METROPOLIS 2067

A LOT CAN HAPPEN IN 50 YEARS. FROM LAB-GROWN MEAT TO UTOPIAN ARCHITECTURE, PEER INTO A VISION OF THE FUTURE BASED ON WHAT'S HAPPENING TODAY.

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A CAVEAT

Do you think you could describe life in 2017 to someone living in 1967? Would it make sense to them? Things like running shoes with computer chips in them, or fridges that text you when you're out of eggs? Do you think you could explain any job in Silicon Valley? Even if you could bring 2017 to them, it wouldn't be any easier. In one of my favourite modern thought experiments, Claire Evans at *Grantland* asks us to imagine sitting through a screening of *Transformers* with Benjamin Franklin. Imagine if was someone from 1967 instead. At least they'd be familiar with movies, and yet, they couldn't possibly process that storm of swirling metal. It'd be utter sensory overload.

Now, what if you were on the other side of this exchange with a time-traveller from 2067? Their stories may sound familiar, just as someone 50 years ago might recognize shades

of Isaac Asimov or Arthur C. Clarke in your stories of intelligent machines. But progress doesn't move at one speed. We're still at the bottom of the asymptote, and we know for certain that by 2067, parts of daily life – perhaps even something as dumb as a blockbuster action franchise – will surpass the limits of our imagination.

"I think you can make some pretty smart guesses," says Scott Dadich, "but when I was editor at *Wired* we tended not to do that because we were usually wrong when we tried to look that far ahead. What used to be a 20-year time horizon in terms of looking at the way the world was changing in 1983 (the year *Wired* was founded) has sometimes been compressed down to 20 months or 20 weeks."

So, when we talk about how cities will evolve in the next 50 years, just keep that in mind.

PRAGMATIC UTOPIAN ARCHITECTURE

The most obvious place to start would be our skylines, which will be reshaped by new philosophies of urban design and architecture. We may not necessarily build higher but we are going to build differently. Perhaps the most high-profile example of an ahead-of-their-time architect is Bjarke Ingels. He's known for a concept called "hedonistic sustainability;" buildings that are environmentally sustainable and cost effective, but also enhance the comforts of modern life.

His first project was Copenhagen's VM House, a structure within which multi-story apartments have been assembled like Tetris pieces. The next were the Mountain Dwellings, a series of homes and private gardens stacked like a great set of stairs. From a distance, the building's features – the concrete units and the gardens – resemble alpine vegetation on rock. His next was the 8 House, also in Copenhagen, a complex of townhomes and apartments layered over retail spaces, childcare facilities, galleries, and cafes. The structure, which looks like an "8" from above, includes courtyards in the centre and a public path on the roof.

What all these projects have in common is the fusion of two or more incompatible ideas: multi-story units that are more affordable than conventional apartments; living spaces with both penthouse views and a lush backyard; private spaces that encourage community involvement. The designs are the beginnings of a new movement called "pragmatic utopian architecture."

But none of these projects have the same visionary quality as his Amager Bakke, a massive power plant that opened this year in Copenhagen. Next year, the roof will open to the public as an artificial ski slope, above which a smokestack will puff massive rings of pure CO_2 and steam generated from the incinerator below. "Instead of having to be far away from it, you can actually enjoy it," Ingels says in the Netflix documentary series, *Abstract: The Art of Design*.

Put another way, you can experience "clean mountain air" atop the country's greatest engine of human consumption.

FOOD

In 2013, a man named Rob Rhinehart conducted a 30-day experiment during which time he didn't eat a single piece of solid food. He consumed only a homemade meal replacement shake that, he claimed, contained every vitamin and nutrient an adult man requires to live well. He called it Soylent, and at the end of the 30 days, he said it improved his energy levels, his mood and his sense of wellbeing. Four years later, Soylent has gone through eight iterations of its formula, and earned more than $70 million in funding from Silicon Valley angel investors. If there's a precursor to the meal-in-a-pill, this is it.

Rhinehart never claimed to want to replace food (he still eats "real" food, though he views it more as a social exercise) but it seems impossible to think products like Soylent won't serve some purpose as the global population balloons to 10 billion people, as it's expected to in the next 40 or so years.

Buy-in hasn't exactly been widespread though. Most people are about as keen to try Soylent as they are insect protein or petri dish hamburger meat. As Erin Kim, the communications director at New Harvest, a not-for-profit organization that supports scientific research in cellular agriculture (they made headlines back in 2013 for funding research into the world's first cell-cultured hamburger) points out, one day we may not always have the same luxury of choice we do today. Meat consumption is expected to double by 2050, which is cause for concern considering 40 percent of all the agricultural output in the industrialized world goes towards feeding the animals we eat (not to mention the enormous impact on water use, and greenhouse gas emissions).

Nobody is more conscious of this than urbanites, and it has already resulted in a number of shifts in the way we eat. The locavore movement, for instance. A logical, but distant, extension of such a movement would be urban agriculture; skyscraper farms where plots of land are stacked atop one another. Structures like this can reportedly produce hundreds of times more crops per acre than conventional farming, and do so twice as fast, with 99 percent less water and 40 percent less power.

But our faith in technologies like this might be misguided because the people who'll have access to them won't really need them. As it is, we produce enough food to feed all 7.6 billion people on earth and then some. The problem is that we lose, according to the United Nations, between 30 and 50 percent of it. In the developed world, we throw away about 220 pounds of food per person per year.

Hunger is primarily a socioeconomic problem. In the next 50 years, the changes that will matter most are less likely to come from a sexy new invention than from changes to our distribution networks and our own behaviours.

THE DATA IN OUR INFRASTRUCTURE

Toronto's eastern waterfront is one of the largest plots of undeveloped land in any major city in North America. Now, thanks to a partnership between the city and Sidewalk Labs (owned by Alphabet, Google's parent company), it will be also be one of the first "smart cities" to be built from the ground up.

In a city where real estate is growing unaffordable for so many and cars clog the major roadways, they're proposing more affordable spaces and a pedestrian-centric street design. Forests of sensors will theoretically allow the infrastructure to adapt in real-time to changes in traffic flow, waste disposal, noise, pollution and lighting. Bryan Smith, the CEO of ThinkData Works, says the spillover effects for the rest of the city will be profound. He believes opening up the city's data to its population will revolutionize public services.

Consider garbage disposal. Carlo Ratti, the director of the MIT Senseable City Lab, led an experiment to track 3,000 pieces of trash in Seattle. Several pieces travelled not only across around Washington State, but across the country. Some of it was still in transit after two months. The people throwing things away never see this, but you blow that image up on a map and it you might think twice about using a disposable razor that'll take 12 trucks, 1,200 kilometres and over a month to reach a landfill.

Ratti's lab has also analyzed the taxi trips around New York in a given year – all 170 million of them – and led another project to map the "green canopy" (i.e., where all the trees are planted) of cities around the world. The applications for such information are manifold, and in a smart city, Smith says much of it (and more) is expected to be out in the open for anyone to use.

"In 2015, mankind produced as much information as was created in all previous years of human civilization," Ratti said. "We are quickly approaching what Italian writer Italo Calvino presciently called the 'memory of the world': a full digital copy of our physical universe."

The fundamental difference in a smart city, according to Smith, is that the data will be out in the open, allowing the public to see the problems, and startups and businesses to solve them. Toronto has already taken a few basic steps, developing an open-data plan that has led to the creation of hundreds of new tools (see any Toronto transit app), but it's still lagging well behind the likes of New York, Barcelona, or Singapore.
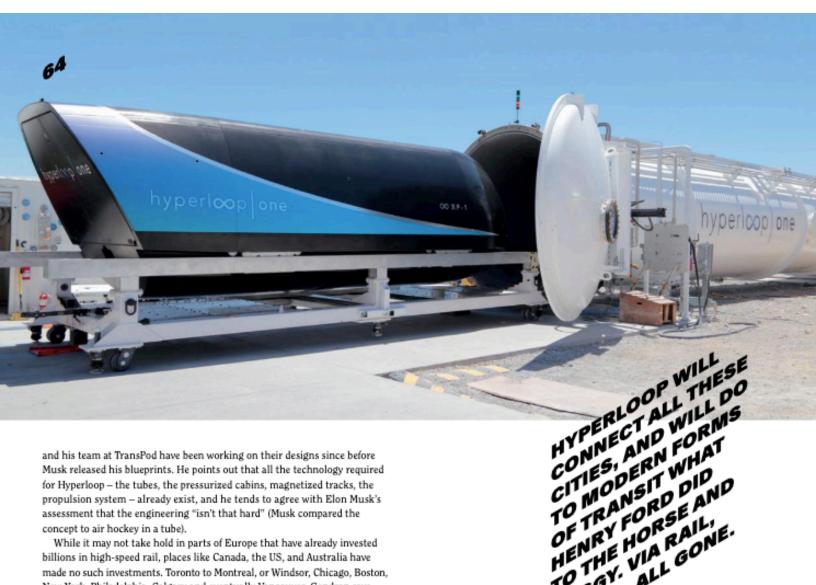
MOVEMENT

Perhaps the most famous example of an open-data collaboration is the one underway to build the fifth major form of transportation. In August 2013, Elon Musk released his blueprints for the Hyperloop and since then, several groups from around the world have begun work on their own designs. On the off chance you're unfamiliar, Hyperloop is a system of massive inter-city pneumatic tubes. Inside pods carrying people and goods travel through a near-vacuum at speeds of over 1,000km/h. The consensus amongst people who know about these things is no longer whether such a method of travel will become a reality, but when.

Some estimate that the first tracks will be operational before 2030 and there's a good chance it may be running out of Toronto. Sebastien Gendron

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and his team at TransPod have been working on their designs since before Musk released his blueprints. He points out that all the technology required for Hyperloop – the tubes, the pressurized cabins, magnetized tracks, the propulsion system – already exist, and he tends to agree with Elon Musk's assessment that the engineering "isn't that hard" (Musk compared the concept to air hockey in a tube).

While it may not take hold in parts of Europe that have already invested billions in high-speed rail, places like Canada, the US, and Australia have made no such investments. Toronto to Montreal, or Windsor, Chicago, Boston, New York, Philadelphia, Calgary and eventually Vancouver. Gendron says in 50 years time, the Hyperloop will connect all these cities, and will do to modern forms of transit what Henry Ford did to the horse and buggy. Via Rail, CN, CP – all gone. Domestic flights in Canada, dropped to a bare minimum. Millions of trucks taken off the road. When the costs come down, Montreal will be a place that Torontonians can drop in on during their lunch break. Vancouver a destination they can travel to as quickly as an office on the opposite side of their own city. "These cities will be part of the neighbourhood," Gendron says.

This will create huge changes in our living patterns as well. Already more than half of the world's population are concentrated in cities and when it takes half as much time to travel to a city on the opposite side of the country as it does to get to a farm out past the city limits, it's going to drive more people into urban areas.

That's going to create new challenges. Dadich says that because cities like San Francisco (or Toronto, for that matter) were designed more than 100 years ago, they aren't really equipped to handle 21st century population pressures. While new technologies can alleviate those pressures, they can also increase them. Uber is a modern example. The ride sharing company opened up entirely new swathes of the city for entertainment, education, and work, which Dadich says is a good thing. But the streets are now gridlocked. He says the length of his commute doubled in just two years. "There's a tension, there's a good and a bad that co-exist with the onset of a new technology," Dadich says.

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There is no single solution to that problem, but the most ballyhooed technological one is the self-driving car. Not only will this drastically reduce the number of cars per capita, ushering in a new era of the sharing economy, but it will also allow far greater numbers of cars to fit on existing roads. According to one study out of Columbia University, a highway filled to capacity today uses just five percent of available road space. Human drivers need that other 95 per cent as a margin for error. Robots don't. A highway full of autonomous cars would have an increased capacity of 273 per cent.

Those roads will also be safer. According to an analysis by the global consulting firm McKinsey & Company, widespread use of autonomous vehicles would eliminate upwards of 90 per cent of all auto accidents in the US, prevent $190 billion in damages, and save thousands of lives. Such a reality is, of course, dependent on human drivers staying off the road, or legislation barring them from the road, but we always yield the march of technology. For the generations born in the next 50 years, self-driving cars and city-to-city Hyperloops will be a fact of life – no more objectionable than trains, planes and automobiles of yore.

ARTIFICIAL INTELLIGENCE (AI)

Taxi, truck and Uber drivers will not be the first to lose their jobs to machines and they certainly won't be the last. According to a report out of the Brookfield Institute for Innovation, more than 40 per cent of jobs in Canada are at risk of being automated within 20 years. Manufacturing jobs will be hit hardest earliest, but the white-collar job sector is by no means exempt.

Krista Jones works at the MaRS not-for-profit in Toronto studying how the commercialization of AI will affect the future of work. She says virtually all knowledge work today has already been somehow augmented by AI.

To name just a few examples, doctors are using the Jeopardy-winning AI Watson to solve especially difficult cancer cases by combing through all the world's published medical research. Some robots already outperform dermatologists in detecting skin cancer, and others are being taught to find anomalies in x-rays and CT scans. Already, hedge fund managers rely more heavily on algorithms than gut instinct to make money. Abishur Prakash, a futurist and author of the forthcoming book *Go.AI (Geopolitics of Artificial Intelligence)*, points out that Sberbank, Russia's state-owned bank, will be replacing 3,000 employees with an AI that can write legal claims. "These are people in the law department," he emphasizes, "these are people with education."

There are no theoretical limits to automation, but Jones doesn't personally believe the human workforce will disappear in the next 50 years, or even be significantly cut. She does, however, believe it will stop growing. If a robot can increase your productivity by 200 per cent, you don't need to hire two more people. What you need are people who can work with whichever machine is doing those other jobs.

Right now, the jobs least likely to be automated are those that require significant or specialized human interaction: kindergarten teachers or nurses, for example. Robots for these tasks require generalized AI, and while the work in this area is still in its infancy even our most modest estimates put its development well within the next 50 years. For perspective, in 2003, famed futurist and author Ray Kurzweil predicted 2045 as the date of the technological singularity, when machine intelligence surpasses the sum total of human intelligence – an event that will remake our world. He predicts that this kind of AI will create things we can't even fathom, such as nanotechnology that can fundamentally change our biology. We'll be able to communicate telepathically with other humans, and alter our physical appearance, our cognitive capacities, our memories.

So, if one can envision *that*, it's not that hard to see a more conventionally futuristic city where humanoid robots comprise the frontline staff of restaurants and bars, hospitals and banks; a city with virtual brothels; a city where politicians discuss robot rights and human-robot marriage. At that point, AI will be the lifeblood of cities, every bit as essential as electricity is now and even more intimately enmeshed in our lives.

THE DARKER TIMELINE

Almost all dystopian scenarios entail a loss of control. The surveillance state, a malicious AI, nuclear war: they're the culmination of a long series of more innocuous and ignorant action, until we step off the cliff's edge. So, it's worth mapping the cliff's edge and trying to figure out where we may begin our descent.

Setting aside the possibility that machine intelligence will exceed our own before we've prepared for it (a genie that will be impossible to put back in its bottle), the more immediate AI-related danger is growing inequality. In a future where a single company can lay off thousands of workers without affecting its product or services, the wealth is going to be further concentrated amongst fewer members, leading to increasingly widespread and severe poverty, which beyond the attendant human suffering, could foment revolutions. Prakash mentions a series of unsettling events in Nigeria, where young people who had been fired began blowing up Shell's oil pipelines as a kind of economic terrorism, retribution for the social and environmental ills the company wrought.

The first domino of environmental collapse was pushed long ago. Urban sprawl is pushing our cities and suburbs deeper into the wild areas. Excessive use of antibiotics in both medicine and agriculture is breeding more resilient superbugs, and climate change is affecting the distribution of insects that make us sick. All of it contributes to the rise and spread of new diseases on unfamiliar scales: 10,000 dead of Ebola before it came under control, a Zika epidemic that spread across two continents unmitigated. Cities, with their dense populations and influx of travellers, are ground zero. Severe weather events, like the series of category four and five hurricanes that charged through the Caribbean this year, will become more common and will one day reach cities we thought were safe.

By 2020, China will roll out a massive Social Credit System, a means of ranking the "trustworthiness" of all 1.3 billion of its citizens. A number of data-gathering giants have devised a "complex algorithm" (the details of which they will not divulge) based on how they paid their bills, their personal characteristics, their behaviour (how often they shop, play video games, or take part in various activities indicative of their character), and who they hang around with. Those scores can affect their ability to get a loan or a passport, or access public services. "Some of these people become pariahs," Prakash says. "It raises an enormous amount of questions about how we live as people." Already, during a trial deployment of this ranking system, scores have come to be seen as social capital. People with high scores tend to talk about them on social networking and dating sites.

We're only beginning to float solutions to these problems. On the employment threat of AI, politicians and media figures are beginning to think about universal basic income and things like robot taxes. We're beginning to apply enough pressure that data giants like Facebook have begun to reckon with the ethical dimensions of their operations and their influence on our politics. Companies like Toronto's BlueDot, formed in the wake of the devastating SARS epidemic, have partnered with governments and the World Health Organization to gather, analyze, and distribute data about infectious diseases with the goal of eventually allowing information to travel quicker than illness. Just this year, Toronto hired its own chief resilience officer whose job it is to address the challenges that will arise from climate change.

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Disasters are inevitable. They'll *probably* escalate in intensity and scope but the idea that it will happen while humanity is sleeping may not be totally accurate – especially if they're byproducts of progress. We went to the moon 48 years ago, but we haven't been there since. Progress isn't inevitable, it needs willing actors, people who work for a long time on a lot of very difficult problems, and who do remarkable things when tested. To borrow a phrase from Hemingway, our cities break but afterwards they become strong at the broken places. We should hope, for now at least, the same will be true tomorrow. ▣