

# **SAM: ONE ROBOT, A DOZEN ENGINEERS, AND THE RACE TO REVOLUTIONIZE THE WAY WE BUILD**

(JONATHAN WALDMAN)

May 24, 2020

The classic American path to technological success has been for driven tinkerers to obsessively work to solve a problem, from Eli Whitney to Thomas Edison to Steve Jobs. Such men strove to enrich themselves while benefiting others. *SAM*, the tale of one Scott Peters and his ten-year attempt to create a bricklaying robot, narrates such a story. True, his attempt was mostly unsuccessful, but then, most such attempts are. And in modern America, when excellence and achievement have been traded in for less-than-worthless “diversity and inclusion,” his is an inspiring tale.

Why did I read this obscure book? Masonry, like metalworking, has long fascinated me, and I have dabbled in both. Automation also interests me, for its economic and political effects. As I’ve written elsewhere, I think automation as a disruptive force is grossly exaggerated, across the political spectrum. This exaggeration has implications for, and says much about, our approach to progress today. The combination of these two topics, not usually tied together, grabbed my attention, so here we are.

A very old trade, not changed much in technique from hundreds or even thousands of years ago, bricklaying is a tremendously physically demanding task, for which, over decades, the mason pays a steep price. All the older masons I know suffer from a variety of physical debilities caused by their trade; years spent lifting heavy brick and block, moving and twisting, invariably take their toll. It is no wonder that the dream of a bricklaying machine has existed for more than a hundred years, and many men have falsely claimed to have created one. Peters decided he could be the first to actually do so. He wasn’t a bricklayer, though he had spent a lot of time on upstate New York building sites, which probably made him think the problem was easier to solve than it ultimately proved to be. But you don’t know until you try.

Why has automated bricklaying always been an intractable problem? For the same reason automation has, so far, proved impossible for the vast majority of human tasks: complexity, much of it not obvious to

the outsider. There are a nearly infinite number of variables involved in bricklaying, that combine in myriad ways, all of which an experienced human can easily process and synthesize, but which have to be specifically identified and precisely programmed into a machine for it to do anything at all. Although it is not the author's goal, this book shows the impossibility of much automation, contrary to the glossy promises sold by and to the professional-managerial elite who have never worked with their hands or tried to understand anything physical, other than paper-pushing at a BS job.

I have personal experience with attempting to roboticize an industrial process. In fact, ten years ago, I intended to almost entirely roboticize my own production facility. Essentially, my factory mixes and fills a variety of foods into containers, a complex set of steps different for every product. After discussion with many of the largest robot manufacturers, such as Fanuc, I was assured that robots could be designed that would assemble and fill containers, then seal and label them, all at high speed without any but occasional human oversight. Moreover, I was assured this could be done for a reasonable, even cheap, price, with a short payback period. This was attractive, because it would save on labor costs, and since my operation is short-run and flexible, filling many different products into many different types of containers, it is a high-touch business with high labor costs.

Every few years extensive press is given to some new development that will supposedly make robots ubiquitous, but never does—such as Baxter, the pick-and-place robot with the emotive face made by Rethink Robotics, which soon went out of business. That should have told me something. None of my competitors used robots, and I should have known that there was a reason for that. Like all dreamers, though, I thought I had seen something others had missed. My conclusion from that industrial robots were very rare outside of the automotive and distribution industries was that I could be the pioneer! So I took the plunge, and bought a robot. I was promised it could take a constant stream of jumbled jars and lids, identify and pick them, fill packages quickly and accurately, seal them, and send them on down the line, allowing me to mint the money I deserved.

It couldn't do any of that. It's possible that a robot could be designed, for many millions of dollars, to actually do that—but at a fraction of the

speed a traditional set of filling machines could do it, at twenty or thirty times the cost. In practice, my robot could do nothing accurately or at more than a snail's pace, and required constant attention and service from a legion of human beings. Why? Because robots, and automation in general, can't handle variability. They excel, as this book shows, only at repetitive tasks with variables that can be narrowly specified, and with no unexpected variations or random occurrences. But in my industry there are already finely honed machines for the tasks I needed done, machines that can be quickly and easily adjusted by human operators to deal with variability, based on their experience. So in my industry, and in most industries, robots are worthless, adding huge expense but finding no outlet for what their strengths are—the ability to be programmed with variables that can be precisely quantified, and to move in multiple dimensions faster and more accurately than a human can, or in toxic environments dangerous for humans.

And this book, despite much inspirational talk, shows this same variability, and thus the uselessness of robots, is true in bricklaying. Bricklaying variables include a kaleidoscopic variety of cross-interacting environmental factors (rain, wind, sun), variability in materials (brick size, mortar rheology), and variations in measurements from plans. All of these a mason, after long experience, can address on the fly, but they choke a machine. The same is true for nearly any industrial process where conditions cannot be precisely specified, meaning most industrial processes. Thus, welding robots make sense, because the variables are few, the material's condition and location in space can be precisely specified, and exact quality parameters are easy to determine. Bricklaying robots, where none of that is true, don't make sense.

But how can this be? We are always told that automation of everything is just around the corner. Proponents of automation, recently most notably Andrew Yang, casting themselves as mere realists, wave their hands at the truth that robots can do little, promising that just around artificial general intelligence is imminent, which will allow robots to synthesize variables just like a human being. However, there is zero evidence of such AI being possible, which is why autonomous cars will never be used outside of controlled test environments, and fifty years from now men will still be laying bricks by hand. But we shrink from admitting that we can't accomplish great technological things

like our forefathers, so we preen ourselves with the fantasy that we can through artificial intelligence, while in fact accomplishing nothing except mass manufacture, using slave Chinese labor, of shiny baubles, sold to consumers to rot their minds and allow them faster access to more personalized pornography. Whatever progress is, that's not it.

So, no surprise to a reader who understands these truths, SAM ("semi-automated mason") was not a success. The book, though published in 2020, ends in 2016, suggesting that SAM was gaining acceptance in the marketplace. You have to do a little research on the company profiled, Construction Robotics, to realize this is untrue, because the author, Jonathan Waldman, never quite comes out and says it. But after 250 pages chronicling in great detail the ups-and-downs, mostly downs, of the small group of men trying to build SAM, you realize that they failed. There is little recent mention of the machine on the internet, and if you go to the website for Construction Robotics, while SAM is mentioned, their main product appears to be MULE ("Material Unit Lift Enhancer"), a device that is not a robot at all, but a flexible and clever lift-assist device for helping a mason lay concrete block without breaking his back. No new iteration of SAM has been brought out for five years. It's quite apparent that SAM is not going to change the bricklaying industry. Yet that is the fate of most men who obsessively work to bring a dream to life; it is not a criticism of Peters, who at least makes machines that help society and add real value, unlike the vast majority of output from Silicon Valley.

The story is good, but the book is not. It is not a pleasure to read, even for someone interested in bricklaying or the building trades. It's mostly just a sequential description of hard-to-distinguish vignettes of the Construction Robotics team trying to make SAM work on various masonry jobsites. It offers zero pictures, which makes the book much less interesting, and also makes it impossible to keep track of who is who, especially with the high turnover at Peters's company. The lack of an index also frustrates the reader, and there are red herrings that seem important, but aren't—such as constant references to a quarter-million-dollar Leica laser system that would supposedly solve all SAM's problems, which I expected to show up for testing some time, but instead just stopped being mentioned near the end of the book. This book might have made an interesting *Medium* article, but that's about it.

Why are we constantly promised innovations that never arrive? There is little doubt that we are in an age of technological stagnation in every area, despite the flash and ubiquity of mobile phones and similar geegaws. I am not concerned here with why they don't arrive—I know that already, corruption and decadence. (If you want to cry, go read *American Genesis*, by Thomas Hughes, a 1989 book that chronicled a brilliant past yet did not realize the future was stupid. To be sure, Hughes notes what others, including Mariana Mazzucato, have also pointed out—that for at least a hundred years, most great advances have been team efforts, though usually driven by the vision of one man, and often receive substantial government support, as they should.) What I want to know is why false promises denying the obvious are constantly made to us. This is true in every area of life—read any news site, and we are told complete lies about everything from autonomous cars and trucks to cures for cancer. And that's ignoring the “news” of technological developments that is simply scams, like “green energy” and “green industry.” Why?

It must be a combination of the ruling classes being unwilling to admit their rule has created a failed society, despite their utopian promises of a remade ideal society, and the (tightly connected) dominance of stupidity and gullibility among the masses, as shown in popular culture—the “I'll buy that for a quarter!” of Cyril Kornbluth's classic story “The Marching Morons” (parodied in the movie *Robocop*). Both groups like to believe the fantasy that the technological future is bright and we will achieve more than our fathers did. Oh, some of the former group know it's a lie, but it's an instrumental lie, a type of consumerism that keeps the masses quiescent, or at least they hope it does. Most of the former group, who indoctrinate the latter group, don't know it's a lie, and can't wrap their mind around the possibility, because they do not want to believe what used to be a commonplace—that success and progress require sacrifice and differentiation that depend upon and reinforce hierarchy. They instead believe in their bones everyone is both equal and above average, and that emancipation means everyone can be Werhner von Braun. They believe the fountain of progress dispenses its benefits to anyone who cares to drink, and that the incompetent and untalented are just as able to achieve as the obsessed geniuses who

in the past drove achievement (and that past geniuses were overrated, guided by hidden figures who were the real talent).

Examples of such lies are everywhere. Let's take something that's not robots. Let's take nuclear reactors. As we all know, the nuclear power industry, originally seen as able to create power too cheap to bother metering, foundered decades ago on the rocks of hysterical fear spun out of environmentalist fever dreams, combined with choking government regulation. Quite often, though, we are told that just around the corner is a new Nuclear Age that will solve all our power problems. Yesterday, for example, prominent people on Twitter (e.g., Jack Dorsey and Scott Adams) noted with excitement that "America Just Made a Huge Investment in Next-Gen Nuclear Power." If you read the details, though, it's silly. A modest government budget has been set to build smaller reactors based on current technology. And are they imminent? No. Any actually new reactors are "strictly in the realm of the imagination in 2020, but will be ready for the runway by the 'mid-2030s.'" In other words, they will never arrive, and the money will be dissipated among grifters. Other reactor technologies, such as thorium reactors, have been pushed for decades, but they will never arrive either. Our sclerosis is too far advanced. Yet we hear, constantly, how bright the future of nuclear power is, a fantasy one step less insane than believing we will have weekend trips to Saturn this century.

So our society is technologically defunct, or, more accurately, decadent. What about private initiative, like Elon Musk? Sorry, while Musk is our most interesting talent, most of his business relies on government handouts, and his space initiatives, while I support them and they do offer some new technology, mostly aim to do what we could do sixty years ago. More to the point, one man cannot swim against the tide. No matter how hard he tries, Musk cannot achieve great things when society has determined it no longer is willing to do what it takes to achieve, trading it in for safetyism and an egalitarianism that pretends that there is not a strict hierarchy of inborn ability that dictates what tiny percentage of men can really achieve great things. Or, back to reactors, it's true that if we gave \$100 million to any genius who could achieve the goal of usable small nuclear reactors, tax-free, no strings attached, we'd get our fabulous new reactors quick smart. We'd never get to use them, though, because the diversity and inclusion thieves with their hands

out, and government micro-regulation, would prevent their adoption. The reactors would look nice on the shelf, though! Our society's failings are inflicted on us by our ruling class, not by any law of nature, while they lie to us about the future to hide the damage they have dealt us.

What about other countries, like the Chinese or the Koreans? Sorry, there is no evidence those cultures will ever lead technologically. Only one society, Western Europeans and their offshoots, created the modern technological world; the rest of the globe contributed nothing, and there is no evidence that is changing, despite other cultures adopting the material blessings of the West. Plus, all advanced societies in the world, including us, have already shot themselves in the face by trading children for more fun and fewer obligations, meaning that all of today's technologically-advanced societies will necessarily disappear within a hundred years, and long before then, will accomplish even less as their populations age, since it is always the young that make progress possible.

What's the solution? You will not be surprised that my solution to decadence in technology is the same one as I advance as an overall political solution for the West—a clean sweep, the defenestration of our ruling class and the complete reworking of society along reality-based lines. It seemed for a brief moment that the Wuhan Plague might start that process. Nope. It's a Grade C apocalypse, that has just made everything worse—enhanced the power of our elites to behave badly, exposed the utter inertia and low intelligence of the masses, and generally shown that everything is stupid. Maybe the next plague, as painful as that would be, will kickstart the necessary changes. It's not going to be one step back for two steps forward, it's apparent now. More like a mile back for two miles forward. But that's the way it has to be, and the alternatives are a lot worse.