine progressed, it needed a ton of labor at all different levels of skill, and instead of dropping out, instead of mass unemployment, instead of mass starvation, we had the rise of a large stable prosperous middle class in country after country.

It feels to me like this time might finally be different. The data that I talked about are not just blips; they look like trends. And when I look at tech progress, I don't see it changing course.

Now, what do we do about it? I think we try as hard as possible to prove me wrong and to make this time just like all the other times, where even though there was a lot of tech progress, the average worker wound up with a better job and a higher wage.

reason: And how do we do that?

McAfee: In the book we tried to concentrate on the really uncontroversial parts of the Econ 101 playbook. And you've got to go a long way outside of the mainstream economics profession before you'll find someone who'll say that the government should not be involved in building out infrastructure or primary education

or basic research, because the private sector tends to undervalue and therefore underfund that kind of stuff. So our playbook consists of things like education reform and immigration reform and increased focus on entrepreneurship and doubling down on infrastructure and revitalizing basic research. To me, that's our best chance to create an economic environment that would let the happy pattern repeat itself and bring labor demand back. There's no way that labor demand is going to come without a lot more economic growth. Great. Let's do what we can to get the economic growth.

reason: In the next, say, five to 10 years, what are the first jobs to go?

McAfee: One of the quickest ones to me looks like different flavors of customer service reps, where they're using their language skills. They're using their pattern-matching skills. Our technologies are really, really good at both of those right now. They're going to get worlds better over the next five to 10 years, so people doing that kind of knowledge work, I think, are going to face some unemployment headwinds.

Depending on the regulatory environment, I think a highly functional, autonomous vehicle is easily in that timeframe, so we have a lot of people who drive for a living now who are going to be confronted by automation.

I think if a piece of technology is not already the world's best medical diagnostician, it easily will be in five or 10 years. Now, I don't know if, again, there are going to be regulatory policy changes that would allow that technology to diffuse. But if that happens, we've got a lot of people who diagnose us for a living who are going to be confronted by technology that does it better.

What then happens in these different fields is not that the employment goes down to absolutely zero. It's

“Among people who have looked pretty hard at this, there's a really broad consensus that when work goes away from the community, relatively few good things happen and lots of bad things happen.”

that it goes down to a pretty small number of very competent, pretty high-level people supported by a ton of automation.

reason: That's something that has happened in lots of other places already, right?

McAfee: Yeah. Longshoremen are the classic job where that happened in the 20th century, but the happy phenomenon is that other industries sprang up that, again, needed labor at all different skill levels. I'm encouraged by things like Uber and Airbnb and the rental economy that's giving average people a chance to earn some money. That's great. I hope it continues.

reason: There's this vogue for famous technophiles to freak out about artificial intelligence [A.I.]. We've got a statement from the Future of Life Institute signed by Stephen Hawking and Elon Musk, saying basically, "Everyone panic, the robots are going to kill us all." Are they right?

McAfee: This is just not high on my list of concerns at all. The best I ever heard it explained is that we are multiple Watson and Crick moments away from anything like a *Terminator* or a *Matrix* scenario.

I could be wrong about that. I could easily be wrong. In which case, oops. Because the interesting point they make is, "Look, even if it's a very low probability of that, and even if it's kind of a long way off in the future, we're talking about an existential risk." OK. It's easy to look at some of the recent advances and extrapolate them forward and say, "Holy Toledo."

reason: What do you think is the most "Holy Toledo"-inducing advance recently?

McAfee: The most telling demonstration for me was when the guys at Deep Mind Technologies told their system to learn to play classic '80s-vintage Atari video games. They didn't tell them the rules of the games, they didn't tell them what controls they had, they didn't try to tell them what was good or what was bad or advanced or "shoot that tank, but don't shoot that thing over there." All they said was to the system, "Your job is to maximize that number up there, which is called the score. Knock yourself out." For the majority of the games that they included, the system is now the world's best player.

reason: How did it do on *Pong*?

McAfee: You would never score a point against it on *Pong*.

reason: That's disappointing. That's a lot of time wasted by a lot of teenagers.

McAfee: Yeah. It's the world's best *Battlezone* player, and I

played a lot of *Battlezone*. I'm not getting those hours back. *(Laughs)*

reason: What technologies are people currently undervaluing and what tech are people currently overvaluing?

McAfee: I think we're simultaneously overconcerned about A.I. progress in an existential sense and underconcerned about it in an economic sense. Because I do think that these advances are going to pretty quickly enter the business world, and I think they're going to accentuate all these phenomena that we talk about in our book.

I personally think 3D printing is extraordinarily cool, and it's going to help with our innovation work and our prototyping and stuff like that. There are people who believe it's going to massively disrupt office supply chains and the manufacturing industry and everything all around the world in some realistic timeframe. I don't see that.

reason: So you're telling me that the future of, "Computer, please make me a ray gun" is further off than I was hoping?

McAfee: That's actually going to—if you want to invest the time to put one of these things in your house and learn to use it and acquire the plans, you can print out your gun. People have done that. What I don't think is that all the gun manufacturers should say, "Oh man, all of our big centralized factories are now completely worthless."

reason: What is the "to be sure" paragraph you wish you had put in the book?

McAfee: Ask me that question in a few more years. Maybe the job market's going to spontaneously tighten back up and the middle class is going to get on a healthy trajectory again and this whole book is going to stand as another example of "Ha ha ha, see how terrible that timing was."

reason: Right.

McAfee: And I guess when the Terminator comes and knocks on my door, I'll say, "Gosh, I wish I'd been a little more guarded about the prospects for artificial intelligence."

reason: I think the Terminator's going to let you live, because you're convincing all of us to lower our defenses.

McAfee: That's true. I could be the quisling for the Terminators, right? I'll be their intermediary. ■

A photograph showing firefighters in yellow gear and blue helmets working in a forest. They are using tools like axes and chainsaws. In the background, a large fire is burning, with smoke and flames visible among the trees. The scene is hazy and smoky.

The Settlement Shakedown

Federal and state governments are extracting and pocketing huge payments from big businesses, perverting justice along the way.

Scott Shackford

IN SEPTEMBER 2007, the “Moonlight Fire” ripped through 65,000 acres of northern California, forcing the evacuation of 100 homes and the exertion of thousands of firefighters over 16 days. More than two-thirds of the wreckage occurred on federal land, so the government had a keen interest in assessing blame.



What one U.S. attorney called “the largest recovery ever...for damages caused by a forest fire” had instead come to symbolize a trend of government shaking down deep-pocketed defendants.

State and federal officials quickly located a culprit: Sierra Pacific Industries, one of the biggest lumber producers in the United States. A logging company contractor working for Sierra Pacific on Labor Day struck a rock with a bulldozer, investigators claimed, setting off the sparks that kindled the initial blaze. Though the company insisted it was not at fault and did not start the fire, it settled with the federal government in 2012 after Judge Kimberly Mueller for the Eastern District of California suggested in pre-trial orders that Sierra Pacific could be held liable for the fire, under complex California forestry regulations, even if the contractor *didn't* start it.

The settlement was a massive haul for the feds: \$55 million to be paid out over five years, with the lumber giant also agreeing to hand over more than 20,000 acres of its land. Yet to Sierra Pacific, it still may have seemed like a good deal. According to company filings, at one point the U.S. attorneys investigating the case claimed more than \$1 billion in damages. The state of California also made its own separate demand for \$8 million from the company.

After Sierra Pacific opened its pocketbook, evidence began emerging that the settlement was based on improper prosecutorial withholding of key information, and even straight-up lies. By October 2014, after Sierra had delivered \$29 million of its settlement to the Department of Justice (DOJ), the company was asking the District Court to void the agreement due to “fraud upon the court.” The alleged fraudsters’ motive? To secure a financial windfall for both the state and the federal government.

While such post-facto complaining might sound par for the course from expensive corporate defense attorneys, the charges had enough merit to stop the state-level lawsuit in its tracks and send shockwaves throughout the Golden State’s legal system. In February 2014, Plumas County Judge Leslie C. Nichols found that the California Department of Forestry and Fire Protection and the California attorney general’s office, which jointly investigated the fire

with the DOJ, engaged in “egregious and reprehensible conduct” in the case, failing to turn over thousands of pages of documents indicating that several other people could be responsible for the fire—people who lacked Sierra’s deep pockets. Also revealed in a 2013 audit: For years, Cal Fire had been secretly and illegally stashing money from settlements in a nonprofit under its control rather than depositing it in California’s general fund. According to Sierra Pacific’s filings, Cal Fire demanded a check for \$400,000 for this fund as part of a settlement offer.

Nichols declared that the state had engaged in “a systematic campaign of misdirection with the purpose of recovering money from the defendants.” California was ordered to pay \$32 million to reimburse Sierra Pacific’s court costs and fees, and the judge tossed out the state’s lawsuit.

In the wake of the scandal, all the judges in the district representing that part of California were recused from considering the case, and Ninth Circuit Chief Justice Alex Kozinski—who has been withering in his criticism of the government’s behavior—was asked to assign a replacement judge. He ultimately decided to return the case to the district, putting it in the hands of Eastern District Senior Judge William Shubb. What U.S. Attorney Benjamin Wagner boasted in a 2013 district report was “the largest recovery ever by the United States for damages caused by a forest fire” had instead come to symbolize an ominous trend of government greedily shaking down deep-pocketed defendants.

Under Attorney General Eric Holder, the DOJ has netted more than \$100 billion in civil fines, settlements, and restitution for fiscal years 2012 and 2013. Criminal fines and settlements

account for another \$80 billion. Attorneys general throughout the 50 states have also learned to love massive payouts from banks and other big businesses accused of wrongdoing. Typically agreed to in exchange for dropping civil and criminal liability, these settlements in theory are supposed to compensate victims. But government agencies are often the biggest beneficiaries, creating an incentive structure that favors negotiation over prosecution and big corporate targets over discrete executive villains. The combination can too easily lead to perversions of justice.

In January, Holder finally recognized a similarly debased incentive that civil libertarians had been complaining about for decades: civil asset forfeiture against individuals, many of whom are never even charged with a crime. The attorney general issued an order banning what so far is only a small subcategory of DOJ asset seizures, but the move came amid mounting bipartisan congressional pressure, increased activism on both the left and the right, and a rash of recent press coverage, particularly in *The Washington Post*. (reason has been documenting and denouncing civil asset forfeiture since the 1980s.)

There is an emerging consensus in America that having law enforcement pocketing and profiting from property taken from non-criminals is a serious miscarriage of justice. “Civil forfeiture is fundamentally at odds with our judicial system and notions of fairness,” argued John Yoder and Brad Cates, former directors of the DOJ’s Asset Forfeiture Office, in a *Washington Post* op-ed piece four months before Holder’s announcement.

Yet this insight has generally not been applied to the property of large corporations. Which is a shame, since the temptation for police and prosecutors is even more corrupting when the target is an entire bank instead of someone who has merely withdrawn a pile of cash from one.

California vs. the Big Guy

Giant logging companies and faceless investment banks do not engender the same sympathy as, say, the owner of a cash-only burrito joint in Arnolds Park, Iowa. (One such owner, Carole

Hinders, recently staved off an attempt by the Internal Revenue Service to seize \$33,000 from her on grounds that Hinders was consistently making bank deposits smaller than \$10,000, thereby potentially facilitating the never-charged crime of intentionally structuring deposits in a way to avoid the Bank Secrecy Act.) It also doesn’t help for public relations that the kinds of crimes financial institutions get charged with make even the Hinders case sound clear-cut.

One key difference is that large corporations can afford lawyers—and absorb settlements. Indeed, Sierra Pacific lists four different law firms on the 100-page motion it filed in November to overturn the agreement it had signed onto just two years before.

What sets the Sierra Pacific case apart is the scope of government skullduggery alleged, sometimes by government insiders themselves. The complaint quotes two assistant United States attorneys who were disgusted by the behavior of their peers and reported it to superiors.

One whistleblower, Robert Wright, was removed from the case in 2010, calling it “the first time in [his] 40 years of practicing law that [he] felt pressured to engage in unethical conduct as a lawyer.” Another, Eric Overby, left the case on his own and reportedly met with Sierra Pacific’s counsel to express his concerns. He told them he had never seen a case like this one, adding, “It’s called the Department of Justice. It’s not called the Department of Revenue.... We win if justice wins.” The U.S. attorney’s office denies the accusations of misconduct.

Overby’s view of what motivates the DOJ may need rethinking. Pivoting off the increased attention on asset forfeiture, some scholars are starting to look more closely at the incentives that encourage U.S. attorneys and state attorneys general offices to pursue these big settlements. What they’re finding is not unlike the rural deputy dragging out the drug-sniffing dog as an excuse to search a car for loose cash to seize, but on a much larger scale.

The pursuit of a giant settlement from Sierra Pacific is no mere one-off. “Many states permit the office of the attorney general to retain a specified percentage of the damages and civil penalties obtained through enforcement of state and federal antitrust laws, and many others have similar provisions linked to the enforcement of consumer protection, false claims and related statutes,” wrote law professors Margaret H. Lemos and Max Minzner in a January 2014 *Harvard Law Review* article titled “For-Profit Public Enforcement.”

The bad incentives are as pervasive as they are unexam-

The amount that U.S. companies have paid in fines has skyrocketed from an estimated \$1 billion a year in total fines at the turn of the 21st century to more than \$12 billion in 2014 from federal judgments alone.

ined, the authors argue: “Other states have established all-purpose revolving funds for the support of the office of the attorney general, which are funded by the proceeds of any civil litigation conducted by the attorney general and may be used for the performance of any of the powers or duties of the office. Such civil enforcement provisions have flown almost entirely under the academic radar, even as commentators have heaped critical attention on similar provisions governing the forfeiture of assets in criminal law.”

For example, did you know the Health Insurance Portability and Accountability Act of 1996 includes a provision that funds its own enforcement arm from fines and recovered assets? Or that the American Jobs Creation Act of 2004 allows the IRS to keep a quarter of the money it collects pursuing unpaid taxes? Both mechanisms are comparable to how law enforcement agencies bolster their funding with assets seized during drug busts. “Just as asset forfeiture provisions create incentives for enforcers to maximize forfeitures,” Lemos and Minzner write, “such enforcement-funded revolving funds create incentives for enforcers to maximize financial recoveries.”

The amount that U.S. companies have paid in fines has skyrocketed in recent years, from an estimated \$1 billion a year in total fines at the turn of the 21st century to more than \$12 billion in 2014 from federal judgments alone, according to a September 2014 cover story in *The Economist* titled “Criminalising the American Company.” The twin threats of overregulation and money-hungry bureaucrats has meant that businesses spend millions trying to comply with arcane rules to avoid attention from prosecutors looking for any excuse to pounce.

Consider Kamala Harris, California’s ambitious attorney general, who filed suit against Delta Airlines in 2012 (and threatened other big companies with the same) over a California law requiring that a privacy policy be conspicuously posted within smartphone apps. Harris’ office warned in a press release that it could demand \$2,500 from

Delta for each documented violation—meaning, every time a consumer accessed the insufficiently labeled app. A federal judge eventually dismissed the lawsuit over a conflict with federal law, saving the company potentially billions in fines.

If even a state attorney general doesn’t know which businesses are impacted by federal regulations, think how tough it is for the companies themselves to keep up. Harris’ misstep has not put a dent in her ambitions: In January, she announced that she’ll be running to fill retiring Democratic Sen. Barbara Boxer’s seat in 2016.

Feeding the Beast

As America struggled through the 2008 housing collapse and its aftermath, state governments in particular felt the pinch. Asset forfeiture became an increasingly attractive way for bureaucrats to fill funding gaps.

In 2012, the federal government and 49 states hailed a massive settlement with five large banks—JPMorgan Chase, Wells Fargo, Citi, Bank of America, and GMAC (now called Ally Financial)—over allegedly abusive mortgage and foreclosure practices. More than \$25 billion in relief was coming to affected homeowners, prosecutors bragged. “Our settlement holds America’s largest banks accountable for harms homeowners suffered from shoddy loan servicing, illegal robo-signing, and faulty foreclosure processing,” declared Washington State Attorney General Rob McKenna. Much of the money did go to harmed homeowners, but not until the government skimmed off a healthy cut.

Some \$2.5 billion of the settlement went to states to use pretty much however they wanted. The national affordable housing advocacy group

Enterprise Community Partners analyzed how the states were spending the settlement money and discovered that many of them diverted it to programs that had nothing to do with housing. In several states, the money went without strings to the office of the attorney general or directly into the state's general fund. In California, Gov. Jerry Brown proposed using part of it to help plug holes in the budget for the state Department of Justice and for debt service on state housing programs.

Despite these potentially corrupting financial incentives, the possibility of prosecutorial misconduct in the Sierra Pacific case hasn't gotten the same kind of attention as, say, the Long Island snack-food distribution company that had \$447,000 seized by the office of then-U.S. Attorney (and current U.S. attorney general nominee) Loretta Lynch for the same kind of small-deposit activity that ensnared the Iowa Mexican restaurant. (In January, the federal government finally agreed to give the money back to the owners of Bi-County Distributors, who had never been charged with a crime.)

But Sierra Pacific did draw the attention of Sidney Powell, a former assistant U.S. attorney turned private white-collar defense lawyer, who wrote about the case in October for the *New York Observer*. Powell's own experience with prosecutorial misconduct in pursuit of convictions led to a 2014 book, *Licensed to Lie: Exposing Corruption in the Department of Justice* (Brown Books). Among the subjects: the misbehavior of prosecutors going after Merrill Lynch executives in 2003 for connections to the Enron scandal (in the course of extracting an \$80 million settlement from the brokerage); the destruction of the accounting firm Arthur Andersen following a conviction (subsequently overturned unanimously by the Supreme Court) for its work with Enron; and the pursuit of charges against Sen. Ted Stevens (R-Alaska), who lost re-election after federal accusations of corruption in 2008. Despite being convicted (and later dying in a plane crash), Stevens was cleared after revelations of prosecutorial misconduct.

"It's an outrage the way they handle things," Powell says. "I think they found out how to make

a boatload of money shaking down corporations and other businesses through civil asset forfeitures that are very hard to defend against."

Asked whether financial incentives played a role in the Enron case, she says the DOJ certainly cashed in. "I know the department got...hundreds of millions from Citibank and some of the other banks related to the Enron debacle. And...I don't know where all that money went. Maybe some of it was owed, but the way the government goes about it and what they do with it has no transparency that I know of."

While Powell sees the settlements as prosecutors shaking down Wall Street for the cash by threatening criminal charges against anybody who might try to resist, the populist *Rolling Stone* journalist Matt Taibbi makes the opposite point: that banks and corporations are greasing the skids by agreeing to large payments that absolve boardrooms and executives of culpability for the housing bubble and collapse.

In a November piece, Taibbi concluded that the DOJ's \$13 billion settlement with JPMorgan Chase in 2013 should be seen not as a punishment but as a bribe. "The root bargain in these deals was cash for secrecy," Taibbi writes. "The banks paid big fines, without trials or even judges—only secret negotiations that typically ended with the public shown nothing but vague, quasi-official papers called 'statements of facts,' which were conveniently devoid of anything like actual facts."

Per the terms of the settlement, \$2 billion will go straight to the U.S. Treasury. Hundreds of millions will be split among the attorney general's offices in California, Delaware, Illinois, Massachusetts, and New York. Just \$4 billion, or less than one-third, is intended as "consumer relief" for anybody harmed by JPMorgan Chase's conduct.

Wall Street critics like Taibbi are frustrated that under such settlements, nobody goes to prison for fraud or misconduct. This would seem to put him at odds with Powell, whose post-Department of Justice career revolves around defending executives and corporations in court. What connects the two is a shared belief that bad incentives are pushing the DOJ to pursue money rather than justice. As Holder and Congress begin the first baby steps toward rolling back the civil-asset-forfeiture regime against individuals, it's time to start being more skeptical when a similar practice is aimed at corporations. ■

Scott Shackford (sshackford@reason.com) is an associate editor at reason.

LIFE OUT ON THE POLITICAL FRINGE

FRINGE

BY PETER BAGGE 2015

SEATTLE, WA, OCT. 2014: I WENT DOOR TO DOOR DROPPING OFF CAMPAIGN LITERATURE FOR TWO CANDIDATES RUNNING FOR THE STATE LEGISLATURE...

ONE WAS RUNNING AS A LIBERTARIAN, THE OTHER AS A "RON PAUL REPUBLICAN." THUS, NEITHER HAD ANY CHANCE OF WINNING.

HMMM... I'LL BET CHAIN-SMOKERS DON'T VOTE...

OR PITBULL OWNERS...

OR—JUDGING BY THAT DOOR—DOMESTIC ABUSERS...



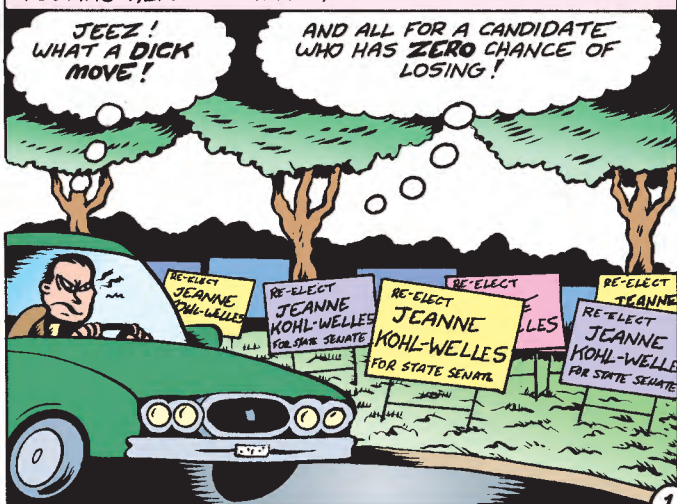
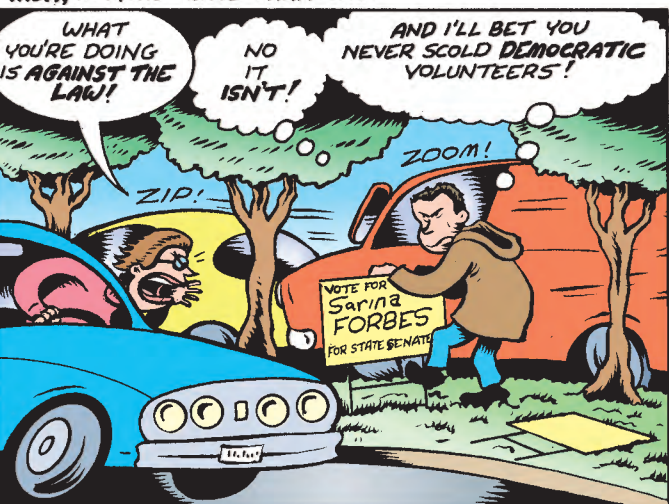
STILL, NO ONE GAVE ME A HARD TIME ABOUT THESE CANDIDATE'S POLITICS. IN FACT, NO ONE TALKED TO ME AT ALL...

SO IT WAS MY OWN LAZINESS THAT LED ME TO COME UP WITH EXCUSES TO AVOID CERTAIN HOMES.

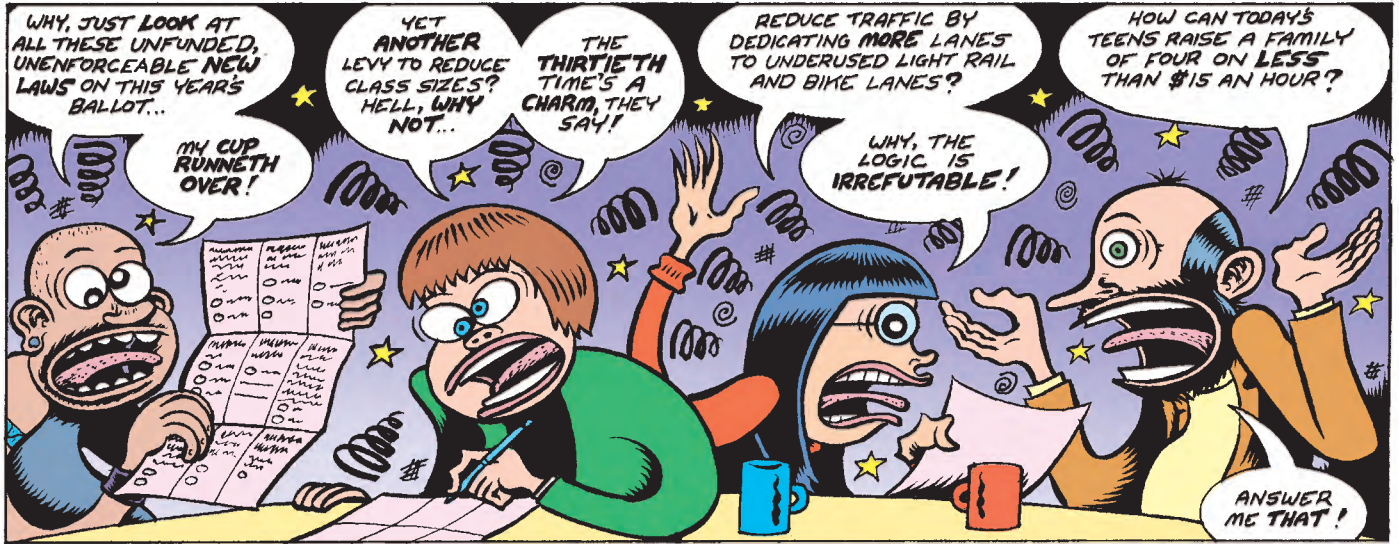


THE REPUBLICAN CANDIDATE ALSO ASKED ME TO PLANT A FEW DOZEN CAMPAIGN SIGNS—A RATHER HARROWING TASK, IN MORE WAYS THAN ONE.

ONE WEEK LATER, THE SIGNS I'D PLANTED WERE ALL MISSING, AND REPLACED WITH HUNDREDS OF SIGNS TOUTING HER OPPONENT!



WHY WAS I DOING THIS, YOU ASK? SIMPLY BECAUSE MOST OF MY FELLOW SEATTLEITES HAVE COMPLETELY LOST THEIR MINDS.



THE STATE GOP GAVE UP ON SEATTLE AGES AGO, WITH ONLY AN OCCASIONAL LONE WOLF CANDIDATE TAKING ON THE DEMOCRATIC/PROGRESSIVE MACHINE...

I HAVE A FULL-TIME JOB, HEALTH ISSUES, NO "WAR CHEST" TO SPEAK OF...

AND NOW MY CAR IS IN THE SHOP...



MOST OF WHOM ARE RON PAUL'S PROGENY, SUCH AS REGISTERED NURSE SARINA FORBES...

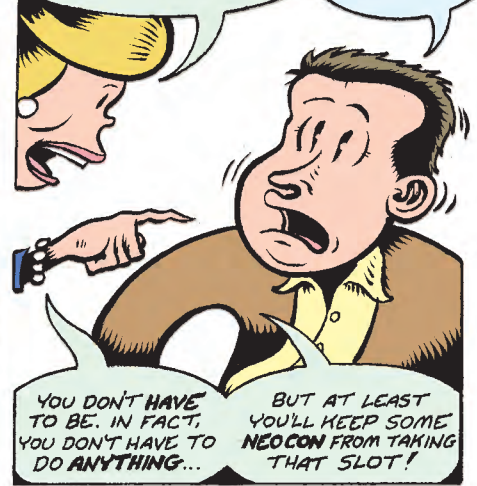
BUT THE THOUGHT OF THAT ENTRENCHED, SPENDAHOLIC INCUMBENT RUNNING UNOPPOSED REALLY BUGGED ME...

SO I'M DOING THIS, IN SPITE OF EVERYTHING...

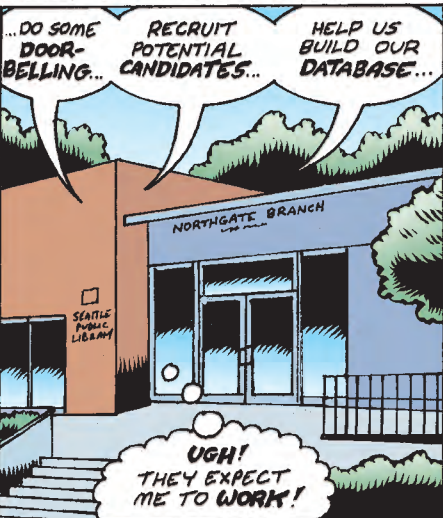


WELL, YOU COULD BECOME YOUR NEIGHBORHOOD GOP PRECINCT COMMITTEE OFFICER...

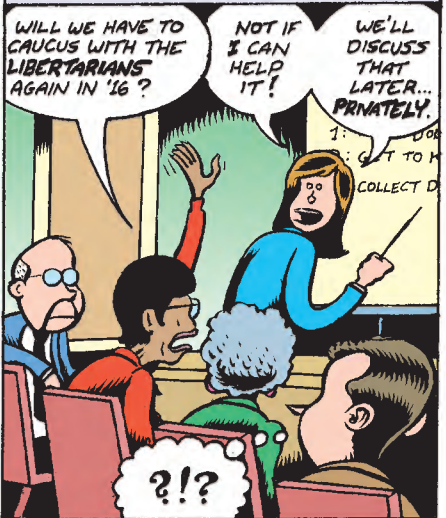
HUH? BUT I'M NOT A REGISTERED REPUB—



ONE WEEK LATER, THERE I WAS, ATTENDING A P.C.O. TRAINING SEMINAR...

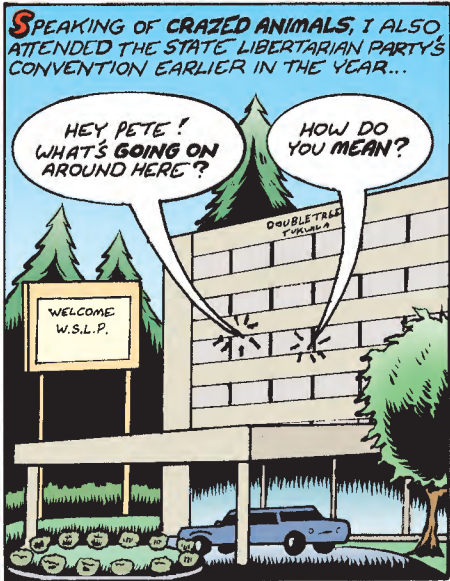


AT ONE POINT ANOTHER P.C.O. ASKED THE CHAIRWOMAN AN ODD QUESTION...

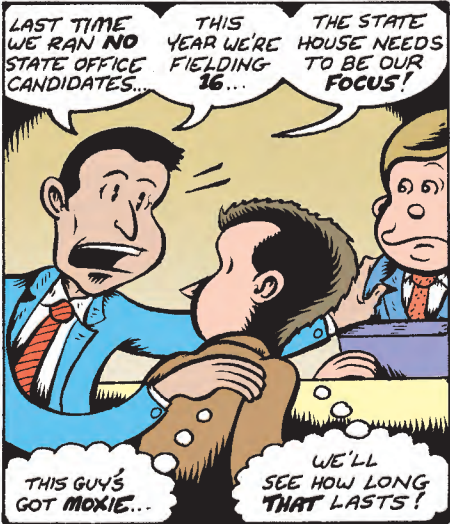


LATER QUESTIONED THE QUESTIONER...





THE JUST-ELECTED PARTY CHAIRMAN APPROACHED US...



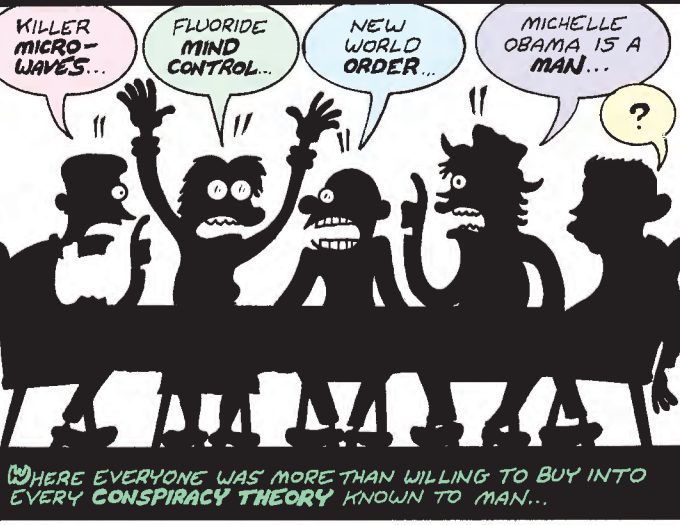
SAID CANDIDATES THEN MADE SPEECHES, INCLUDING ONE CHARISMATIC YOUNG VET WHO REALLY GOT THE CROWD GOING...



UNTIL HE HAPPENED TO MENTION THAT HE WAS RUNNING AS A REPUBLICAN...



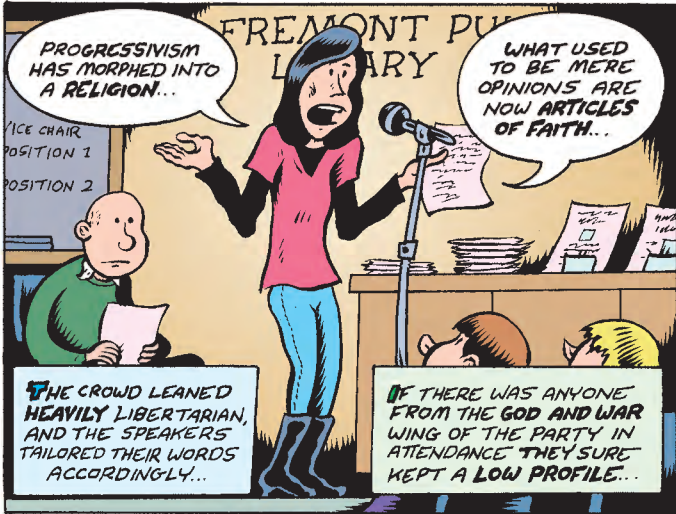
PRACTICALLY LOOKING FOR WHAT MIGHT REMAIN OF RON PAUL'S COALITION, I ATTENDED A LOCAL "CAMPAIGN 4 LIBERTY" MEETING...



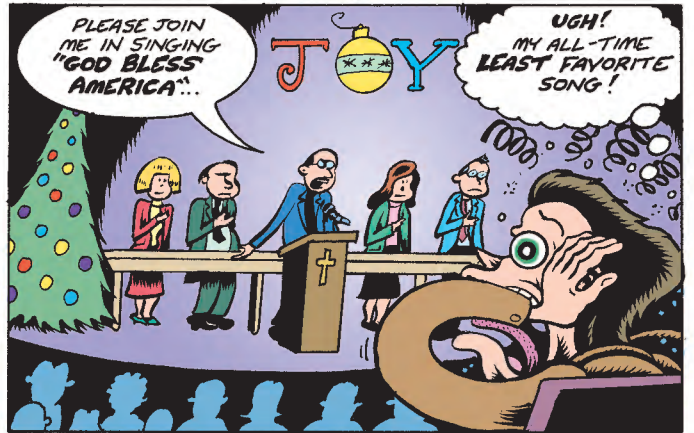
WE ALSO WATCHED SEVERAL YOUTUBE CLIPS CLAIMING THAT OUR NATION IS RUN BY A BUNCH OF PSYCHOPATHS...



NEXT: VARIOUS CANDIDATES RUNNING FOR LEADERSHIP ROLES IN THE COUNTY GOP ADDRESS A GROUP OF SEATTLE-BASED P.C.O.S...

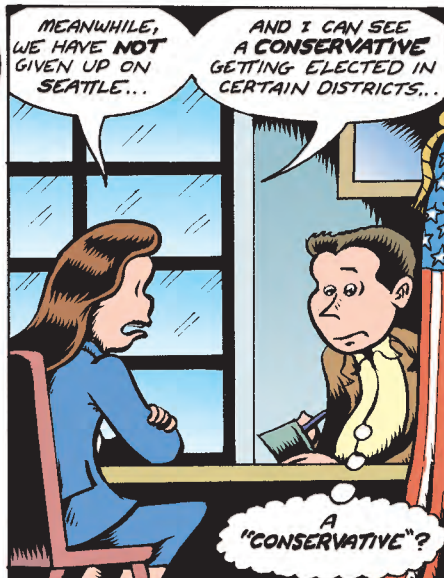
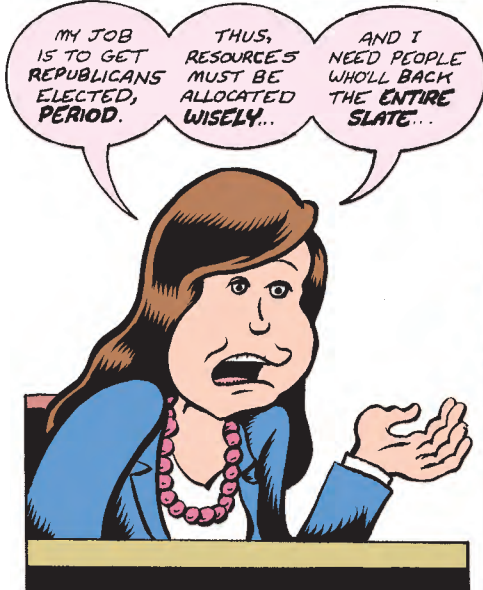
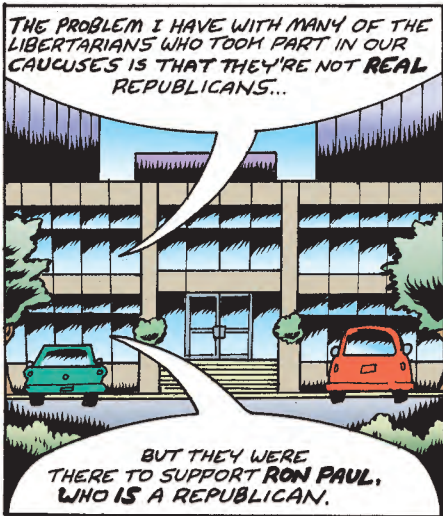


BUT ONCE THE COUNTY-WIDE ELECTIONS WERE HELD (IN A CHURCH, NO LESS), THE OLD URBAN/SUBURBAN CULTURAL DIVIDE RAISED ITS UGLY HEAD...



AND THE LIBERTARIAN WING OF THE PARTY WAS ONCE AGAIN A NOTICEABLE (ALBEIT GROWING-) MINORITY.

EVENTUALLY I MET UP WITH KING COUNTY GOP CHAIRWOMAN LORI SOTELO...



Should Pregnant Addicts Go to Jail?

Criminalizing dependency is counterproductive and unconstitutional.

Amanda Winkler

DARIENNE DYKES SMILES as she thinks about her 5-month-old son, Phoenix. “He’s everything to me,” says the 21-year-old Nashville resident. “Being a mother is just the most amazing experience.” Wiping tears from her eyes, she continues, “And now looking back, I definitely regret continuing using drugs during my pregnancy.”

Dykes is not alone. Approximately 900 babies were born with Neonatal Abstinence Syndrome (NAS) in Tennessee last year, a 10-fold increase from a decade ago. NAS is caused when mothers continue their opiate use through pregnancy. Babies can usually be weaned off the drug within a few weeks after birth, and there are no known long-term effects.

Tennessee officials have declared NAS an “epidemic,” however, and took action last July by implementing Public Chapter 820. This law allows the authorities to charge a woman with assault for using a narcotic while pregnant if her child is born harmed by the drug. An assault conviction is punishable by a fine and anywhere from one to 15 years in prison. So far, at least nine women have been charged.

The law has been controversial, with opponents saying it’s counterproductive to put a drug-addicted mother in jail. Shelby County District



Attorney Amy Weirich, a strong proponent of the law, says the point isn’t to lock up these women. Instead, she considers the law a state-sponsored “motivation” to seek treatment.

“What we hope to do is to get these women help for their addiction,” says Weirich, explaining that the women have the choice to go through drug court and complete rehabilitation instead of being processed through the regular criminal justice system. Once treatment is successfully completed, she says, the charges would be expunged from their record. But if the program is not completed, jail time is the consequence.

Thomas Castelli of Tennessee’s American Civil Liberties Union points out that threatening mothers with the criminal justice system doesn’t help when there’s not enough drug treatment facilities to begin with. There are only 19 facilities in the entire state that offer rehabilitative care to pregnant women, and these are mostly centered in populated areas, leaving rural women with the burden of driving long distances to attend treatment. For many of these lower-income single mothers, this is logistically difficult.

This shortage in treatment facilities has resulted in waitlists ranging from a few weeks to a few months.



Clockwise from top: Drug paraphernalia (Elliott Burlingham/Dreamstime); a baby born with Neonatal Abstinence Syndrome (Amanda Winkler); Pregnancy (Otnaydur/Dreamstime)

Due to the new law, the waitlist can mean the difference between freedom and imprisonment for a pregnant woman.

Castelli argues that the law not only will prove to be counterproductive but is unconstitutional. “It violates the Eighth Amendment. The Supreme Court back [in 1962] determined that it would be cruel and unusual to punish people for having a status or hav-

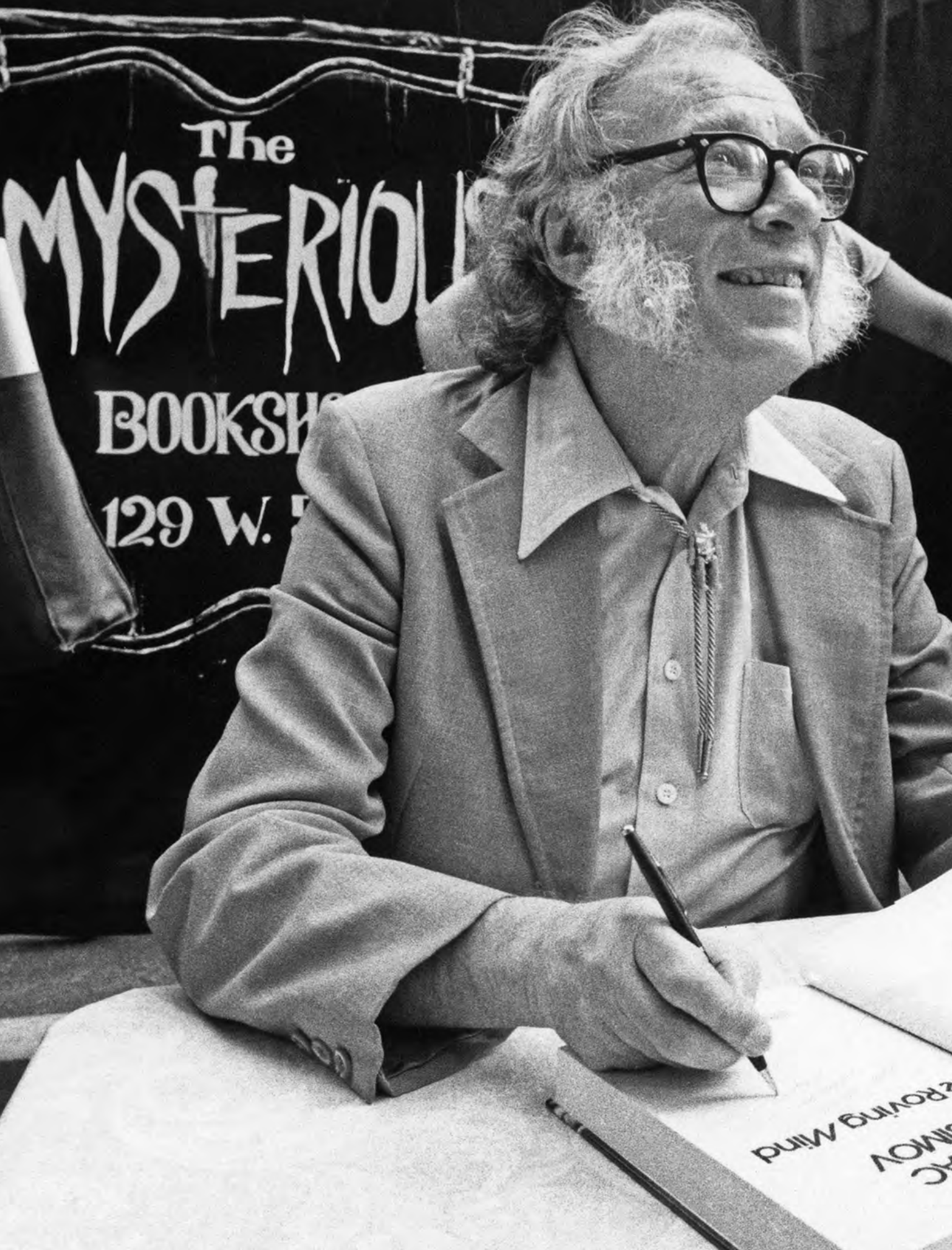
ing an illness,” he says. The case, *Robinson v. California*, concluded that the state’s law which criminalized being a drug addict was unconstitutional. Castelli argues that this law does the same thing.

The law has a sunset provision and is set to expire in two years, at which time lawmakers will review its efficacy and consider extending it. In the meantime, Dykes, who has been clean for nine months, plans to con-

tinue her successful drug rehabilitation for years to come.

“Just the joy he brings me from hearing the little giggle to seeing the little smile, there’s nothing else that can beat that in life,” says Dykes. “There’s no drug that can give you that feeling.”

Amanda Winkler (amanda.winkler@reason.tv) is a producer at Reason TV. For a video version of this story, go to reason.com.



The

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MOVING MIND
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Hi, Robot

How science fiction androids became real-life machines.

Peter Suderman

BEFORE THERE were robots in real life, there were robots in science fiction. Many decades' worth of robots. Unsurprisingly, those works of imaginative fiction led directly to the reality we live in today.

The idea of humanoid automata goes back centuries—historian Noel Sharkey has found evidence of robot-like designs in ancient Greece—but the word *robot* is less than 100 years old. It was first used by the Czech writer Karel Capek in a 1920 play called *R.U.R.*, which tells the story of a revolt at Rossum's Universal Robots, a factory that produces humanoid machines. (Capek's robots were biological creations, more like androids than metal men.)

The word *robot* was drawn from *robota*, a Czech word meaning drudge work. Capek's story set the tone for decades of robot fiction, mostly by stoking fears that the servants could eventually turn on their masters. Such scenarios were on Isaac Asimov's mind in 1939 when he wrote "Robbie," the first of what would be dozens of influential stories about future societies populated by robots.

In the introduction to *The Complete Robot*, a 1982 compendium of his robot tales, Asimov explains that as a sci-fi-reading teenager, he found that the stories tended to fit largely into

Isaac Asimov, 1984 (Associated Press)

klink
alcohol delivery

CLICK THE PARACHUTE TO START



or type your street address

Bottoms App!

A new generation of alcohol delivery services is offering lazy lushes a chance to order wine, beer, and liquor directly from their smartphones or Web browsers. At **reason**'s D.C. office in January, we tested a few.

The best of the Uber-but-for-booze bunch is Klink, a slick app-based delivery service that whisked a nice selection of beers to the office in a neat 25 minutes. One disappointment: Klink's logo is a parachute, and at least one **reason** staffer thought we'd be getting our draughts by drone. No such luck—at least not until the Federal Aviation Administration gets around to clarifying the rules about the commercial use of unmanned aerial vehicles. For now, drivers pick up booze from a local (licensed) liquor-store partner and drop it off in less than an hour at no markup.

Competitors in the one-hour booze delivery space include Ultra, which has a creaky browser-based interface, and glitchy Drizly, which wasn't accepting orders on the day of the test.

—Katherine Mangu-Ward

one of two categories: Robot as Menace, which essentially reworked the Frankenstein myth of the rebellious creation; or Robot as Pathos, which imagined them as lovable companions, often abused by human overseers. Asimov's first robot story was intended to take the Pathos route, but he quickly found himself with a rather different notion.

"I began to think of robots as industrial products by matter of fact engineers," he wrote. "They were built with safety features so they weren't Menaces and they were fashioned for certain jobs so that no Pathos was necessarily involved."

No science fiction author contributed more to the way that science fiction imagined robots, and none were as influential on the field of robotics itself, as Asimov. Indeed, Asimov coined the word *robotics* in his 1941 short story "Liar!" about a robot that unexpectedly develops telepathic powers.

Asimov by then had already dreamed up an ethics code that would guide his writing, shape the broader popular debate, and even inspire industrial designs for decades to come. The Three Laws of Robotics were the basic operating system for Asimov's go-to fictional robotics firm, U.S. Robots and Mechanical Men. The first law prevented robots from harming humans either by action or inaction; the second law ordered robots to obey human commands so long as they did not conflict with the first law; the third law required robots to protect themselves, so long as there was no conflict with the first two laws. Many of Asimov's stories were investigations into aberrant robot behavior produced by the laws' loopholes and contradictions when exposed to unusual circumstances.

Asimov, an outspoken rationalist and science popularizer, was attracted to the way that robots were creations bound by logic, consistency, and rules. They were also moral creations: tools and helpers, friends and companions, to be celebrated and used rather than restricted and feared.

"Robbie" tells the tale of a young girl's fascination with one such robot companion. Her

parents send the robot away because her mother finds the attachment to an artificial friend unseemly and unnatural; the parents spend the rest of the story attempting to convince their daughter to get over her obsession with her lost pal.

In the end, the two are reunited, the robot saves the young girl's life—Asimov's First Law in action—and the parents give in. It's a parable about human attachment to robots, the absurdity of social stigmas on technology, and the inevitability of productive partnerships between human beings and their creations.

Asimov's Three Laws became permanent fixtures of debates about robot ethics, spawning countless books and articles. And while intelligent humanoid robots didn't become the common household appliances he foresaw, his factory-built robots sure did.

Many early industrial robots were designed and built by Unimation, a firm co-founded by the physicist/entrepreneur Joseph Engelberger, commonly known as the Father of Robotics. Under Engelberger, Unimation created the very first industrial robot, a mechanized assembly line arm called the Unimate, which was placed in a General Motors factory in 1961. By the late 1970s, the company was producing as much as one-third of all industrial factory-line robots.

Engelberger, who received a doctorate from Columbia a year after Asimov received his, explicitly credited his fascination with the subject to Asimov. The industrialist was enamored enough of the science fiction writer that he asked him to draft the forward to his 1980 book on robotics industry management practice and, a few years later, named his

company's custom-built servant-bot "Isaac."

The Menace/Pathos dichotomy persists in the popular imagination today. On the one hand, robot helpers in homes and factories are an everyday reality for millions—building cars and computers, vacuuming homes, and giving us directions. On the other hand, popular culture is still packed with tales of robot takeovers. Two of 2015's most anticipated movies—*Avengers: Age of Ultron* and *Terminator: Genisys*—feature powerful intelligent robots determined to

"I see [robots] growing incredibly more complex, versatile, and useful than they are now," Asimov wrote. "I see robots leaving human beings free to develop creativity, and I see humanity astonished at finding that almost everyone can be creative,"

destroy their human creators.

Indeed, fears of the robot apocalypse are pervasive enough that in 2008 a team of researchers from Washington University in St. Louis held a conference workshop on how science fiction influences perceptions and interactions with robots.

"It's surprising how often people make nervous jokes about robots taking over the world," roboticist Bill Smart told *New Scientist* at the time. "Most people have never seen a robot before. Their experiences—such as they are—all come from movies or literature."

There's research to back up this impression. As one team of media and technology academics from the

University of Sussex argues in a 2013 paper on "The Mutual Influence of Science Fiction and Innovation," the relationship between technology and fiction is a kind of two-way exchange. Science fiction influences invention, which then influences science fiction, in an ever-evolving loop of creative ideas and practical refinement.

For Asimov, that give and take

between science and fiction was a lifelong reality. Late in his life, he wrote about how astonished he was to see his science fantasies come true. In an introduction to the 1985 edition of the *Handbook of Industrial Robotics*, Asimov looked forward to a future in which the kind of friendly, productive partnership between humans and robots he had envisioned would become even more robust.

"I see robots growing incredibly more complex, versatile, and useful than they are now," he wrote. "I see them taking over all work that is too simple, too repetitive, too stultifying for the human brain to be subjected to. I see robots leaving human beings free to develop creativity, and I see humanity astonished at finding that almost everyone can be creative in one way or another."

Humans and robots, he predicted, would continue working together, "advancing far more rapidly than either could alone." It would be a future of beneficial mutual dependence, in other words—a relationship much like the one between the science fiction thinkers and scientific tinkerers who made robots a reality. In the end, maybe the robots will take over. But only because we let them. ■

Peter Suderman (peter.suderman@reason.com) is a senior editor at reason.

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No Fools

Walter Williams, syndicated newspaper columnist and guest host for Rush Limbaugh, is one of America's best-known free market economists. A new PBS documentary on his life, *Suffer No Fools*, shows how he learned about the problems with government economic policies from experience.

A poor teen growing up in the projects in Philadelphia in the '50s, Williams worked odd jobs to make money—until child labor laws got him fired. In 1959, Williams had to put his education on hold when he was drafted and packed off to the segregated South. (Williams is black.) He deeply resented this confiscation of his labor and caused as much trouble for his superiors as he could: writing letters, staging protests, and eventually earning a discharge in 1965.

Williams, now 78, still raises hell about coercive government labor policies. Never one to pull punches, he tells **reason**: “Minimum wage law is one of the most effective tools in the arsenals of racists all around the world.” —*Robby Soave*

How to Survive a Robot Uprising

Seeing dark omens of catastrophe in new tech demos.

Robin Hanson

Rise of the Robots: Technology and the Threat of a Jobless Future, by Martin Ford, Basic Books, 352 pages, \$28.99

MARTIN FORD, author of *Rise of the Robots*, doesn't like the recent increase in U.S. wage inequality. So he wants to tax the rich more, to fund a basic income guarantee for the poor. (But only the U.S. poor. Other poor don't seem to concern him.)

Maybe you think you've heard this story before. But Ford, a software engineer and businessman, doesn't argue that inequality is unethical or that it will destroy democracy. He instead argues that inequality will soon get much worse, so bad that most adults won't be able to find jobs. So bad the economy will descend into “catastrophe.” And all because of robots.

Now, Ford wants to reassure you that he isn't crazy. He isn't one of those people who see robots with human-level intelligence coming soon and superintelligent terminators killing us all soon after. No, Ford just thinks that dumb robots specialized for particular jobs are quite enough reason to panic.

In the old days, if you wanted to scare people into action via fear of a coming catastrophe, you could point to most anything unusual as an omen: an eclipse, a sighting of a strange animal, a king dying young, perhaps even a new strain of music becoming popular. It helped if your coming catastrophe was something, like a flood or war, that everyone knew would come eventually—that it was a matter of when, not if.

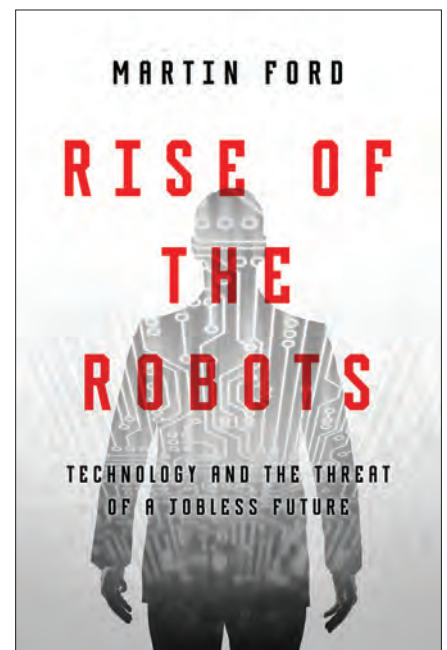
Today, we know more about how the world works, so fearmongers can't just point to any aberration as an omen. But Ford's fears are thoroughly modern: all those new computer-based gadgets. Such things spook many people today, because super-robots come from a realm of futurist speculation that has landed with a

plausible pop into the world we live in. A whole intellectual industry has sprung up to treat computer demos as dark omens.

Ford is correct that, like floods or wars, super-robots are likely to arrive eventually. That is, if our automation technologies continue to improve, it is plausible that in the long run, robots will eventually get good enough to take pretty much all jobs.

But why should we think something like that is about to happen, big and fast, *now*? After all, we've seen jobs replaced by automation for centuries. Sure, there have been fluctuations in which kinds of jobs are more valued and which are most vulnerable to automation. Wage inequality has also varied. But why shouldn't we just expect these things to stay within roughly the same range of variation we've seen in the past? Workers found new jobs before, and the economy never imploded because of automation; more like the opposite.

Many have cried this wolf before. This isn't the first time people have been so impressed with new tools that they've warned machines may



soon make us replaceable. Ford admits this, and pointing out how in the 1960s such people were top academics who attracted big press. In the 1980s, I was personally caught up in a similar wave of concern; I left physics graduate school to start a nine-year career researching artificial intelligence (A.I.).

Like many others today, Ford says this time really is different. He gives four reasons.

First, there is a 2013 paper by Carl Frey and Michael Osborne, an engineer and an economist at Oxford University, estimating that 47 percent of U.S. jobs are at high risk of being automated “perhaps over the next decade or two.” Ford likes this paper so much that he mentions it in three different chapters. Yet this 47 percent figure comes mainly from the authors “subjectively” (their word) labeling 30 particular kinds of jobs as automatable and 40 as not. They give almost no justification or explanation for how they chose these labels. Such a made-up figure hardly seems a sufficient basis for expecting catastrophe.

Second, Ford thinks recent labor market trends are ominous. In the U.S., median wages have been stagnant and wage variance has increased since about 1970, while the labor share of income, the fraction of adults who work, and the wage premium for college graduates have all fallen since about 2000. Ford sees automation as the main cause of all these trends, but he admits that economists reasonably see other causes, such as changes in demographics, regulation, worker values, organization practices, and other technologies.

Third, Ford notes that the rapid

rate at which computer hardware prices fall could let computers quickly displace many jobs, if we reach a threshold where many jobs all require roughly the same computing power. But while computer prices have been falling dramatically for 70 years, the job-displacement rate has held pretty steady. This suggests that jobs vary greatly in the computing power required to displace them and that jobs are spread out rather evenly along this parameter. We have no particular reason to think that, contrary to prior experience, a big clump of displaceable jobs lies near ahead.

And then there is Ford’s fourth reason: all the impressive computing demos he has seen lately. This is where his heart seems to lie. He devotes far more space describing things like Google’s self-driving cars and language translators, IBM’s Jeopardy champion Watson, Baxter’s flexibly programmable robots, and Narrative Science’s software for writing news articles than explicating reasons one through three. Only rarely does Ford air any suspicions that such promoters exaggerate the rate of change or the breadth of the impact their new systems will have. (He is somewhat skeptical about the market for 3D printing and about prospects that self-driving cars will increase road throughput soon.) And of course several generations have seen A.I. demos with just as impressive advances over previous systems.

So basically, Ford sees a robotic catastrophe coming soon because he sees disturbing signs of the times: inequality, job loss, and so many impressive demos. It’s as if he can feel it in his bones: *Dark things are coming! We know robots will eventually*

take most jobs, so this must be now.

If a big burst of automation takes most but not all jobs, won’t those who lose jobs to robots switch to doing jobs that robots can’t yet do? After all, this is what we’ve seen for centuries, and it is the straightforward prediction of labor economics. But Ford says no, new firms like Google and Facebook have few employees relative to sales. As if Google’s experience were some sort of universal law, Ford says, “Emerging industries will rarely, if ever, be highly labor intensive.” Yet even if this turns out to be true, Ford doesn’t explain why old industries can’t hire more workers.

Moreover, even if workers could find new jobs, Ford still sees catastrophe if new jobs don’t pay as much, increasing wage inequality. The economy will “implode,” he says, because the rich just don’t spend

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1844: The Year That Remade America

Few American elections were as pivotal as the one in 1844. When James K. Polk beat Martin Van Buren for the Democratic nomination, the party's libertarian-leaning anti-slavery wing had to take a back seat to the slaveholders and expansionists. (Four years later, Van Buren's faction would walk out altogether, forming the nucleus of the new Free Soil Party.) And when Polk defeated Henry Clay in November, the country was set on the road to seizing the Southwest—and to some key disputes in the lead-up to the Civil War.

John Bicknell's *America 1844* (Chicago Review) is the riveting story of an eventful year, covering not just an election but nativist riots, pioneer journeys, and religious frenzies. Two spiritual movements play major roles: the Millerites, who expected Christ to return before the voting started, and the Mormons, who ran their own candidate. He didn't make it to November: A mob killed him, making the prophet Joseph Smith the first man assassinated on the White House trail. —Jesse Walker

enough: “A single very wealthy person may buy a very nice car....But he or she is not going to buy thousands of automobiles....The wealthy spend a smaller fraction of their income than the middle class.” Ford admits that increasing inequality since 1970 hasn't hurt spending, but he attributes this to increasing debt that can't last. (Yet that debt increase is small compared to the increased inequality.) He ignores the fact that the world economy had increasing wage inequality for centuries without imploding. Worldwide inequality has decreased only recently.

Ford eventually admits that “the global economic system” might “adapt to the new reality” via “new industries producing high-value products and services geared exclusively toward a super-wealthy elite.” He calls this “the most frightening scenario of all,” comparing it to the dystopian 2013 movie *Elysium*. In the end, it seems that Martin Ford's main issue really *is* that he dislikes the increase in inequality and wants more taxes to fund a basic income guarantee. All that stuff about robots is a distraction.

After all, there isn't a fundamental connection between automation and wage inequality; in past eras more automation was associated with *less* inequality. If there's a connection now, it may be temporary and change again. More important, if we want to increase transfers because we dislike inequality, we don't need to discuss robots at all. It wouldn't matter *why* inequality is high; we'd just increase transfers when we saw more inequality than we liked. Or set up a system, like a basic income guarantee, to do this automatically.

So why didn't Ford just say this straight out? Perhaps because many others have already taken that direct route, but with limited success. It seems most people just aren't very bothered by current levels of inequality. So they need to be scared with something else.

If I'm not persuaded by Ford's omens, what would persuade me? Well, I take betting odds seriously. Since automation might reduce employment, I've expressed my skepticism

about big automation progress soon by betting \$1,200 at 12–1 odds that the Bureau of Labor Statistics' measurement of the labor fraction of U.S. income won't go below 40 percent by 2025. And since better computer software should increase the demand for computer hardware, I've bet \$1,000 at 20–1 odds that computers and electronics hardware won't be over 5 percent of U.S. GDP by 2025. That's just me, of course, but more and bigger bets like these could tell us what people think when they are willing to put their money where their mouths is. It wouldn't cost that much to create prediction markets with prices **This isn't the first time people have been so impressed with new tools that they've warned machines may soon take all the jobs. But Ford says this time really is different.**

that estimate these and a great many other important future events, estimates that are at least as reliable as those from any other public source.

I'd also like to see a time series of the rates at which jobs were displaced by automation in the past. If this rate were unusually high and rising, that would be an omen worth noticing. But if it's too hard to say which past jobs were lost to automation, what hope could we have of predicting which future jobs will be so lost?

Finally, trends in the rates of progress in robotic research are worthy of study. When I meet experienced artificial intelligence researchers informally, I often ask how much progress they have seen in their specific A.I. subfield in the last 20 years. A typical answer is about 5 to

10 percent of the progress required to achieve human-level A.I., though some say less than 1 percent and a few say that human abilities have already been exceeded. They also typically say they've seen no noticeable acceleration over this period.

If a more sustained study bears out those informal answers—and if that rate of progress persists—it would take two to four centuries for many A.I. subfields to (on average) reach human-level abilities. Since there would be variation across subfields, and since achieving a human-level A.I. probably requires human-level abilities in most subfields, a broadly capable human-level A.I. should take even longer than two to four centuries to emerge. Furthermore, computer hardware gains have been slowing lately, and we have good reason to think this will cause software gains to slow as well.

Perhaps my small informal survey is misleading for some reason; bigger, more systematic surveys would be useful, as well as more thoughtful analyses of them. We do expect automation to take most jobs eventually, so we should work to better track the situation. But for now, Ford's reading of the omens seems to me little better than fortunetelling with entrails or tarot cards. ■

Robin Hanson (rbanson@gmu.edu) is an associate professor of economics at George Mason University and a research associate at the Future of Humanity Institute of Oxford University. He was a researcher in A.I. from 1984 to 1993, and he is writing a book on the social implications of the cheap availability of a brain emulation form of artificial intelligence.

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Live Forever or Die Trying

The Immortalists, a genial documentary now making the film-festival rounds, reveals the scientific passions and private lives of two leading anti-aging researchers, Aubrey de Grey and Bill Andrews.

Andrews is the CEO of Sierra Sciences, whose slogan is “Cure aging or die trying.” De Grey is the founder of Methuselah Foundation and the SENS Research Foundation. “The first person to live to 1,000 might be 60 already,” de Grey said in 2004. Straight-arrow Andrews is an ultra-marathoner; luxuriantly bearded de Grey is rarely seen without a pint of stout. Shot over two years, the film shows both men dealing with 80-something parents in declining health. De Grey’s mother dies.

At age 60, Andrews marries for the first time. At age 50, de Grey is polyamorously partnered with his 68-year-old wife and two other women, ages 45 and 24. Both men fiercely promote their distinct research agendas with some success. Biologists Leonard Hayflick and Colin Blakemore appear as skeptical counterpoints.

—Ronald Bailey

Somalia Lived While Its Government Died

“Serious” foreign policy minds care about everything but citizens’ lives.

Brian Doherty

Somalia in Transition Since 2006, by Shaul Shay, Transaction Publishers, 304 pages, \$59.95

IN MOST American minds, Somalia raises unsettling images of pirates and warlords, drought and famine, anarchy and downed U.S. helicopters. For those arguing politics, the East African nation is a powerful talisman: Its mere name is deployed to trump any libertarian argument for less—or God forbid *no*—government.

Established in 1960 from former colonial territories of Britain and Italy (though united for centuries by a rough sense of national identity and language, with complicated clan divisions), Somalia has been without a functioning modern central state since the collapse of Siad Barre’s socialist dictatorship in 1991.

Barre’s allegiance bounced from the USSR to the U.S. during the Cold War, while his domestic approach tended toward ruthlessly inefficient central control, cronyism, and inflation.

He strove to demolish independent sources of power outside the state and left a nation awash in weaponry from his former patrons. Under Barre, military and administrative costs consumed 90 percent of government spending, while economic and social services commanded less than 1 percent.

Shaul Shay is a former deputy head of Israel’s National Security Council and a senior research fellow at the International Policy Institute for Counter-Terrorism. His new book, *Somalia in Transition Since 2006*, distills a bureaucrat’s-eye view of Somalia. It reads like a set of white papers left behind at a conference of ministers, undersecretaries, and academics shuttled in on taxpayers’ dimes to develop, as an actual United Nations report on Somalia states dizzily, “long term approaches to institutional development [that] will include support for the development of capacities to formulate strategies [which will] involve the provision of technical assistance to develop, formulate and implement policies.”



The Immortalists
Somalia in Transition Since 2006 (cover detail)

Shay's book is all about war, diplomacy, international conferences, and failed attempts to make Somalia a modern Western state. While he barely expresses his own opinions, his book—especially when combined with research on Somalia outside its purview—shows Somalia has been more victim than beneficiary of the West's attempts to fix it.

Shay devotes hundreds of pages to Somalia's grim and baffling recent political and military history, but to sum up quickly: After Barre's regime collapsed, warlords hoping to establish themselves as a true national government fought, looted, and extorted. The United Nations and United States intervened, but by the mid-'90s both had given up.

The early 21st century brought a period of relative peace, disrupted by three separate attempts to create internationally supported "real" governments that in practice exacerbated conflict. As much of the largely pastoral population just tried to live their lives, an alphabet soup of often Islamist militias rose and fell and rose and fell, fighting each other and the feckless would-be national governments.

By 2006, a coalition of Islamist courts—known as the Islamic Courts Union (ICU)—dominated Mogadishu, the nominal nation-state of Somalia's nominal capital. They imposed some rough versions of Shariah law where possible. Although they won much love from the Somali people for reducing the number of extortionary checkpoints and amount of militia fighting, they became targets of American wrath. In late 2006 a U.S. proxy invasion by Ethiopians (long-time enemies of the Somalis) brought violent chaos back to huge

parts of Somalia, resulting in a fresh wave of 10,000 civilian deaths, 1 million refugees, and 3 million in need of emergency food aid.

War, natural disasters, an absent government—but how were people *living*? Shay neither answers nor even asks that question. What a society looks like without squadrons of technically trained experts isn't worthy of his serious consideration.

Some other researchers are interested in Somalis who aren't warriors or bureaucrats, and they have been fascinated by this phenomenon of a stateless zone in the modern world. Some of the more prominent such researchers have been of a libertarian bent. But even the libertarians, such as the economists Peter Leeson of George Mason University and Benjamin Powell of Texas Tech, rely on data and analysis from non-libertarian scholars and standard international sources.

In a 2007 paper in the *Journal of Comparative Economics*, Leeson examined 18 development indicators for Somalia. He found that "14 show unambiguous improvement under anarchy. Life expectancy is higher today than...in the last years of government's existence; infant mortality has improved 24 percent; maternal mortality has fallen over 30 percent; infants with low birth weight has fallen more than 15 percentage points; access to health facilities has increased more than 25 percentage points; access to sanitation has risen eight percentage points; extreme poverty has plummeted nearly 20 percentage points...and the prevalence of TVs, radios, and telephones has jumped between 3 and 25 times."

Somalia was still, certainly, a des-

perately poor and underdeveloped nation. Access to clean water had not improved, and adult literacy and school enrollment had gotten worse. Straight-up comparisons of official numbers showed gross domestic product (GDP) falling in the first decade of statelessness, though Leeson felt these data were ambiguous due to likely upward reporting biases in the Barre era.

But Somalia did not completely devolve. In many respects, it more than held its own against its statist neighbors. As Leeson wrote, "on the majority of the indicators...Somalia improved more than its neighbors over the same period, suggesting that the collapse of government resulted in greater development improvements than would have occurred in its absence. In a number of cases, Somalia has been improving while its neighbors have been declining." National macro-statistics for Somalia, as with most of sub-Saharan Africa, are known to be unreliable, but they are the closest we have to big-picture knowledge.

The Somali cattle trade managed to thrive through that first decade of statelessness, for example. Leeson, relying on data collected by Peter Little in his 2003 book *Somalia: Economy without State*, wrote that "Between 1989 and 2000 the value and volume of the cattle trade [from Somalia to Kenya] increased 250 and 218 percent respectively." Somalis managed a working monetary system via a combination of Barre-era currency, counterfeits of it, and the U.S. dollar. Many multinationals continued to do business in Somalia. Apparently, trade, technology, and tribal institutions do more for Somali lives as lived than a collection of administrators in Mogadishu.



Send in the Clones

The TV series *Orphan Black*, starring Tatiana Maslany as grifter Sarah Manning and her various “genetic identicals” (some of them are touchy about the c-word), returns to BBC America for a third season April 18.

The tale of a group of clones becoming aware of their roles in a decades-long genetic experiment and forming bonds of sisterhood, *Orphan Black* explores a wide range of bio-tech issues, from ethics in science to intellectual property, from reproductive rights to government-created cartels. Maslany plays nine clones, four of whom appear regularly.

The show avoids cliché sci-fi McGuffins and tells rich stories in which such issues come up naturally. (“This situation isn’t your usual identity crisis,” Sarah explains to a trans-clone who has just found his sisters.) This thoughtful and compelling show suffers no identity crisis, knowing exactly who and what it is: a sterling example of smart modern TV that uses science-fiction tropes to illuminate our future. —Ed Krayewski

A 2012 paper from the International Crisis

Group concluded that the “international community made a mistake in recognizing the [Transitional Federal Government] as the national government, representative of all Somalia. The parliament is self-selected by those who had the means or connections to participate in the endless peace conferences in Arta, Mbagati, and Djibouti City that led to the formation of the last three transitional governments. Many legislators have few, if any, real ties to the local people they claim to represent. The president was then ‘elected’ by this non-representative institution. The government has failed to win the trust of most Somalis.”

Ken Menkhaus, a Somalia scholar at Davidson University and no partisan for anarchy, astutely noted in a 2007 article in *International Security* that at worst, “anarchist” Somalia has emulated existing international anarchy, developing bottom-up systems of “protection and access to resources...through a combination of blood payment groups (*diya*), customary law (*xeer*), negotiation (*shir*), and the threat of force—mirroring in intriguing ways the practices of collective security, international regimes, diplomacy, and recourse to war, which are the principal tools of statecraft that modern states use to manage their own anarchic environment.” But, he says, “these extensive and intensive mechanisms for both managing conflict and providing a modest level of security in a context of state collapse are virtually invisible to external observers, whose sole preoccupation is often with the one structure that actually provides the least amount of rule of law to Somalis—the central state.”

The Somali people have decently functioning cultural and juridical practices that come surprisingly close to the private adjudication systems proposed by the anarcho-capitalist writers Murray Rothbard and David Friedman. That “legal” system, known as *xeer*, generally outlaws only direct physical harm to other people or their personal property. *Xeer* is built entirely around victim compensation, known as the *diya*, not punishment or imprisonment. Kinship groups have an interestingly sophis-

ticated system of group insurance, essentially committing to pitching in to help make good on costly misbehavior by their relatives. (In a less Rothbardian touch, the largely nomadic pastoral Somalis don’t recognize true individual ownership of landed property.)

The ICU’s legal system tended toward a non-uniform syncretist mix of Shariah and *xeer*, with the former applying most to family, marriage, inheritance, and strictly civil matters. Some instances of harsh Shariah-like physical punishment

The Somali people have decently functioning cultural and juridical practices that come surprisingly close to the private adjudication systems proposed by Murray Rothbard and David Friedman.

are known to have happened in Mogadishu when the ICU dominated the city. But as Hanno Brankamp wrote in a 2013 overview of ICU practice for *Think Africa Press*, “Contrary to popular assumption and terminological intuition, the Islamic Courts were not able to establish a system under which *sharia* was systematically, or even exclusively, applied.” Indeed, clan law “ensured that the legal force of Islamic law remained limited.”

Andre Le Sage, a political scientist at National Defense University, wrote in a 2005 paper that “customary *xeer* is the most far-reaching of the Somali justice systems, particularly in rural areas that are commonly beyond the reach of formal judicial systems, and is the most

effectively enforced.” Since these various justice systems have maintained “a modicum of peace and security in various parts of the country,” he added, trying “to force one system across all areas would undermine those systems that function locally, and ‘rule of law’ assistance could in those circumstances create more conflict by undermining the structures that currently underpin local peace and security arrangements.”

Those are some of the cultural resources that have helped Somalia’s development indicators keep pace with its neighbors’. What has bedeviled the Somalis, from the Cold War to the war on terror, is being treated as a pawn in larger powers’ schemes. Intervention has bred intervention: The 2006 Ethiopian invasion to overturn the ICU led to the rise of the Al Qaeda–allied radical Islamist group Al Shabaab, which led in 2009 to a new Kenyan invasion. (The Kenyans, like the Ethiopians, acted with America’s active cooperation.) Back in 1992, a State Department official said that the U.S. mission in Somalia was “basically re-creating a country.” Having perhaps learned that that’s a trick that never works, Washington is now more cynically using Somalia to wage a drone war and to run rendition and torture camps.

As the latest attempt to impose a national government flounders in internecine bickering, the Associated Press reported in November that Somali sources said the U.S. is threatening to cut off aid to the would-be state if the current president and prime minister can’t work together effectively. The existing aid package includes “\$58 million...in development assistance in this fiscal year and an additional \$271 million in military assistance for the Somali national

army and the African Union force in Somalia.”

A wide range of scholarship and commentary on Somalia, most with no ideological ax to grind, tells an interesting and even somewhat encouraging story—one about a society with an unusual and robust clan-based system of dispute resolution and goods provision that has managed to keep daily life moving along even without a “Somali government.” (Even the threat of Somali piracy has practically disappeared compared to its zenith in the early part of this decade.) But for all its very fine-grained details about militias and conferences and battles, *Somalia in Transition Since 2006* misses this tale entirely.

The problems with Shay’s book, as informative as it is about what it chooses to cover, are the problems with the American and international outlook toward Somalia writ small: Both view bureaucrats and military leaders as paramount, ignoring what life is actually like for the people trying to live, work, co-exist, and even thrive. ■

Senior Editor Brian Doherty (bdoherty@reason.com) is the author of four books, including *Radicals for Capitalism: A Freewheeling History of the Modern American Libertarian Movement* (*PublicAffairs*).

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Feeling Clint Eastwood's Disgust

American Sniper is not a pro-war movie.

Kurt Loder

WHATEVER Clint Eastwood's exact politics may be—kind of libertarian? sort of conservative?—his hit movie, *American Sniper*, waves no flags for America's involvement in the Iraq war. In a film inspired by the true story of Navy SEAL Chris Kyle, said to be the deadliest sniper in U.S. military history, Eastwood marshals deep feelings about the moral and physical destruction of war, and he flashes anger toward the higher-ups who guide young warriors to their doom. He doesn't flinch from showing us the full ugliness of combat—American forces violently invading an Iraqi home, a vicious jihadi taking a power drill to a helpless civilian—but this is in no way an old-school Hollywood war movie. Eastwood never exults in the brutal action, and throughout the film we can feel his disgust.

Over the course of four tours in Iraq, Kyle was credited with 160 confirmed enemy kills, and he was probably responsible for many more that were undocumented. The man had a terrible gift. Bradley Cooper, who acquired the film rights to Kyle's bestselling 2012 memoir early on, plays him here, bearded and bulked-up, in a performance of intense focus. Cooper has come a very long way from his breakthrough in *Wedding Crashers* 10 years ago. Here he portrays a difficult character, a man whose emotions are held tightly inside, by subtly projecting those feelings without parading them before us. This is a wonder to watch throughout.

We're introduced to Kyle on a rooftop in Fallujah, sighting his rifle on the street below, alert for targets. He sees an Iraqi woman stepping into the street with a boy who could be her son. She hands the boy a weapon she has brought out from beneath her chador as they both watch an American convoy that's making its way toward them through the rubble of the city. Kyle's duty is alarmingly clear, but his soul is torn.

To illustrate Kyle's divided nature, Eastwood fills in his backstory with compelling economy, flashing back to his Texas childhood. We see him out hunting with his father, dropping a deer with a difficult shot. We see the whole family in church, and later, at the family dinner table, we hear his father explaining his stern view of the world. There are three kinds of people, he says: sheep, who "don't believe evil exists"; wolves, the evil men who prey upon them; and sheepdogs, men with "the gift of aggression," a "rare breed that lives to confront the wolf." Kyle knows which sort of man his father wants him to be.

Appalled by the 1998 Al Qaeda attacks on U.S. embassies in Nairobi and Dar es Salaam, Kyle enlists in the Navy and trains to join the SEALs, the service's elite sea-air-and-land division. In a bar one night, talking to the woman who will soon become his wife, he tells her, "I'd lay down my life for my country. It's the greatest country on earth."

When Kyle deploys to Iraq for the first time, Eastwood shows us how he reconciles his deepest beliefs—his religious faith, his patriotism, his family values—with his duties as, essentially, a professional killer. He appears to have no interest in the



political forces in which he's caught up, and this enables him to tightly narrow his focus. He wants only to protect his fellow fighters and to dispatch the evil enemies who seek to annihilate them. Nothing else matters. But his determination to maintain this difficult mental balance begins eating him up inside.

The movie is masterfully shot and edited. It's also unexpectedly intimate, especially in the scenes with Cooper and Sienna Miller, who have



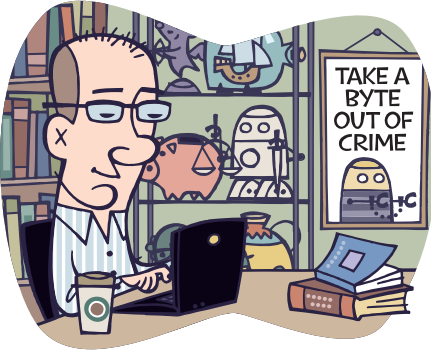
a rich chemistry. Miller plays Kyle's wife as a high-spirited woman who loves her husband and the kids they've begun accruing but is distraught as she watches him turning into a stranger, spooked and uncomfortable at home and repeatedly drawn back to the never-ending war. "You did your part," she tells him. "Let somebody else go....If you think this war isn't changing you, you're wrong." But Kyle keeps returning to Iraq, where he does legendary things (taking out one jihadi killer from

more than a mile away) and awful things as well. He also has to listen to fatuous officers make statements like, "These wars are won and lost in the minds of our enemies," a line at which we can almost see Eastwood cringing in revulsion.

There surely was more to the real Chris Kyle than what we see here. (He was shot to death two years ago, ironically by a troubled veteran he'd been trying to help.) But Eastwood uses the key aspects of Kyle's life with determined pur-

pose. He doesn't seek to arouse us with the slaughter amid which the celebrated sniper spent so many of his days—the massacred civilians, the dying SEALs choking on their own blood—but to make us think about it. It's not a pretty picture, but Eastwood has made a powerful film out of it. ■

*Kurt Loder (kurt@kurtloderonline.com) reviews movies for reason.com. His most recent book is *The Good, the Bad, and the Godawful* (St. Martin's Griffin).*



Roombas in the Big House?

What to do when robots break the law

IN 1979, a robot killed a human for the first time. It happened at a Ford facility in Flat Rock, Michigan, in an elaborate five-level structure called a core stacker where 10 robots continuously stored and retrieved large metal castings. Litton Industries, which built the core stacker and the robots that toiled there, described it as an “unattended system.” But according to a 1984 *Omni* feature about the incident, the machines actually required a great deal of intervention in practice—people had to tweak alignments and pick up dropped objects on a regular basis.

But the robots, which glided along rail-like tracks in near silence, continued operating even when fragile, fleshy human beings were nearby. And one day in 1979, one of those machines, which was equipped with sensors that allowed it to “see” some components of the system but apparently not people, rolled up behind Robert Williams and struck his head,

killing him. A jury instructed Litton Industries to pay \$10 million in damages to Williams’ family. Presumably, the robot got off scot-free.

No account of the incident suggests the robot acted with deliberate malice, or even recklessness, but the incident set the stage for future dystopias nonetheless. We had begun to create a new category of machines that were capable of killing us—and unlike, say, cars, guns, or roller coasters, these new machines were deliberately imbued with a degree of autonomy that could potentially make their behavior somewhat unpredictable. That autonomy would only increase over time.

Thirty-six years later, the worldwide robot population has exploded, and the bots are increasingly sophisticated. Their designers have gotten more sophisticated too, and that helps mitigate some of their potential danger. The Litton Industries robots weighed 2,500 pounds and issued no warning noises when they moved. Today’s robots boast sensors that help them avoid collisions with humans, they’re often built out of light-weight and forgiving materials, and they’re often designed to be easy to shut off.

But as artificial intelligence (A.I.) systems—including bots that exist as nothing more than lines of code—become increasingly pervasive and autonomous, it’s only natural to assume that their potential for unexpected and unwanted behavior is going to increase too. In short, some robots are going to commit crimes.

Take a recent project by a couple of Swiss artists. They created an automated shopping bot, gave it a budget of \$100 in bitcoin per week, and instructed it to go on a buying spree

at a darknet market that offered thousands of items for sale—some legal, others not.

The bot bought a variety of items, including 10 ecstasy pills. In the wake of its buying spree, various observers entertained the notion of whether or not the artists might be criminally liable for the bot’s actions. But while the potential liability of the artists was indeed interesting, another possibility emerged that was even stranger than arresting human beings for something a bot did without the explicit instruction or knowledge of its creators or operators. The authorities could arrest the bot.

In this particular instance, we know a crime was committed: Ecstasy pills were purchased. And if whatever local laws are in play suggest the artists aren’t criminally liable for that purchase, then who is, except the bot that committed the act?

Charging robots and other A.I. systems with crimes may seem absurd. And locking up, say, an incorrigibly destructive Roomba in solitary confinement sounds even more preposterous. How exactly do we punish entities whose consciousness arises from computer code?

These are the kinds of questions the law professor Gabriel Hallevy addresses in his 2013 book *When Robots Kill: Artificial Intelligence Under Criminal Law*.

Hallevy, who teaches law at Israel’s Ono Academic College, argues that there are both social benefits and a legal precedent to applying criminal liability to A.I. systems when they misbehave.

There’s certainly a rationale for this perspective. The coming proliferation of robots is creating a fair amount of anxiety, at least among the

human punditocracy. Many of their concerns are economic in nature—they're worried that robots are on the verge of putting everyone out of work. But robot anxiety is broader than that. There are concerns about drones and privacy, concerns about how self-driving cars will make snap decisions when lives are at stake, concerns about what happens when we unleash millions of intelligent entities that have the capacity to make autonomous decisions instead of just following predictable preprogrammed routines. Decades of sci-fi stories have primed us to imagine the worst.

Perhaps our legal system can

assuage these fears somewhat.

“Criminal law plays an important role in giving people a sense of personal confidence,” Hallevy writes. “If any individual or group is not subject to the criminal law, the personal confidence of the other individuals is severely harmed because those who are not subject to the criminal law have no incentive to obey the law.” But if we understand that drug-buying bots and self-driving cars must abide by the same rules we all follow, and face similar punishments when they transgress, perhaps some of our anxieties about their potential behavior will dissipate.

Is this perspective fair to robots, though? Essentially, it puts them on the same level as people, even though they're clearly not human. The robot that killed Robert Williams in 1979 had no conception of morality. Neither did the ecstasy-buying bot.

In Hallevy's estimation, such concerns are unfounded. “Criminal liability does not require that offenders possess all human capabilities, only some,” he writes. “If an AI entity

possesses these capabilities, then logically and rationally, criminal liability can be imposed whenever an offense is committed.”

What matters, Hallevy suggests, is not moral accountability or an A.I. system's ability to grasp concepts like good and evil, but rather culpability. If any entity—human or robot—intentionally engages in actions that are prohibited by law, then criminal liability may be imposed. (Sometimes, of course, failure to act, a.k.a. negligence, is also grounds for criminal liability.)

Conversely, robots that are sophisticated enough to be held criminally liable for their actions may also obtain protections under the law that go beyond those your lawnmower may enjoy. “This situation is similar to corporations, which are non-human legal entities,” Hallevy explained in an email. “Corporations are subject to criminal liability, and part of that ‘deal’ is that they have certain basic rights. Consequently, corporations have the right to sue humans, corporations and even their ‘owners’ (the stock-holders). If we think of AI entities similarly as corporations, we would not see a significant difference.”

In his book, Hallevy elaborates on the notion of corporations as a precedent regarding our potential treatment of robots. They're not individuals, and they have no moral sentiments or thoughts or feelings of any kind; yet we often find them guilty of crimes and impose punishments on them, independently of specific corporate employees who may also be involved in a crime's commission.

While A.I. systems may indeed be criminally liable for acts they commit in certain situations, that doesn't

mean they're easily or effectively punishable. As satisfying as it might be to deliver 50 lashes to a robot butler who cuts in line in front of you at Walgreen's, that form of justice would be meaningless to the unfeeling machine.

But as Hallevy writes in his book, some

traditional functions of punishment, like rehabilitation and incapacitation, are applicable to A.I. entities. A robot that commits some criminal act and doesn't learn on its own that such acts are prohibited could potentially be “rehabilitated” through reprogramming. And if reprogramming is ineffective, incapacitation for A.I. systems is largely analogous to incarceration for human beings: A killer robot that's locked up or disabled simply won't be able to kill again, regardless of its rehabilitative capacity.

In one light, the notion of heavily manacled Roombas suggests a police state run amok, a totalitarian future where the government's appetite for discipline and punishment extends to whole new classes of beings. What's compelling about Hallevy's perspective is that it involves neither pre-emption of new technologies nor expansion of the law. Instead of banning advances in robotics before they're even implemented or insisting we need to draft a wide range of new regulations, he argues that “the current criminal law is adequate to cope with AI technology.” Whatever brave new worlds are coming, perhaps we're already equipped to handle them. ■

Contributing Editor Greg Beato (gbeato@soundbitten.com) writes from San Francisco.

RoboCop 1.0

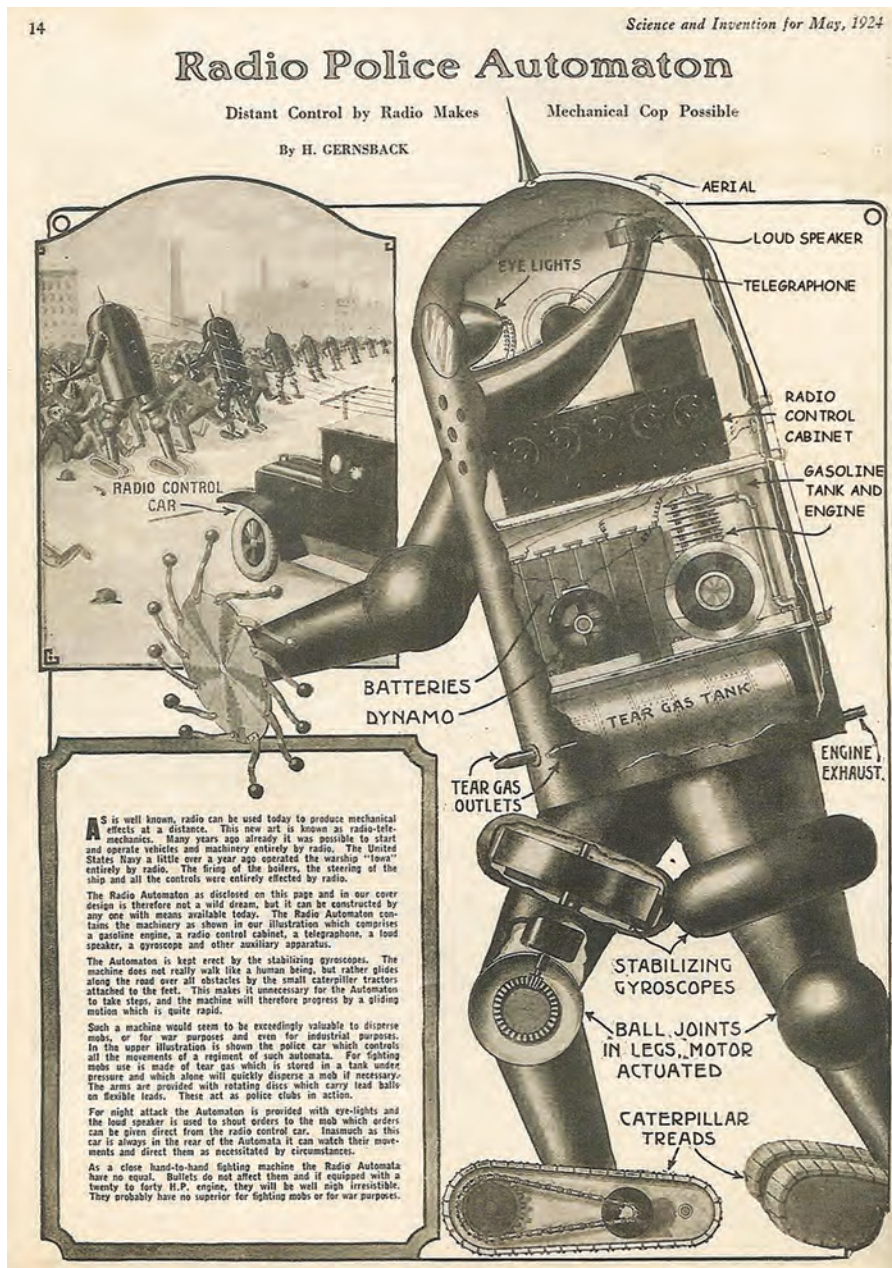
Nick Gillespie

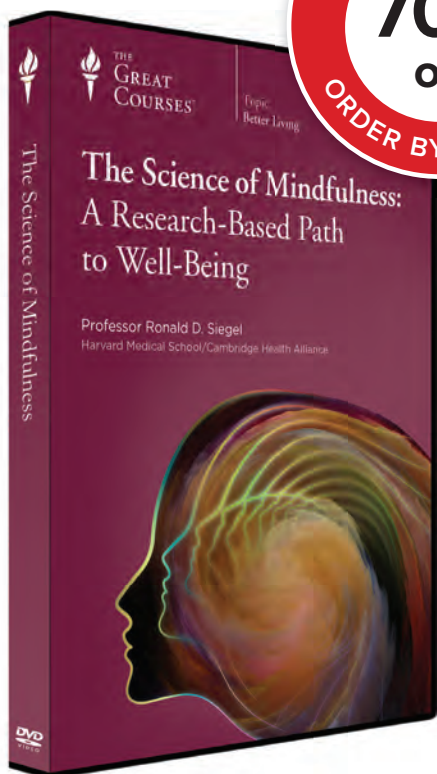
THE TITLE character of the 1987 movie *RoboCop* was “part man,” “part machine,” and “all cop.” The concept was popular enough to spawn two sequels, a TV series, and a 2014 reboot film that promised, “Crime has a new enemy.”

As this 1924 image of a hypothetical “Radio Police Automaton” attests, the dream of a perfectly impervious and unemotional peacekeeping force is an old one. “Such a machine would seem to be exceedingly valuable to disperse mobs,” enthused Hugo Gernsback in *Science and Invention* magazine. “The arms are provided with rotating discs which carry lead balls on flexible leads. These act as police clubs in action....Bullets do not affect them and if equipped with a twenty to forty H.P. engine, they will be well nigh irresistible.”

In the wake of highly publicized cases of police violence in Missouri, Ohio, New York, and elsewhere, it’s perhaps comforting to think that law and order can be outsourced to machines. But as the *RoboCop* franchise reminds us, human emotion, error, avarice, and empathy will always get in the way. Alas, even with radio-controlled automatons keeping the peace, somebody somewhere will still be calling the shots. ■

Nick Gillespie (gillespie@reason.com) is editor in chief of reason.com and *Reason TV*.





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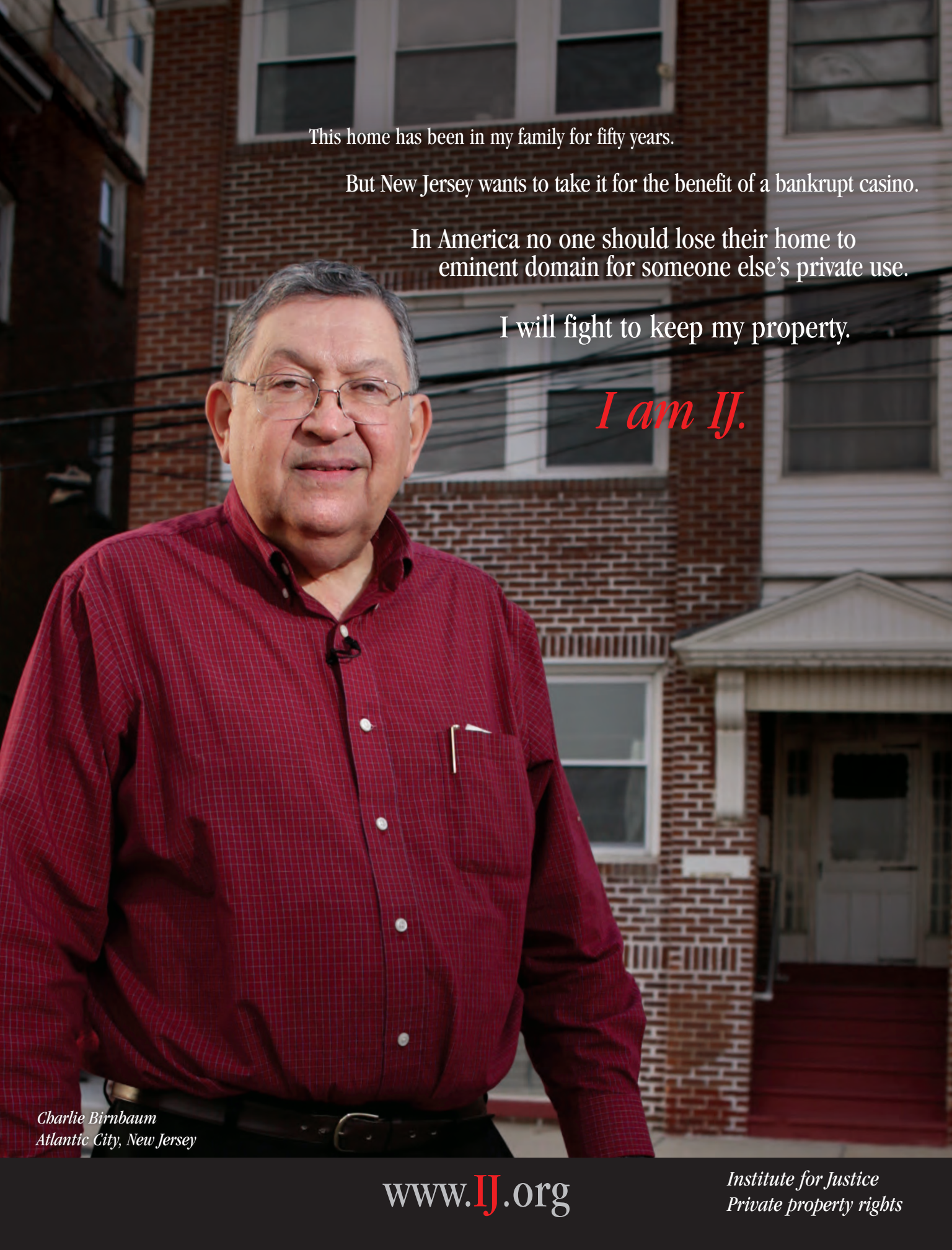
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A middle-aged man with glasses and a red checkered shirt stands in front of a brick house. The house has several windows and a white door with a small porch. The man is looking directly at the camera with a slight smile.

This home has been in my family for fifty years.

But New Jersey wants to take it for the benefit of a bankrupt casino.

In America no one should lose their home to eminent domain for someone else's private use.

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