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THE POWER OF ALGORITHMS:

part 4

Учебное пособие

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PREFACE

Настоящее учебное пособие включает актуальные тексты (2018-2019гг.) учебно-познавательной тематики для студентов механико-математического факультета (направления 02.03.01 «Математика и компьютерные науки», 01.03.02 «Прикладная математика и информатика», 38.03.05 «Бизнес-информатика»). Целью данного пособия является формирование навыка чтения и перевода научно-популярных текстов, а также развитие устной речи студентов (умение выразить свою точку зрения, дать оценку обсуждаемой проблеме).

Пособие состоит из 5 разделов, рассматривающих значение информационных технологий в современном мире. Каждый из них содержит аутентичные материалы (источники: *The Disconnect*, *The Guardian*, *The Atlantic*, *Real Life Magazine*, *BBC Future*, *Wired magazine*) и упражнения к ним.

Раздел “Supplementary reading“ служит материалом для расширения словарного запаса и дальнейшего закрепления навыков работы с текстами по специальности. Пособие может успешно использоваться как для аудиторных занятий, так и для внеаудиторной практики.

1. Escape: The Next Digital Divide

Exercise I.

Say what Russian words help to guess the meaning of the following words: privilege, instructions, primitive, list, practice, routine, exotic, tennis, hobby, sociology

Exercise II.

Make sure you know the following words and word combinations. menial, to repeal, surveillance, to abstain, legitimate, utility, revenue, inequitable, disdain, squeeze

Escape: The Next Digital Divide

You might be able to access and make sense of the internet. But getting away from it is becoming a privilege

I remember the first day I accessed the internet. It was in the late 90s, in a computer lab at school. The room was new, uncluttered, jet black PCs, and bright blue wires snaking along the baseboards. We slumped in front of each computer in pairs and passed around slips of paper with log-on details and instructions for connecting to the internet. In Netscape, we entered obnoxiously long URL addresses and patiently waited for images to load. In hindsight, the experience seems primitive, as we only visited a fixed list of websites and clicked through a few hyperlinks. But at the time, it felt thrillingly futuristic. Going online was an escape from the banalities of the real world. Twenty years later, I take the internet with me everywhere I go. Thanks to my smartphone, being connected is my default setting. I routinely reach for my phone when waking and rubbing the sleep from my eyes. Connecting is rarely arduous—I effortlessly move between

Wi-Fi and mobile networks, with only the odd notification interrupting me to inquire about my preferred network. What's more, I no longer merely access the internet, it also accesses me. Every website visited, photo shared, or comment offered, is captured, analyzed, and sold off; a practice I apparently agree to when consenting to various terms and conditions. In turn, my news feeds and social media channels become more bland and familiar. I get an uneasy sense that various platforms on the internet want to *know* me and demand a relationship of routine. As such, the internet no longer feels exotic, but oddly mundane. Now, activities in the real world—a game of tennis, or a long hike—provide an escape from the habits of the internet. I know I'm not the only person who feels fed up with the internet; tired of mindlessly scrolling on their smartphone. Somehow, we've flipped from craving digital worlds to digital detoxes, all in the space of twenty years. I'm not only suspicious about the direction in which the internet is going, but also worried that getting away from it has become an aspirational hobby of the privileged few. To understand why, I'm going to dip into some internet sociology and discuss the development of the digital divides. Consider it a people's history of the internet and a skeptical view towards the future. The digital divide is a way of describing inequality in relation to the internet, a tech version of the "haves and have-nots." We typically use the term to understand who has access to the internet and who doesn't. It was coined in the 90s, right about the time I was surfing the web in my school computer lab. Back then, there was a significant gulf between those who could regularly access the internet and those who couldn't. And make no mistake—this division is still substantial.

According to a report from the International Telecommunication Union, only 43% of the global population have ready access to the internet. But what's more telling is that this has increased by 36% over only fifteen years. Thanks to devices like the smartphone and ambitious infrastructure projects such as Google's Project Loon (a hot air balloon that floats around the globe providing Wi-Fi), the internet is rapidly spreading to remote corners of the globe. Digital know-how has never been more important.

But there's more to the digital divide than just having a decent Wi-Fi connection. As the internet becomes intricately integrated into our lives, the digital divide has been redefined. Take countries like the U.S. or my own New Zealand, where the internet has become so commonplace that many services have migrated completely online. Activities like accessing government services, booking appointments, or mobile banking all require a degree of familiarity with the internet. In these places, the divide has less to do with access and more to do with digital literacy—knowing what to do once you get online. It is true that the have-nots are typically older folk, but the divide isn't simply generational. Media commentator Ryan Holiday points out that any person who regularly works with a computer has “their internet time subsidized by their employer.” As they spend more time online, they develop digital literacy and become less susceptible to cyber traps like trolling or fake news. Having digital know-how has never been more important. It's difficult to say whether the literacy divide will reduce in time. As digital natives grow up and hone their skills, they could introduce new digital tech and associated standards of digital literacy. The blockchain is a good example—if you know how this emerging crypto-

technology works, you're ahead of the game. This is where we diverge from most discussions about the digital divides. The majority of tech experts forecast that the divides will end when everyone can access or adequately use the internet. This thinking is not only blinkered—failing to chart our evolving relationship with the internet—it also fetishizes technology. It is a naively optimistic view, implying that inequality can be solved by providing a Wi-Fi modem and an instruction manual in remote parts of the world. There are other tech issues that disproportionately affect the have-nots: the automation of menial labor, the decision to repeal net neutrality, and surveillance tech, to name a few. Given how essential the internet has become to people's day-to-day lives, I think it's time to expand the conversation. If the divides have been reimagined from access to literacy, we can redefine them again. Ten years ago, the UK government coined the term nomophobia to describe the anxiety people feel when they're either separated from their phone or out of range from a mobile network. This aptly captures how most people today see the internet: *essential* to our lives. Media scholars call this dependence mediatization, which is a theory that describes how entangled media technologies are with our day-to-day routines. In other words, it is increasingly difficult to opt-out of various aspects of the internet. Which apps could you bear to live without? Could you navigate a new city without Google Maps? Or manage your social life without Facebook or Messenger? I've spoken to many friends who want to delete their Facebook account, but only go as far as removing the app from their phone. The reality is that being off Facebook today is like being excluded from the phone book twenty years

ago—it makes it trickier for people to get hold of you, inviting social exclusion. Similarly, I've flirted with the idea of downgrading to a brick phone, but I'm hesitant to lose services like WhatsApp, which allows me to easily share photos with friends and family. As we increasingly socialize through these technologies, divorcing yourself from them not only diminishes your social life, but also your day-to-day routine. It's akin to choosing to live on outdated software: everything slows down and becomes more difficult. These apps provide the latest ways to keep in touch and are personal assistants that help us manage our lives.

We should stop pathologizing the way we use the internet and question how it's being supplied. How dependent are we? In a 2014 study led by the International Center for Media & the Public Agenda, over 800 participants were asked to abstain from the internet for merely 24 hours. Unsurprisingly, less than half of the participants were able to do so. Perhaps the only shocking thing about these results is that, in 2018, they are no longer shocking. The most commonly cited reasons for going back online was the anxiety associated with unplugging and the dependencies of people's daily routines to their devices. Being tech-institutionalized doesn't necessarily mean we're all gaming addicts, holed in a dark basement for hours on end. Instead, it is having a *legitimate* dependency on the internet that can't be easily shaken. Many people use their phones to check on their kids or elderly parents, while others have jobs requiring them to be easily contactable. Asking them to stop using the internet is like asking the mayor to switch off the electricity grid: it's cutting off an essential utility. For these people, the anxiety associated with nomophobia

has less to do with addiction and more to do with the realization that they no longer have access to an essential service. So perhaps we should stop pathologizing the way we use the internet and question how it's being supplied. This becomes urgent once you realize the internet isn't even designed for us. Not only are we dependent on the internet, but the internet is increasingly dependent on us. This is because the internet is largely an *attention* marketplace, where our eyeballs and data are the hottest thing for sale. Tech companies have redesigned the internet to hook us to our devices, for the benefit of their actual customers: advertisers. Every click, comment, or share generates troves of data that offer behavioral insights. So services like Instagram and YouTube are offered for “free” in exchange for what we leave behind. It's why the news feeds are bottomless, videos play automatically, and notifications are colored red. It's all designed to maximize our time spent online: the longer we're there, the more ad-revenue we generate. We struggle to leave the internet because we've become like lab rats, conditioned to anticipate the rewards. Being the product largely explains why the internet has become undesirable. It may be the infrastructure to our lives, but it's increasingly *privatized* infrastructure, meaning we're always being sold something or tempted to stay for a little longer. Ads appear out of nowhere or are disguised as news, and even if we manage to leave, notifications and alerts are deployed to influence our return. It's deeply manipulative; Facebook and Google are hiring hordes of behavioral scientists to keep us scrolling, and one smaller company—the aptly named Dopamine Labs—promises commercial clients advanced neuroscientific solutions to glue their

audiences to their screens. Designers start by looking for blind spots, edges, vulnerabilities, and limits of people's perception, so they can influence what people do without them even realizing it. Once you know how to push people's buttons, you can play them like a piano. What research reveals is an uncomfortable truth: we struggle to leave the internet because we've become like lab rats, conditioned to anticipate the rewards. Not only are we dependent on the internet, but we're addicted by design.

Here lies the next digital divide. It's not an inequality of access, nor literacy, but of headspace. Because of our increasing dependence on and value to the internet, the real privilege of the future is how to disconnect and distance yourself from it. The tech haves will develop the means to break the cycle of relentlessly checking their phones or have the independence to part from them without serious consequence. Silicon Valley executives are (ironically) already sending their kids to tech-free schools. Not only will the tech haves be able to divorce themselves from technology, but when going online, they'll have a walled garden of ad blockers and productivity apps to counteract the constant din of distractions and visual pollution. They will be free to use the internet as a service, without being enslaved to it. Opting out of tech, ads, or data-collecting practices is a luxury not many can afford. In contrast, the have-nots risk being stuck to their devices. There are the parents, children, or employees who will feel obliged to be available and hesitant to risk extended periods of disconnection. Tech companies have put a price on people's attention and data, so opting out of tech, ads, or data-collecting practices is a luxury not many can afford. Ad-free services are expensive,

many internet blockers or productivity apps come with a subscription fee, and the free apps that promise disconnection are dubious. For example, Unroll.me is a “free” service that automatically unsubscribes users from mailing lists. What Unroll.me doesn’t make obvious is that in exchange for this service they mine your inbox and sell anything interesting to third parties. Unroll.me promises disconnection, but by selling your most precious information, they enable other companies to keep you scrolling. As it currently stands, not enough people are fighting for the right to disconnect. Many people are acutely aware that there’s something inequitable about being addicted to their phones, but there’s not much information out there on the subject. There’s Time Well Spent movement, a possible upcoming phone ban in schools in France, and a few former tech insiders who have expressed disdain about the internet they’ve helped create. But it’s in the interest of the tech giants for technology addiction to be swept under the rug or dismissed as a moral panic. They are responsible for creating this divide and are dependent on the have-nots to supply data to the attention economy. The reality is that as the internet is being hyper-commercialized—it’s being squeezed for every cent, rendering digital divisions inevitable. Yet what’s concerning about the divide of disconnection are the possible consequences for the have-nots. They face a future of constant distraction driven by persuasive tech that is addictive by design. How busy will our digital futures be? In an interview with Vanity Fair, Facebook founder and CEO Mark Zuckerberg opines: “our mission isn’t to connect a billion people, it’s to connect everyone in the world.” In

this future, connecting may be free, but taking a break will be a bonus.

Adapted from The Disconnect

Exercise III.

Fill in the gaps.

1) Carefully remove any _____ to allow access to the bottom plate.

2) There is a fine line between happiness at work and _____ cheerful people.

3) In _____ I shouldn't have been surprised, but it seemed too good to be true.

4) There is admittedly something _____, not to say comical, about a sewing robot.

5) Yet _____ and reality have not always coincided in the recovery from Katrina.

6) Gleefully, he shows me a poster for a _____ he developed in 1980.

7) Please remind your readers to _____ from making remarks about a person's size.

8) It is inefficient, uneven in quality, _____ in distribution and overpriced.

9) Like many of the high-tech faithful, Shirky displays a casual _____ for print.

10) Endless choice, super-sized portions, and friendly faces can be very _____.

Exercise IV.

Make up sentences of your own with the following word combinations:
 to make sense of , to get away from, to access the internet, to connect to
 the internet, in hindsight, to click through hyperlinks, going online, in
 turn, to provide an escape from, fed up with

Exercise V.

Match the words to the definitions in the column on the right:

baseboard	turn over or cause to turn over with a sudden sharp movement
hindsight	lacking strong features or characteristics and therefore uninteresting
slump	concerned with the world or worldly matters
obnoxiously	with elaboration
consent	a hope or ambition of achieving something
bland	a narrow wooden board running along the base of an interior wall
mundane	permission for something to happen or agreement to do something
to flip	sit, lean, or fall heavily and limply, esp. with a bent back
intricately	offensively
aspiration	understanding of a situation or event only after it has happened or developed

Exercise VI.

Identify the part of speech the words belong to:

persuasive, obnoxiously, experience, primitive, futuristic, mobile, notification, various, conditions, social

Exercise VII.

Match the words to make word combinations:

real	sense
media	details
brick	channels
uneasy	phone
blind	lab
fixed	divide
URL	world
log-on	spot
computer	list
digital	addresses

Exercise VIII.

Summarize the article “Escape: The Next Digital Divide”.

2. How to Spend It: the shopping list for the 1%

Exercise I.

Say what Russian words help to guess the meaning of the following words: regular, central, hotel, ceremony, hall, group, dominant, elite, criticised, parallel

Exercise II.

Make sure you know the following words and word combinations.

austerity, high-end, inadvertently, malaise, brigantine, sanctuary, strenuous, faint-hearted, tactile, conspicuous

How to Spend It: the shopping list for the 1%

In an age of astonishing wealth, nothing reveals the lives of the ultra-rich like the FT's unashamedly ostentatious luxury magazine.

On 7 October 1967, the Financial Times added a regular new page to its Saturday edition. Buried deep inside the paper, behind the usual thicket of articles about share prices and companies and pensions, the page was introduced to readers a little euphemistically, as “a guide to good living”. In small letters across the top of the page, the FT spelled out what “good living” meant. The page was called How to Spend It. In the still slightly austere postwar Britain of 1967, where the great majority of the FT's prosperous readership of 150,000 lived, spending opportunities were limited. The new page had an article about installing home central heating, then a relative luxury; about a new electric coffee maker; and about how to select and cook a pheasant: “Choose carefully. Hens are always best.” The most expansive piece was on an old-fashioned Scottish hotel owned by

state-run British Rail. “The visitor is received with all the ceremony of an arrival at a country house,” wrote the reviewer. “You go into the immense hall and no one takes any notice.” Fifty-one years later, the rich are very different. It may be hard to imagine now, but for much of the 20th century, they were a relatively small, even beleaguered group: held in check in Britain and other western countries by high taxes and steadily more egalitarian social values. Today, they are an ever more dominant and international elite: lightly taxed, politically pivotal, admired as much as criticised, and so untethered from everyone else in their lifestyles that they exist in “a parallel country”, as the American investigator of the wealthy Robert Frank puts it. Since 1980, the share of national income taken by the richest 1% of Britons and Americans has almost trebled. Across the world as a whole, the 1% now have half of all the wealth, the highest proportion for almost a century. Sometimes this elite life is fleetingly visible to the rest of us – the chauffeur-driven car waiting outside a boutique in a smart part of London or New York. More often, it is invisible – the super-yacht out at sea. The 2008 financial crisis and subsequent global recession and austerity have left this life largely unaffected – and often enhanced, with emergency measures such as quantitative easing hugely benefiting the rich – while altering the lives of almost everyone else. Books and articles about the 1% have become a booming genre; many newspapers, including this one, now have “wealth correspondents” to report on the super-rich. Yet journalists and academics often struggle to capture more than the hard, glossy surfaces of this private world: the size of the yachts, the profusion of servants. If you want to understand the underlying desires and pleasures

– and the restlessness and competitiveness – of the 1%, then you need to read How to Spend It. The original one-page section has swelled into a thick, large-format magazine, almost the size of a tabloid newspaper, which now appears 34 times a year, distributed with the FT across the world on Fridays and weekends. There is also an elaborate website, updated daily – and, unlike the FT’s main website, presented without a paywall. Under consumer capitalism, you are what you buy – or would like to buy. But the rich are different from everyone else in their consumption, because they can afford almost anything. Their challenge is choosing. The key role in this process played over decades by How to Spend It has made it an almost unique social lens, through which we can see how much the world has polarised since the egalitarian 1960s and 70s. Together, the magazine and website form “an elegant luxury environment for readers and advertisers”, as the FT’s promotional material puts it. At How to Spend It, “the world’s most desirable audience, with the largest purchasing power and highest net worth” is – in theory at least – judiciously steered by expert FT journalists towards the correct purchasing decisions. The magazine usually has between 80 and 100 pages. About half of them are advertisements, for the biggest global luxury brands and for more singular commodities, such as art and property. The other pages are a gleaming parade of articles – not always easy to tell from the ads – about the most expensive fashion, travel, food, interior design and other consumer goods imaginable.

A long recent feature suggests “a sumptuous gastronomic tour of Spain by private jet”, three days long “from £6,995 per person”. An article on home furnishings with an aeronautical theme included a

decommissioned Sky Flash air-to-air missile, polished to a perfect sheen and mounted on a pedestal: “This could be sitting in your drawing room for a mere £29,500.” To read *How to Spend It*, depending on your income level and attitude to extravagance, is to enter a world that is seductive or ridiculous, a thrill or utterly enraging – and possibly all at the same time. According to the FT, 61% of *How to Spend It* readers are men, and the average age of this readership is 47. The same trophy products for the middle-aged alpha male appear again and again: vintage motorbikes, fast cars, private aircraft. Alongside these paeans to old-fashioned masculine luxury are pages and pages of ads for the most delicate and rarefied women’s jewellery. Most consumer journalism draws readers to products within, or just beyond, their financial reach. But *How to Spend It* “is not aspirational”, says Qing Wang, a professor at Warwick Business School and an authority on the consumption habits of the very wealthy. “It’s for those who’ve made it, for the exclusive enjoyment of them and their kind.” Not all *How to Spend It* readers are rich, but a lot of them are. According to the FT, “Half have or would consider paying \$14,000+ on a high-end watch” and “1 in 5 have or would consider using the service of a private jet”. Wang says: “*How to Spend It* can be sophisticated, but in the end, it’s all about status. Many of its readers are bankers, or businessmen from China and India – quite blunt people. They like the magazine’s directness. They pick it up thinking: ‘Just tell me what I need.’” A former FT journalist says: “Some readers take *How to Spend It* into a shop, point at a picture in it, and say: ‘I want that watch.’ It’s the catalogue for rich people.” The consumption habits of this elite matter increasingly to all of

us; the spending decisions of the rich are now economic and social forces of enormous power. “As the rich have been getting progressively richer,” an analysis by the US investment bank Citigroup found, they have been “saving less and spending more”. Unlike other consumers, the report went on, the rich find many products, such as designer clothes, more desirable the more expensive they become. The countries where the rich congregate, such as Britain, Canada and the US, have been changed radically by this frenzy of spending: they have become “Plutonomies – economies powered by the wealthy”. Plutonomies have ever more dominant and sterile cities, spiralling property prices, worsening social segregation and increasingly polluted environments – as the 1% travel more and more, and take up more and more space, their luxury towers literally casting everyone else into shadow. Above all, the increasingly separate world of the rich consumer sends a divisive message: if you have enough money, you can escape. It is one of the most prestigious and important newspapers in the world. Its readers usually radiate confidence. But its pages also inadvertently reveal that the rich have anxieties. Unlike in many other luxury magazines, almost everything covered is extremely expensive. Most products have the same kind of unblemished finish, both showy and perfectionist. Everything is under control. Only rarely and awkwardly are references made to relevant but unsettling events outside this carefully curated world. “Post-protracted recession, repression and years of general national malaise, Zimbabwe,” an article announced in May, “is now one of the most exciting places to safari on the African continent.” As one of the magazine’s staff puts it, “It gives readers permission to be rich and not feel guilty.” Yet

while it reinforces the rich's sense of entitlement – their sense that the world is their playground – *How to Spend It* also serves to remind them that they frequently lack taste. With striking bluntness, the magazine's name says as much. “Compared with the truly fashionable, who are often less well-off, and have acquired their edge by having to choose between products,” says a prominent British writer on class and style, “seriously rich people are often ever so slightly behind the beat.”

In an age of mass luxury – of designer shops proliferating in seemingly every major city – how can the rich stand out? *How to Spend It* often advises its readers to buy limited-edition or hand-made goods. But sometimes the discernment required seems never-ending. In an issue in May, the British designer of upper-class menswear Jeremy Hackett recommended a London shoemaker, George Cleverley, whose bespoke products cost “from £3,600”. “My current order,” said Hackett, “is for some tan and white Oxfords ... made from a batch of reindeer leather salvaged from the *Metta Catharina* – a 53-ton brigantine that sank off the southern coast of England during a voyage from St Petersburg to Genoa in 1786. The leather was tanned in St Petersburg by artisans whose techniques were secret for centuries ...” Hackett might have been joking – except that *How to Spend It* doesn't do jokes. There are rarely any people in its formal, crystalline photos of hotels and homes, as if readers need to have these places to themselves, as sanctuaries from the rest of the world. “*How to Spend It* sells a kind of tranquility – a promise that luxurious products and experiences will have a restorative effect,” Qing Wang says. “That's what many of its readers need.” Unlike the wealthy of previous ages, most of today's rich have made their own money. Many are

workaholics. “They are time-poor. They want instant satisfaction – and they also want relaxation,” adds Wang. It has been the lucrative but strenuous task of How to Spend It to fulfil these contradictory needs. One of its most fascinating but brazen regular items is a close look at the consumer desires of an individual, titled “the Aesthete”. As its name suggests, the page is meant to be more about taste than price. But rich people and costly products predominate. Like many of the rich themselves, the pages of How to Spend It have spent the turbulent decade since the financial crisis in a state of comfortable equilibrium, at the very least. The staff are mostly experienced journalists, men and women of varying ages, who work long days according to a weekly production rhythm that has been strictly maintained for years. A few are embarrassed by some of the material they process. “A 3,000-word piece on perfume – who’s reading that?” one asks rhetorically. But in the office they keep such thoughts to themselves. “Mind your own business, and do what you’re told – that’s the culture,” says another. Serving the rich is usually not for the faint-hearted. The industries that cater to their elaborate tastes are often very exacting and top-down: the rich expect the best, and are not squeamish about hierarchies. Luxury magazines are no exception. In an age of fragmenting media, there is something old-fashioned about a single publication telling the rich how to live. Over the past dozen years, other newspapers have tried to copy the How to Spend It formula. Rival magazines and websites such as the Times’s Luxx and the Daily Telegraph’s Luxury have less clever names, but in content and format are not always easy to tell apart from the original. For now, there is enough advertising to go round: luxury

magazines, being highly tactile, useful badges of status, and free of online clutter, are one of the few remaining boom areas in print media.

Meanwhile, a different approach to luxury journalism has been evolving – one that suggests that the good life requires eclectic experiences and products, not just pricey ones. In these magazines, upmarket consumer recommendations sit alongside articles about Asian street food and Scandinavian public transport, and about politics and social trends. Some analysts think this mix is better attuned to the tastes of prosperous millennials – the 1% of the future. A 30-year-old's idea of luxury is very different to a 50-year-old's. A regular survey of the luxury goods market concluded that a “millennial state of mind” was “changing purchasing habits”, forcing companies to focus more on products that were simultaneously upmarket and downmarket, such as deliberately trashy-looking designer trainers. How to Spend It does have articles about trainers, but it prefers to write about shoes that send more reliable signals about wealth. Inside the boutiques, the rest of the world recedes. There are rarely many other customers; just staff waiting. In recent years the rich have begun to “spend significantly less on conspicuous consumption and more on education, healthcare, pensions, and personal insurance. They are buying the security and long-term elite status that are more valuable, in perilous times, than escape or pleasure. Top income groups are not just living good lives in the present, but making sure this standard is maintained into the future and for their family members – ensuring that another generation will have more wealth than they know what to do with. Which is good news if you're in the business of telling them how to spend it. *Adapted from The Guardian*

Exercise III.

Fill in the gaps.

- 1) He grew up a have-not in an oil-rich country that prized _____ consumption.
- 2) High spirits and energy replaced the gloom and angst of previous _____ years.
- 3) For your children, divorce is an _____ issue they have had no preparation for.
- 4) It suggests that, well, bad things may happen, which they soon do, in _____.
- 5) I'm a non-smoker, but allow the _____ of chocolate once or twice a month.
- 6) The graphics reach a level of beauty rarely seen outside of _____ gaming PCs.
- 7) The _____ and self-assurance of Morgan's e-mail messages didn't surprise me.
- 8) Being served by a sushi master is the ultimate _____ food experience in Japan.
- 9) Patents and other intellectual property are often today's most _____ assets.
- 10) Single women living with their parents are among the most _____ consumers.

Exercise IV.

Make up sentences of your own with the following word combinations: to protract, to recede, to spell out, in perilous times, to tell apart from, free of

online clutter, in print media, stand out, hand-made goods, to fulfill contradictory needs

Exercise V.

Match the words to the definitions in the column on the right:

lucrative	the rescue of a wrecked or disabled ship or its cargo from loss at sea
austere	producing a great deal of profit
immense	a quantity or consignment of goods produced at one time
tether	(of an appearance or action) Suggest; be evidence of
chauffeur	the outside limit of an object, area, or surface; a place or part farthest away from the center of something
bluntness	severe or strict in manner, attitude, or appearance
edge	extremely large or great, esp. in scale or degree
bespoke	a rope or chain with which an animal is tied to restrict its movement
batch	a person employed to drive a private or rented automobile
salvage	the quality of being direct and outspoken

Exercise VI.

Identify the part of speech the words belong to.

Ostentatious, pivotal, profusion, judiciously, commodity, sumptuous, decommission, pedestal, extravagance, segregation.

Exercise VII.

Match the words to make word combinations:

country	maker
quantitative	income
good	crisis
coffee	easing
national	house
financial	living
central	luxury
relative	heating
shopping	list

Exercise VIII.

Summarize the article “How to Spend It: the shopping list for the 1%”.

3. When Malls Saved the Suburbs From Despair

Exercise I.

Say what Russian words help to guess the meaning of the following words: class, global, private, tragic, commerce, capitalism, apocalyptic, ruins, specific, separated

Exercise II.

Make sure you know the following words and word combinations. screwed, to sustain, affluent, linchpin, infiltration, to refine, quandary, to overhaul, bespoke, to designate.

When Malls Saved the Suburbs From Despair

Like it or not, the middle class became global citizens through consumerism—and they did so at the mall.

“Okay, we’ll see you in two-and-a-half hours,” the clerk tells me, taking the iPhone from my hand. I’m at the Apple Store, availing myself of a cheap smartphone battery replacement, an offer the company made after taking heat for deliberately slowing down devices. A test run by a young woman typing at a feverish, unnatural pace on an iPad confirms that mine desperately needed the swap. As she typed, I panicked. What will I do in the mall for so long, and without a phone? How far the mall has fallen that I rack my brain for something to do here. The Apple Store captures everything I don’t like about today’s mall. A trip here is never easy—the place is packed and chaotic, even on weekdays. It runs by its own private logic, cashier and help desks replaced by roving youths in seasonally changing, colored T-shirts holding iPads, directing traffic. The

Apple Store is one of the only reasons I go to the mall anymore. Usually I get in and out as fast as I can. But today I'm stuck. When all is said and done, it turns out to be a strange relief. Contrary to popular opinion, malls are great, and they always were.

The tragic story of the American shopping mall is well-known by now. Precious few have been erected in the last decade, but plenty have been shuttered, and as many as half of the remaining could close within the next 10 years. The reasons are many, including economic downturn and the rise of internet commerce. Americans loved malls, then they loved to hate them. Good riddance to these cathedrals to capitalism, many think, as they pore over apocalyptic photos of abandoned malls in ruins. Of course the mall is for shopping. But more specifically, it gives shopping a specific place. The mall separated commerce into its own, private lair. The mall provided a space where people could amble in thick proximity. For one part, malls put products in places where they otherwise might not have been accessible. Malls offered local access to national or international products and trends that might otherwise have been unavailable.

Without my iPhone to distract me, I inspect the Mall. I'm not going to buy any of the goods at the boutiques. But here they are anyway, occupying physical space alongside my actual body, not just symbolic space online or on television. Strange as it may sound, the mall also allowed people to leave commercialism behind, for a time at least, after they were through with it. Consumerism might have run rampant, but it had a safe haven in which to do so. Malls are prisons for commerce, but at least the commerce stays inside them. Like a casino is designed to contain and focus risk, so a mall is designed to do so for expenditure. Eventually,

your own humanity forces you to leave, in fact. Forty-five minutes into my iPhone wait, the familiar dizziness of mall-going sets in. “Mall head,” I’ve always called it. The mall also discretizes commerce, breaking it up into segments. Whether purchases are necessary or not isn’t the point. Rather, the mall classifies human commerce and, thanks to capitalism, thereby human life. Look around in a mall. It’s a chart of market segmentation. Pandora for bracelet charms. Payless for discount shoes. Sephora for cosmetics. Victoria’s Secret for underthings, and American Eagle for what goes atop. These are the diverse apartment blocks of commerce. Dense but separated, they contrast with the slurry of online shopping at Amazon.com or Walmart.com. Online, you don’t ever really know what something is, or what size might be in stock, or whether the item displayed even matches the one you will receive. Alas, it’s become harder to use the mall this way. Almost every shop boasts a sale: 20, or 40, or even 60 percent off. It’s not clear if this is a function of the changing fashion season or of the tenuous mall economy. No matter the case, the message is the same: Nothing here is worth the price on the tag. Comparison shopping with smartphones has become so easy, and pricing and availability seem so arbitrary, it’s easy to feel like you’re getting screwed all the time. Not to mention the incessant badgering of online shopping, with emails from every vendor with whom you’ve ever transacted arriving daily. Worse, capitalism has shifted commercial activity from the material to the symbolic. People still buy plenty of goods, of course, from books to clothing to makeup. But thanks to the internet, they also trade in ideas, signs, and symbols with increasing frequency and importance. They hope to buy and sell attention. The scene

becomes an Instagram post. The shopping trip itself becomes a YouTube haul video.

The mall itself is grappling with the matter. Madewell, a women's clothing shop, has posted a café-style folding sign in its entrance. "Hot new fits = hot new fitting-room selfies," it reads. When I open my laptop at the Starbucks, it joins the nearby Abercrombie and Fitch free Wi-Fi, and a terms-of-use screen appears: in big, bold letters, "because we understand the need to 'gram in the fitting room." Buying is now optional—it's sufficient to simulate a purchase in order to create an image of its concept, for exchange in the marketplace of ideas. And yet, the concept is not all that different from the original vision for the shopping mall. A place to gather, a place to shop, a place to relax, a place to live. The mall was and remains horrible in some ways, but useful and even magical in others.

The Constant Consumer

Amazon's mission is to make customer identity more primary than citizenship

Every day, the imperative to perceive oneself as a customer grows across a range of experiences and institutions: in the shopping centers and business improvement districts that have replaced public squares and parks; in the schools and hospitals, where offerings are tailored not to general social welfare but to individual consumer choice and what each can afford; and in the gym, where exercise, nutrition, and other forms of wellness have been redefined as personal lifestyle choices. If the customer is always right, then you're never wrong when you're consuming. No contemporary company has offered the bargain more broadly and aggressively than Amazon. In a previous era, being at home meant you

probably weren't shopping. Recent technologies have enabled the role of customer to be fused with the newer role of user, who inhabits an entire system rather than a specific transaction. Imagine an avid Amazon customer's typical day living with a near future iteration of the platform: He wakes up and speaks his first words of the morning to his Amazon Echo in the kitchen, asking Alexa to order toothpaste after noticing he was running low. Upon checking his email, he gives Alexa a few more instructions, adding social engagements and reminders to his calendar, checking the weather, and finally opening the garage door once he's ready to leave for work. At the office throughout the day, idle shopping fills his distracted moments. He browses books, clothing, and even furniture, placing orders within seconds, many of which automatically appear in his shopping cart based on patterns from his activity history (he even knows that some of what he buys will be waiting at home tonight). During the evening commute another Alexa-enabled device in his car prompts him to send his sister a birthday card, an action he asks Alexa to do for him. He stops by Whole Foods to pick up groceries — as an Amazon Prime member, it's always the most cost-effective option in his neighborhood. He arrives home to find a variety of Amazon packages stacked neatly on the living room coffee table, delivered throughout the day by part-time contractors who let themselves into the house via the smart lock on the front door. The soundtrack to his entire day is provided by Amazon Music, in which his Prime membership has automatically enrolled him for a small monthly fee. Few parts of this hypothetical day, which is already within the realm of possibility, remain untouched by Amazon's user experience.

Amazon, as much as any single company, is transforming the environments in which we live and embedding itself within the fabric of daily existence. Beyond individual experience, those changes also manifest themselves in the physical environment. Many physical retail stores have been rendered obsolete as Amazon and other online retailers started undercutting them on price and offering a wider selection. (Bookstores experienced this first but it eventually spread to almost every form of retail.) As Amazon and food delivery apps eliminate some of the most common reasons to leave one's house one wonders what sort of neighborhood life will be sustainable in affluent urban areas. In light of Amazon's all-encompassing ambitions, the strategy behind several of the company's most important product initiatives — Alexa, Amazon Prime, physical retail stores (including Amazon Go and Whole Foods), and Amazon Key— becomes clearer. These products seek to redefine what being a customer means by immersing us more completely within the Amazon universe. Formerly, being a customer was a role one assumed upon physically entering a store or ordering something from a company. Amazon promises to create a newer type of environment, a hybrid of the digital and the physical, that lets us permanently inhabit that role: the world as Everything Store, which we're always inside. Consumers' access to product reviews, price comparisons, and shipping timelines has created a space where they and not retailers call the shots. To succeed in this landscape, Bezos suggests, companies must respond to their customers' ever-increasing power by treating them like the linchpins that they are;

whoever does this best will rightfully dominate its market. What could be wrong with the company being focused on our needs?

But that is the fundamental problem: Amazon's constant praise of the customer implies we are all already customers and nothing more — that we should understand “consumer” as our core identity. It is part of its intent to disarm us, to invite us to enter its universe of deals and recommendations and to internalize the status of permanent customer — and specifically, Amazon's customer. We dream of being creators, friends, neighbors, or citizens, but rarely of being customers. The customer role used to be temporary and specific — buying something from a seller — and not an aspirational identity. What happened? “The customer is always right.” Part of being “right” was being offered choices to be right about. Whereas Henry Ford once famously joked that customers could buy a car in any color they wanted, as long as it was black, such narrow standardization proved a less viable course as mass markets became saturated. Rather than sell products on their basic utility, advertising began to orient itself toward identity, selling the idea that individuals could reveal their unique selves through purchases. Edward Bernays, a nephew of Sigmund Freud, pioneered this approach in the 1920s, purporting to link goods to individuals' inner desires. By the logic of identity-driven advertising, wanting more things corresponded to greater personal depth. The transition toward consumerism across so many domains exemplifies a phenomenon that writer Sarah Perry calls a tiling structure, a system that “tiles the world with copies of itself.” Tiling structures flourish because they solve certain problems well enough that they become more or less mandatory, and block alternate solutions. The best example of this

transition may be the neighborhood itself. Living in a city, for many, resembles a pure customer experience, in which buying or renting an apartment or home determines one's relationship with a place more than membership in any kind of community. Residents commonly don't know their neighbors and oppose local developments that serve a greater good at their own expense. Real estate agents even appeal to individual identity to brand various locations and increase their appeal. As our lives are increasingly oriented toward a global system of consumerism mediated by massive, scale-seeking platforms rather than smaller, more localized groupings. It's harder to remember what we've lost. We are less and less equipped to imagine ourselves as anything but customers or users within those systems, we adopt the desires that companies like Amazon can best satisfy: convenience, choice, and frictionless consumption. These developments may be replacing another consumer system that wasn't necessarily worth preserving itself, but beyond those visible changes, we face a new risk: becoming users offline, in the physical world. The more Amazon can control our experience of that environment, the less we'll care what's outside the system it creates. Amazon's true objective, it seems, is a full infiltration of the world rather than ongoing refinement of a walled garden confined to the internet. To permanent customers, further gains in convenience, choice, price, and delivery speed are pure benefits. If life is meant to be a series of consumer experiences, they might as well happen as seamlessly as possible. Years ago, Amazon's "1-click" purchasing option seemed to remove all remaining friction from online shopping, but there was still a long way to go. The company's more recent initiatives

respond to deeper psychological friction that might prevent us from purchasing a product using Amazon's platform. A single-click purchase still requires opening Amazon's website or app, but people spend plenty of time away from their device screens. The Amazon Echo and other Alexa-enabled devices, placed throughout our homes like furniture, connect more directly to our supposedly subconscious impulses by letting us simply speak our desires and translating those words into Amazon orders. We might change our minds by the time we get around to opening an app, after all. More than removing friction from its user experience, Amazon wants to be our environment. In realizing such a totalizing vision, Amazon faces an obstacle: If being a customer feels so great, as the past century has trained us, what happens when the consumer experience encompasses us so completely that we forget we're customers at all? The minor friction of 1-click ordering pleasantly reminds us how easy it is to be one of Amazon's empowered customers, the object of the company's obsession. Will we remember that feeling if "smart" devices can effectively read our minds and our desires subtly manifest themselves in our homes? This quandary returns us to the definition of user. A user isn't just an evolved customer but a qualitative transformation of that role: one who occupies a system and creates value for the system's owner by merely being there. Those platforms, for all their seeming omnipresence, haven't figured out how to expand beyond their digital containers. This is Amazon's ambitious vision: The world is its platform, and instead of being customers, we will just become users whether we are looking at screens or not.

Shops Aren't for Shopping Anymore

Retail stores used to be places to buy things. Smartphones changed that, and retailers are struggling to invent new reasons, and methods, for shopping.

Retail stores have become a host for experiences first, and buying things second—if at all. In retail spaces, consumer attention has shifted away from goods on shelves, and toward smartphones and apps instead. In response, retailers face a growing need for elevated in-store experiences that seamlessly mesh with online platforms and web stores. The resulting retail model looks a lot less like previous notions of conspicuous consumption and a lot more like visual culture. Customers no longer shop till they drop. Instead they cultivate virtual feeds and inspiration boards. Thanks to smartphones, apps, and social-media platforms like Instagram, a broader public has developed a visual vocabulary and aesthetic sensibility. Retailers, particularly in fashion, have overhauled marketing and branding strategies to promote their individual labels among broader audiences. But they also face a new challenge: how to adapt retail design to sell pictures on social-media profiles as much as, or more than, they sell garments for real bodies. To bridge the gap between virtual and physical retail operations, behind-the-scenes organizational shifts have occurred. The focus is more on marketing than goods, telling customers which brands and products are worthy of hashtags, geotags, and reposts. Shopworkers now have titles like brand specialist, and buyers have given way to 'influencers' who remix shopping into a new kind of job. More importantly, consumer priorities have changed drastically in regards to material purchases. Buying things has become less important than pursuing experiences. That poses a problem for retailers, who are in the

business of selling consumer goods. Brands like Warby Parker, a web-based eyewear retailer with stores in major U.S. cities, have redefined retail partly by changing the purpose of stores. By keeping only samples on their sales floor, Warby Parker reduced their back-of-house stockroom square footage while simultaneously grooming customers to prefer an online retail experience. Customers can bring a prescription to the store and play with the various glasses on display, or they can upload a head shot and try on glasses virtually. Browsing in person and ordering online later is nothing new, but Warby Parker deliberately decoupled the retail experience from purchase completely. That turns the retail showroom into a place to experience the products' style without guilt or pressure from salespeople. Shifting consumer preferences may account for part of this shift from material possessions to bespoke experiences. But other forces are also at work, including the critical mass of unlimited data and upgrade cycles of cellular devices, which permit everyone to partake in snapping, posting, liking, and sharing physical experiences in virtual space. The result is a much more nuanced consumer, who expects more from brands and products, whether they actually purchase anything or simply (re)post it instead. It's hard to know if that shift is for the better or worse, in the long run. All the experiences you could ever imagine are right there, in the palm of your hand.

The Unbearable Awkwardness of Automation

Automation has changed how people shop, park, fly, and more. In the process, it has reshaped the architecture that contains those experiences—making them more efficient, often, but also putting machines above people.

Enter a bank branch today—if you visit one at all—and chances are you’ll be greeted by a waiting row of ATMs (automatic teller machines). To find an actual human, you’d have to travel deeper into the building, often through another set of doors. Over the course of a typical bank transaction, customers are unlikely to deal with a person at all. And at banks in more remote areas, complicated financial questions that necessitate human contact are often handled remotely. Instead of speaking with someone on-site, the customer uses an ITM—or Interactive Teller Machine, essentially a video conferencing system—to reach an employee at a centralized location. The buildings that house banks are no longer sites for person-to-person interaction. They are places where people come to transact with machines. “I remember going to a bank and talking to a person,” says architect Greg Lynn. “But now everything happens with a portal on the side of a wall. It’s all about speed of transaction and efficiency.” Banking is not the only industry where this is taking place. Arrive at a hotel and you might find yourself swiping a credit card to check yourself in. Park your car at a lot and chances are you’ll feed your money (or more likely, your bank card) into a machine that will supply you with another card that will allow you to exit the lot. All of this is changing the nature of the structures that people inhabit. “Architecture is losing places where you interact with people,” Lynn tells me. “There is so much desire for a rapid transaction and rapid movement and buildings are changing to accommodate that as well.” Mariana Pestana, an architect, describes this phenomenon as “post-human architecture”—one in which structures are aimed at generating machine interactions rather than in

bringing human beings together. Sometimes, this can result in an awkward dance between the human world and the automated one. At many supermarkets and stores, for example, space once allotted to a checkout station has been replaced by a row of self-checkout systems. The cashier, who previously had a spot behind the counter, now stands at the end of this row, ready to assist when customers get confused or if the machines fail. Self-checkout hasn't completely eliminated jobs, but it has transformed them. Automation design prioritizes machines over humans. That impacts customers who have to deal with the machines, but it impacts the workers even more. At Target, a cashier overseeing a row of self-checkouts has a job that is now less at interacting with customers than in tending to the machines the customers operate. Having humans toil alongside machines isn't new. But the current wave of automation is affecting spaces that were once specifically designed around human interaction: the front desk at the medical office or the hotel check-in counter, for example. At Yotel, an outpost of the affordable hotel chain in New York City, guests are greeted not by hotel staff, but by a row of check-in kiosks, as well as a luggage storage robot called the "Yobot." Yotel is easy to navigate because it's small. But at larger hotels and office towers, automation can leave a building visitor feeling slightly adrift. "Many buildings no longer have a receptionist, which is fine if you work there and you know where you are going, but it's extremely disorienting to everyone else. There's a sense that things are losing their focus. That's what you are seeing happen now in bigger public spaces: the airport check-in or the supermarket. You lose your focus." But what does it mean to design a structure that focuses

human attention on technology instead of other humans? It's possible to move through a crowded airport without interacting with anybody. Even at eateries, you now sit down at a table and there's an iPad and you punch in your order and someone will bring it to you. We have to remember the value of those little encounters as we automate them all.

Adapted from The Atlantic and Real Life Magazine

Exercise III.

Fill in the gaps.

- 1) Who's going to sit there and _____ their _____ over the minuscule differences between the HTC Surround and Samsung Focus?
- 2) Why, this just might be the beginning of the end for Instagram, and good _____.
- 3) Considerations have to include security, privacy and _____ to royal palaces.
- 4) Most expect to authorise more IT _____, most expect their revenue to grow.
- 5) Birth control and looser standards on co-habitation _____ marriage unnecessary.
- 6) It may be tough at first but you _____ and make the decisions yourself.
- 7) We were expected to appreciate what we'd been given and make _____ use of it.
- 8) Microsoft released a complete _____ to its mobile operating system last year.
- 9) You may even be able to _____ which online store can accept the card number.

10) The second _____ is to use existing technology in imaginative new ways.

Exercise IV.

Make up sentences of your own with the following word combinations: to rack the brain, to call the shots, to punch in, to avail, to swap, to badger, to fuse, to render, to saturate, to purport

Exercise V.

Match the words to the definitions in the column on the right:

roving	no longer produced or used; out of date
amble	having or showing a keen interest in or enthusiasm for something
proximity	travel constantly without a fixed destination; wander
rampant	a walk at a slow, relaxed pace, esp. for pleasure
slurry	nearness in space, time, or relationship
tenuous	(esp. of something unwelcome or unpleasant) Flourishing or spreading unchecked
arbitrary	the action of spending funds
expenditure	a semiliquid mixture, typically of fine particles of manure, cement, or coal suspended in water
avid	very weak or slight
obsolete	based on random choice or personal whim, rather than any reason or system

Exercise VI.

Identify the part of speech the words belong to.

riddance, omnipresence, conspicuous, replacement, unnatural, chaotic,
private, logic, popular, opinion

Exercise VII.

Match the words to make word combinations:

person-to-person	card
money	battery
remote	saver
hotel	interaction
bank	areas
credit	transaction
smartphone	class
middle	mall
shopping	staff

Exercise VIII.

Summarize the article “ When Malls Saved the Suburbs From Despair”

4. Have Smartphones Destroyed a Generation?

Exercise I.

Say what Russian words help to guess the meaning of the following words: crisis, shows, doctoral, psychology, characteristics, trends, dramatic, proportion, percent, radically

Exercise II.

Make sure you know the following words and word combinations. Brink, hand-wringing, studios, to levy, affirmation, endeavor, prevalence, to exacerbate, to congregate

Have Smartphones Destroyed a Generation?

More comfortable online than out partying, post-Millennials are safer, physically, than adolescents have ever been. But they're on the brink of a mental-health crisis.

One day last summer I called Athena, a 13-year-old who lives in Houston, Texas. She answered her phone—she's had an iPhone since she was 11—sounding as if she'd just woken up. We chatted about her favorite songs and TV shows, and I asked her what she likes to do with her friends. "We go to the mall," she said. Those mall trips are infrequent—about once a month. More often, Athena and her friends spend time together on their phones. They talk on Snapchat, the smartphone app that allows users to send pictures and videos that quickly disappear. Sometimes they save screenshots of particularly ridiculous pictures of friends. "It's good blackmail," Athena said. She told me she'd spent most of the summer hanging out alone in her room with her phone. That's just the way her

generation is, she said. “We didn’t have a choice to know any life without iPads or iPhones. I think we like our phones more than we like actual people.”

I’ve been researching generational differences for 25 years, starting when I was a 22-year-old doctoral student in psychology. Typically, the characteristics that come to define a generation appear gradually, and along a continuum. Beliefs and behaviors that were already rising simply continue to do so. I had grown accustomed to line graphs of trends that looked like modest hills and valleys. Then I began studying Athena’s generation. Around 2012, I noticed abrupt shifts in teen behaviors and emotional states. The gentle slopes of the line graphs became steep mountains and sheer cliffs, and many of the distinctive characteristics of the Millennial generation began to disappear. In all my analyses of generational data—some reaching back to the 1930s—I had never seen anything like it. At first I presumed these might be blips, but the trends persisted, across several years and a series of national surveys. The changes weren’t just in degree, but in kind. The biggest difference between the Millennials and their predecessors was in how they viewed the world; teens today differ from the Millennials not just in their views but in how they spend their time. The experiences they have every day are radically different from those of the generation that came of age just a few years before them. What happened in 2012 to cause such dramatic shifts in behavior? It was after the Great Recession, which officially lasted from 2007 to 2009 and had a starker effect on Millennials trying to find a place in a sputtering economy. But it was exactly the moment when the

proportion of Americans who owned a smartphone surpassed 50 percent. The more I pored over yearly surveys of teen attitudes and behaviors, and the more I talked with young people like Athena, the clearer it became that theirs is a generation shaped by the smartphone and by the concomitant rise of social media. I call them iGen. Members of this generation are growing up with smartphones, have an Instagram account before they start high school, and do not remember a time before the internet. The Millennials grew up with the web as well, but it wasn't ever-present in their lives, at hand at all times, day and night. iGen's oldest members were early adolescents when the iPhone was introduced, in 2007, and high-school students when the iPad entered the scene, in 2010. A 2017 survey of more than 5,000 American teens found that three out of four owned an iPhone. The advent of the smartphone and its cousin the tablet was followed quickly by hand-wringing about the deleterious effects of "screen time." But the impact of these devices has not been fully appreciated, and goes far beyond the usual concerns about curtailed attention spans. The arrival of the smartphone has radically changed every aspect of teenagers' lives, from the nature of their social interactions to their mental health. These changes have affected young people in every corner of the nation. The trends appear among teens poor and rich; of every ethnic background; in cities, suburbs, and small towns.

The aim of generational study, however, is not to succumb to nostalgia for the way things used to be; it's to understand how they are now. Some generational changes are positive, some are negative, and many are both. More comfortable in their bedrooms than in a car or at a party, today's teens are physically safer than teens have ever been. They're

less likely to get into a car accident and, having less of a taste for alcohol than their predecessors. Psychologically, however, they are more vulnerable than Millennials were: Rates of teen depression and suicide have skyrocketed since 2011. It's not an exaggeration to describe iGen as being on the brink of the worst mental-health crisis in decades. Much of this deterioration can be traced to their phones. Even when a seismic event—a war, a technological leap—plays an outsize role in shaping a group of young people, no single factor ever defines a generation. Parenting styles continue to change, as do school curricula and culture, and these things matter. But the rise of the smartphone and social media has caused an earthquake of a magnitude we've not seen in a very long time, if ever. There is compelling evidence that the devices we've placed in young people's hands are having profound effects on their lives—and making them seriously unhappy. The allure of independence, so powerful to previous generations, holds less sway over today's teens, who are less likely to leave the house without their parents. The shift is stunning: 12th-graders in 2017 were going out less often than eighth-graders did as recently as 2009. Today's teens are also less likely to date. The initial stage of courtship, which Gen Xers called “liking” (as in “Ooh, he likes you!”), kids now call “talking”—an ironic choice for a generation that prefers texting to actual conversation. After two teens have “talked” for a while, they might start dating. But only about 56 percent of high-school seniors in 2017 went out on dates; for Gen Xers, the number was about 85 percent. Even driving — a symbol of adolescent freedom — has lost its appeal for today's teens. “My parents drove me everywhere and never

complained, so I always had rides,” a 21-year-old student in San Diego told me. “I didn’t get my license until my mom told me I had to because she could not keep driving me to school.” She finally got her license six months after her 18th birthday. In conversation after conversation, teens described getting their license as something to be nagged into by their parents—a notion that would have been unthinkable to previous generations.

Independence isn’t free—you need some money in your pocket to pay for gas, or for that bottle of beer. In earlier eras, kids worked in great numbers, eager to finance their freedom or prodded by their parents to learn the value of a dollar. But iGen teens aren’t working as much. Of course, putting off the responsibilities of adulthood is not an iGen innovation. Gen Xers were the first to postpone the traditional markers of adulthood. Gen X managed to stretch adolescence beyond all previous limits: Its members started becoming adults earlier and finished becoming adults later. Beginning with Millennials and continuing with iGen, adolescence is contracting again—but only because its onset is being delayed. Across a range of behaviors—drinking, dating, spending time unsupervised—18-year-olds now act more like 15-year-olds used to, and 15-year-olds more like 13-year-olds. Childhood now stretches well into high school. Why are today’s teens waiting longer to take on both the responsibilities and the pleasures of adulthood? Shifts in the economy, and parenting, certainly play a role. In an information economy that rewards higher education more than early work history, parents may be inclined to encourage their kids to stay home and study rather than to get a part-time job. Teens, in turn, seem to be content with this homebody arrangement—

not because they're so studious, but because their social life is lived on their phone. Combined with the decline in working for pay, this means iGen teens have more leisure time than Gen X teens did, not less. So what are they doing with all that time? They are on their phone, in their room, alone and often distressed. One of the ironies of iGen life is that despite spending far more time under the same roof as their parents, today's teens can hardly be said to be closer to their mothers and fathers than their predecessors were. "I've seen my friends with their families—they don't talk to them," Athena told me. "They just say 'Okay, okay, whatever' while they're on their phones. They don't pay attention to their family." Like her peers, Athena is an expert at tuning out her parents so she can focus on her phone. She spent much of her summer keeping up with friends, but nearly all of it was over text or Snapchat. "I've been on my phone more than I've been with actual people," she said. In this, too, she is typical. The number of teens who get together with their friends nearly every day dropped by more than 40 percent from 2000 to 2017; the decline has been especially steep recently. It's not only a matter of fewer kids partying; fewer kids are spending time simply hanging out. The basketball court or the town pool—they've all been replaced by virtual spaces accessed through apps and the web. You might expect that teens spend so much time in these new spaces because it makes them happy, but most data suggest that it does not. The Monitoring the Future survey asks teens how happy they are and also how much of their leisure time they spend on various activities, including nonscreen activities such as in-person social interaction and exercise, and, in recent years, screen activities such as

using social media, texting, and browsing the web. The results could not be clearer: Teens who spend more time than average on screen activities are more likely to be unhappy. There's not a single exception. All screen activities are linked to less happiness, and all nonscreen activities are linked to more happiness. If you were going to give advice for a happy adolescence based on this survey, it would be straightforward: Put down the phone, turn off the laptop, and do something—anything—that does not involve a screen. What's the connection between smartphones and the apparent psychological distress this generation is experiencing? For all their power to link kids day and night, social media also exacerbate the age-old teen concern about being left out. Today's teens may go to fewer parties and spend less time together in person, but when they do congregate, they document their hangouts relentlessly—on Snapchat, Instagram, Facebook. Those not invited to come along are keenly aware of it. Accordingly, the number of teens who feel left out has reached all-time highs across age groups. This trend has been especially steep among girls. Girls use social media more often, giving them additional opportunities to feel excluded and lonely when they see their friends or classmates getting together without them. Social media levy a psychic tax on the teen doing the posting as well, as she anxiously awaits the affirmation of comments and likes. When Athena posts pictures to Instagram, she told me, "I'm nervous about what people think and are going to say. It sometimes bugs me when I don't get a certain amount of likes on a picture." These more dire consequences for teenage girls could also be rooted in the fact that they're more likely to experience cyberbullying. Boys tend to bully one

another physically, while girls are more likely to do so by undermining a victim's social status or relationships. Social media give middle- and high-school girls a platform on which to carry out the style of aggression they favor, excluding other girls around the clock. Social-media companies are of course aware of these problems, and to one degree or another have endeavored to prevent cyberbullying.

In 2014, a 13-year-old girl in North Texas woke to the smell of something burning. Her phone had overheated. National news picked up the story, stoking readers' fears that their cellphone might spontaneously combust. To me, however, the flaming cellphone wasn't the only surprising aspect of the story. Why, I wondered, would anyone sleep with her phone beside her in bed? It's not as though you can surf the web while you're sleeping. Curious, I asked my undergraduate students at San Diego State University what they do with their phone while they sleep. Their answers were a profile in obsession. Nearly all slept with their phone, putting it under their pillow or at the very least within arm's reach of the bed. They checked social media right before they went to sleep, and reached for their phone as soon as they woke up in the morning (they had to—all of them used it as their alarm clock). Their phone was the last thing they saw before they went to sleep and the first thing they saw when they woke up. If they woke in the middle of the night, they often ended up looking at their phone. Some used the language of addiction. "I know I shouldn't, but I just can't help it," one said about looking at her phone while in bed. Others saw their phone as an extension of their body—or even like a lover: "Having my phone closer to me while I'm sleeping is a comfort." It may be a comfort, but the smartphone is cutting into teens'

sleep: Many now sleep less than seven hours most nights. Sleep experts say that teens should get about nine hours of sleep a night; a teen who is getting less than seven hours a night is significantly sleep deprived. Electronic devices and social media seem to have an especially strong ability to disrupt sleep. Teens who read books and magazines more often than the average are actually slightly less likely to be sleep deprived—either reading lulls them to sleep, or they can put the book down at bedtime. Again, it's difficult to trace the precise paths of causation. Smartphones could be causing lack of sleep, which leads to depression, or the phones could be causing depression, which leads to lack of sleep. But the correlations between depression and smartphone use are strong enough to suggest that more parents should be telling their kids to put down their phone. As the technology writer Nick Bilton has reported, it's a policy some Silicon Valley executives follow. Even Steve Jobs limited his kids' use of the devices he brought into the world. What's at stake isn't just how kids experience adolescence. The constant presence of smartphones is likely to affect them well into adulthood. Adolescence is a key time for developing social skills; as teens spend less time with their friends face-to-face, they have fewer opportunities to practice them. In the next decade, we may see more adults who know just the right emoji for a situation, but not the right facial expression.

I realize that restricting technology might be an unrealistic demand to impose on a generation of kids so accustomed to being wired at all times. My three daughters were born in 2006, 2009, and 2013. They're not yet old enough to display the traits of iGen teens, but I have already witnessed firsthand just how ingrained new media are in their young lives. I've

observed my toddler, barely old enough to walk, confidently swiping her way through an iPad. I've experienced my 6-year-old asking for her own cellphone. Prying the phone out of our kids' hands will be difficult. But more seems to be at stake in urging teens to use their phone responsibly, and there are benefits to be gained even if all we instill in our children is the importance of moderation. Significant effects on both mental health and sleep time appear after two or more hours a day on electronic devices. The average teen spends about two and a half hours a day on electronic devices. Some mild boundary-setting could keep kids from falling into harmful habits. In my conversations with teens, I saw hopeful signs that kids themselves are beginning to link some of their troubles to their ever-present phone. Athena told me that when she does spend time with her friends in person, they are often looking at their device instead of at her. "I'm trying to talk to them about something, and they don't actually look at my face," she said. "They're looking at their phone, or they're looking at their Apple Watch." "What does that feel like, when you're trying to talk to somebody face-to-face and they're not looking at you?" I asked. "It kind of hurts," she said. "I could be talking about something super important to me, and they wouldn't even be listening." We have limited attentional resources, usually different things are important in different contexts, but some things—like your name—have a really privileged status. This idea with smartphones is that it's similarly relevant all of the time, and it gets this privileged attentional space. There's a pretty good chance that whatever your phone represents is more likely to be relevant to you than whatever else is going on. In other words: If you grow dependent

on your smartphone, it becomes a magical device that silently shouts your name at your brain at all times. (Now remember that this magical shouting device is the most popular consumer product ever made. In the developed world, almost everyone owns one of these magical shouting devices and carries it around with them everywhere.)

In the study, Ward and his colleagues examined the performance of more than 500 undergraduates on two different common psychological tests of memory and attention. In the first experiment, some participants were told to set their phones to silent without vibration and either leave them in their bag or put them on their desk. Other participants were asked to leave all their possessions, including their cell phone, outside the testing room. In the second experiment, students were asked to leave their phones on their desk, in their bag, or out in the hall, just as in the first experiment. But some students were also asked to power their phone off, regardless of location. In both experiments, students who left their phones outside the room seemed to do best on the test. They also found the trials easier—though, in follow-up interviews, they did not attribute this to their smartphone’s absence or presence. Smartphones draw attention, and it takes mental energy to keep your attention focused when a desirable distractor is nearby. We know that cell phones are highly desirable, and that lots of people are addicted to their phones, so it’s not so surprising that having one visible nearby would be a drain on mental resources. But this study is the first to actually demonstrate the effect, and given the prevalence of phones in modern society, that has important implications.

Adapted from The Atlantic

Exercise III.

Fill in the gaps.

- 1) Success is an _____ visitor, but this time it was especially warmly welcome.
- 2) Conservatives _____ at the mention of his name, but he's a hero to liberals.
- 3) He cannot possibly be responsible for the _____ processes of globalization, deindustrialization and suburbanization.
- 4) There's a lot of _____ about how expensive our medical system has become.
- 5) He has taken steps to _____ inflation and cool the overheating economy.
- 6) No self-respecting programmer would ever willingly let that _____ on the air.
- 7) These emotion-laded beliefs _____ fears and spawn anxious ways of relating.
- 8) He said some people will read his book and find _____ for their own ideas.
- 9) Its easier to replace rotten leaders than to _____ ethics in an entire nation.
- 10) Comical as one might find the concept of homeopathy, its _____ is shocking.

Exercise IV.

Make up sentences of your own with the following word combinations: to tune out, to keep up, to send pictures and videos, to save screenshots of

pictures, in teen behaviors, to pore over, to go far beyond the usual concerns about, in every corner of the nation, of every ethnic background, to power their phone off

Exercise V.

Match the words to the definitions in the column on the right:

to instill	oppressively constant; incessant
infrequent	gradually but firmly establish (an idea or attitude, esp. a desirable one) in a person's mind
to sputter	write or carve (words or symbols) on something, esp. as a formal or permanent record
concomitant	exceptionally large
to curtail	fail to resist (pressure, temptation, or some other negative force)
to succumb	reduce in extent or quantity; impose a restriction on
outsized	not occurring often; rare
to inscribe	make a series of soft explosive sounds, typically when being heated or as a symptom of a fault
relentless	naturally accompanying or associated

Exercise VI.

Identify the part of speech the words belong to: favorite, infrequent, ridiculous, generation, actual, performance, common, psychological, attention, experiment

Exercise VII.

Match the words to make word combinations:

distinctive	mountains
sheer	characteristics
steep	slopes
line	cliffs
gentle	crisis
emotional	app
abrupt	graphs
doctoral	states
smartphone	shifts
mental-health	student

Exercise VIII.

Summarize the article “Have Smartphones Destroyed a Generation?”

SUPPLEMENTARY READING

The forgotten software that inspired our modern world

A now-discontinued computer tool that allowed people to create their own software even if they didn't have programming experience has been surprisingly influential.

Last year I set out to build a simple piece of software to let my daughter practice her “sight words” as she began to learn how to read. This was nothing fancy, just a program that flashed words for her to memorise on the screen.

I'm not an expert programmer by any means, but while this task wasn't hard, it required some work and effort, not to mention the accreted experience of about 20 years of coding. But most people can't do this kind of thing: there simply aren't tools currently available for making lots of types of software without sophisticated computer programming.

It wasn't always this way. At least on the Macintosh, there was a time when this was possible. In my own personal retelling of computer history, even though the Macintosh was released in 1984, its potential was not truly achieved until 1987. What really confirmed the earth-shattering nature of the Mac for me was that year's release of a piece of software called HyperCard. This one-two punch of Macintosh and HyperCard changed how I thought about computers.

If you know about HyperCard, the mere mention of it will elicit a sense of delight at its crackling wonder. But if you've never heard of it, then allow me to enlighten you.

Bill Atkinson, its developer, described HyperCard as “an erector set for building applications.” Simply put, you could build your own software using HyperCard, with each program made up of “stacks” of “cards”. Each card could contain text and images, as well as interactive elements like buttons, with the ability to interconnect between other cards. Think of these stacks as rudimentary websites of sorts that exist entirely on a single machine, with each card as a page.

What could you do with these basic features? Pretty much anything you wanted. You could start small, storing and linking information, and slowly build from there. If you were an average user – read “non-programmer” – there was little barrier to building a piece of interactive software easily. You could easily add buttons, text, and images through menus and interactive graphical tools, and even provide a bit of code – courtesy of its friendly and readable HyperTalk programming language – to make these pieces all work together. Based on these basic components, you could make something as whimsical as an on-screen button that when pressed would show a picture. But you could do a lot more than that. You could manage an inventory system, or even an entire company. You could build an interactive story, where each page of the story is a separate card and the pieces of the scenery are interactive and clickable. You could make educational software, with a stack full of interactive cards on information about outer space or Moby Dick or dinosaurs. You could build blockbuster computer games, like Myst, which was originally developed using HyperCard. And apparently, you could control the lights of a massive skyscraper:

two of the tallest buildings in the world – the Petronas Towers in Kuala Lumpur – had parts of their lighting system controlled by HyperCard. HyperCard was even an inspiration for the world wide web, as well as one of the early web browsers.

Atkinson once described HyperCard as “an attempt to bridge the gap between the priesthood of programmers and the Macintosh mouse clickers”. But even more than that, HyperCard didn’t compromise between the easily usable and the creatively powerful. All of that was to be found within its computational power for creativity. To use a phrase from the computer scientist Seymour Papert, HyperCard embodied the concept of low floors and high ceilings: technologies that are easy to begin working with but still have lots of open-ended potential. It provided space for both the beginner and the expert.

HyperCard was a gateway to programming and was what first got me comfortable with the idea of coding. It’s probably not ridiculously hyperbolic to say that it inspired an entire generation of future software developers to think computationally. The developer of the original “wiki” software – the foundation for Wikipedia – was inspired by HyperCard. At least one of the current crop of Apple engineers also credit it for getting them into programming. And Samantha John, co-creator of children’s programming tool Hopscotch, says it inspired the software she’s helping to build.

Simply put, HyperCard was the fulfillment of the truly generative and creative power of the Macintosh. However, computing has changed since HyperCard’s heyday in the 1990s (it stopped being updated in 1998 and stopped being sold by Apple in 2004). There is a gaping hole in the space of computing, and each of us should feel it deeply. As we go about our daily use of technology, each of us might recognise the need for not-yet-created small tools and applications. But because these are not the kind of things that would be showered with venture funding or become the next Facebook, no one will create them for us. They could help us do our jobs better or make our lives easier or more delightful – imagine being able to build the simple note-taking app you’ve always wanted – but because they are hard for non-programmers to create, we find ourselves forced to dismiss these desires as not available to us. But it needn’t be this way.

Currently, the “best” contemporary example of software that allows everyday users to avoid being passive end-users of computer programs is probably one you would never even think of in this context: Microsoft Excel. People who would never consider themselves programmers use this spreadsheet software program every day to build incredibly sophisticated models, crunch numbers in subtle ways, and much more. But we deserve a lot better than this.

And I think change is on its way. There is a growing subset of software that allows non-coders to build programs themselves, often described by its more technical name of end-user programming or the increasingly popular “no code” software.

There is Bubble, which bills itself as a way of visually building web applications. There’s Webflow, to easily make websites. There’s IFTTT and Zapier,

for stitching together web tools and apps to automate processes. There's Glitch, a platform for easily building, sharing and remixing web projects and applications, which, while daunting to the non-programmer, had the original name HyperDev, hinting at its likely inspiration. There's even Scratch, aiming this kind of open-ended creation for children.

While much of this is either specialised or still not quite the low floor or high ceiling we might wish for, I'm beginning to detect hints of the promise of HyperCard. As Bonnie Nardi, anthropologist on the faculty of informatics at the University of California, Irvine and one of the early experts in end-user programming, notes, the legacy of HyperCard is the normalisation of end-user programming for ordinary users.

In a fantastic computer advertisement from the 1980s, the programming language Logo – co-created by Seymour Papert – billed itself thus: “Logo has often been described as a language for children. It is so, but in the same sense that English is a language for children, a sense that does not preclude its being also a language for poets, scientists, and philosophers.”

A powerful new software meta-tool and sandbox – one where you can play, rapidly prototype ideas, and learn about the world no matter whether you are a poet, a scientist, a philosopher, or a child – is something worth striving for. It's time to go out and recapture that HyperCard feeling.

Adapted from BBC Future

God is in the machine

*Carl Miller on the terrifying, hidden reality of Ridiculously Complicated Algorithms
'I'll lose my job if anyone knows about this.'*

There was a long silence which I didn't dare to break. I had begged to make this meeting happen. And now the person I had long been trying to meet leaned towards me. “Someone is going to go through your book line by line,” he said, “to try to work out who I am.”

He'd been a talented researcher, an academic, until his friend started a small technology company. He had joined the company and helped it to grow. It eventually became so big that the company had been acquired by one of the tech giants. And so, then, was he.

He was now paid a fortune to help design the algorithms that were central to what the tech giant did. And he had signed solemn legal documents prohibiting him from speaking to me, or to anyone, about his work. But as the years passed, his concern – indeed his guilt – grew. “It's power without responsibility.” He paused. “There's so much power, and so little responsibility. This is not notional abstract power. This is real power about day-to-day lives. It's both material and cultural and financial. The world has to know that this is how it works . . . There's something rotten in the state of Denmark,” he said, quoting Hamlet a little melodramatically.

So he had decided to take a risk. “If they find out I'm doing this,” he said, “I'll be marched out of my office and I'll never work in technology again. That's the best-

case scenario.” He wasn’t just going to talk to me about his work. He was going to show me it.

From his satchel, the researcher pulled out his laptop. He tapped for a few minutes and, with a sense of occasion, turned the screen to face me. “It’s all there.” And there it was: a white screen with instructions neatly arranged in a series of boxes. There were words in different colours, some green, some purple, some in red, in bold, in italics. I looked at the researcher, a proud grin spread across his face. There it was. An algorithm that really influenced people’s lives. And it was ... totally underwhelming. Twenty-three centuries ago, the Greek mathematician Eratosthenes sat in the Great Library of Alexandria and tried to find a way to identify prime numbers. He wrote every number from one to 100 in ten rows, and crossed out the one. He circled the two, crossed out all the multiples of two, circled the three and continued. He had created an algorithm, in essence something very simple. His ‘sieve’, as it was called, did what all algorithms do. It took an input, followed a series of well-described steps and produced an output. Input, process, output: that’s all an algorithm is, and has ever been.

Throughout their history, algorithms have been built to solve problems. They have been used to make astronomical calculations, build clocks and turn secret information into code. “Up till the nineties,” the researcher said, “algorithms still tended to be RSAs – Really Simple Algorithms. Previously it was pretty clear how stuff happened. You take the original Google algorithm. It was basically a popularity study. You’d just surface (or rank more highly) things that people clicked on more. In general, the people who made it understood how the thing worked.” Some algorithms were more complicated than others, but the input > process > output was generally transparent and understandable, at least to the people who built and used them.

The algorithm he had brought up on his screen was built to solve a problem, too. It ordered and organized reality in an important way, trying to separate what was important from what was irrelevant. But it was different from the RSAs. “It’s way more complicated than it looks,” he said, hovering a pencil over some of the short words in square brackets. “But I need to show you why.” And with that, we started to journey through his creation.

First, it imported “libraries”, a specific language of definitions, instructions and actions. Next, he showed me how it brought in data. “There’s a bit of a macho thing about feeding your algorithms as much data as possible,” he said. “The more data you feed it, the better. We work with a lot more data than most teams, actually,” he said, drawing his cursor longingly over the script that brought the huge, churning quantities of data that fed the algorithm. Gigabytes, terabytes, petabytes of data were ordered, there on the page.

By instruction fifteen, “functions” were added. “A function is a little factory,” the researcher said, highlighting each one. “These are the building blocks of the algorithm: a subalgorithm, basically.” He showed how he built each of these building blocks, stringing together phrases like “get component”, “filter by station”, “sort_nodes_in_degree”. Then, the main stage. “This is the business end of the

algorithm,” he said. “This is where I stack up the building blocks.” He was supposed to be showing me how the functions were connected. But I was lost. “I don’t get it,” I said. “How can you keep track of what’s doing what?”

Each of these sub-algorithmic functions, his building blocks, was really another complete house. Each was a complex tangle of instructions and processes, and some were themselves made from sub-algorithmic building blocks. The screen looked simple, but I was looking at a blueprint of building blocks within building blocks within building blocks: millions of instructions in just a few pages of code. Its builder was sitting next to me, but even he struggled to explain the stages, retracing steps and correcting himself as he tried to hold the layer upon layer of abstraction in his head. He seemed to finish, but then paused. “I don’t really remember where that last bit comes from,” he said.

The researcher knew, of course, what data he’d fed into the process. He knew why he’d designed it, the problem it was trying to solve and the outputs that it produced. However, after he’d been trying to explain it for over an hour, he sat back in his chair, exhausted. “Yes, as you can see, the gap between input and output is difficult to understand,” he said. He’d flooded the algorithm with a huge amount of information, “a trend”, he said, because in the tech giant he could, and everyone did. But the amount of data meant it was hard to tell what the salient inputs within it were. “From a human perspective you’re not sure which of the inputs is significant; it’s hard to know what is actually driving the outputs. It’s hard to trace back, as a human, to know why a decision was made.”

Within his tech giant, algorithms rarely stand alone. Instead, they exist within webs. “I rely”, he said, “on signals that are produced by other algorithms.” His algorithm was fed by outputs that were shaped by other algorithms. It was like a car assembly line. He, like his colleagues, worked on a small, specific part of a much larger process.

The algorithm was also constantly changing. The data inputs were flowing into the algorithm in real time, but the actual weights, measures and trade-offs that the algorithm made weren’t static either. Some of the functions that the researcher had woven in used machine learning – techniques where the machine constantly learned and adapted to what the most important patterns, correlations and relationships were. It meant that the algorithm was constantly changing and moving as the world moved around it, and its diet of data changed to reflect that.

We sat there, looking at the computer, his creation laid out in multi-coloured type. “This is all to do with complexity,” he said contemplatively. “Complexity of input. Complexity of analysis. Complexity of how outputs are combined, structured and used.” One of the reasons that he’d been employed to build a process like this was exactly because it could handle complexity by being complex itself. It grasped the blinding number of factors, signals and influences that bounced off each other at every moment in ways that we simply cannot.

Algorithms have changed, from Really Simple to Ridiculously Complicated. They are capable of accomplishing tasks and tackling problems that they’ve never

been able to do before. They are able, really, to handle an unfathomably complex world better than a human can. But exactly because they can, the way they work has become unfathomable too. Inputs loop from one algorithm to the next; data presses through more instructions, more code. The complexity, dynamism, the sheer not-understandability of the algorithm means that there is a middle part – between input and output – where it is possible that no one knows exactly what they’re doing. The algorithm learns whatever it learns. “The reality is, professionally, I only look under the hood when it goes wrong. And it can be physically impossible to understand what has actually happened.”

With a triumphant flick of his wrist, the researcher tapped a key and the algorithm began. Twenty seconds later, the algorithm was finished. There in black and white, was an output. One, of course, that I cannot specifically describe, but an output that many of us use every day. The algorithm had produced a kind of reality, really – one that we make decisions from, that can even change our lives.

The researcher scrolled through the bundle of instructions, and changed a single one to a two. A single value. The algorithm reran, and reality popped out again, but this time, a quarter of the results had ceased to exist.

“OK,” I said, “what happened there? Why did you change it? You know the two is wrong. But how do you know the one is right?”

“That”, he said, gesticulating at the sabotaged result, “is the point. It’s a heuristic. I tried it, and it seemed to work. Then I tested it, and the result looked right. I can’t say the one is true. I can only say that it passed minimum evaluation criteria. The whole algorithm is full of parameters that could have been something else. Truth is dead,” he sighed. “There is only output.” “Who checks these?” I asked. “Me.” “What about your boss?”

“You’ve seen how difficult it is to really understand. Sometimes I struggle with it, and I created it. The reality is that if the algorithm looks like it’s doing the job that it’s supposed to do, and people aren’t complaining, then there isn’t much incentive to really comb through all those instructions and those layers of abstracted code to work out what is happening.” The preferences you see online – the news you read, the products you view, the adverts that appear – are all dependent on values that don’t necessarily have to be what they are. They are not true, they’ve just passed minimum evaluation criteria.

Jure Leskovec spoke with a strong Slovenian accent, softened slightly by the rolling Rs I had become used to in California. Jure had spent time at Facebook and as chief scientist at Pinterest before moving back to academia. We were sitting in his office in Stanford, which, like the other centres of tech in California, seemed to be expanding rapidly. As we spoke, clouds of hot, white dust drifted up past his window from drilling below.

He grabbed a pen and sprang towards an enormous whiteboard that took up a full wall of his office. His latest work was building an algorithm to help criminal court judges make better decisions over whether to grant bail. “You have a judge,” he said, drawing a large, black rectangle on the board with a J in it, “and a defendant.

The judge is trying to make a single determination: if bailed, will the defendant commit crime or no crime? So I can train a machine learning algorithm to answer the question, ‘If I release you, will you commit another crime or not?’”

The scribbling on the board became more profuse, as Jure excitedly sketched out the study. He’d gathered criminal records data on people who, when bailed, committed another crime, and other data on people who hadn’t. He also found a way, by comparing lenient and stricter judges, of constructing data on people who were released but who normally would have been locked up, and whether they had committed another crime too.

“The point”, he said, “is that our algorithm outperforms human judges by 30 per cent. So far, these machine learning algorithms have mostly been used in, y’know, recommendations, the online world. And I would say that these types of domains are low stakes. You might get a bad ad. You have a bad Friday night because you’ve watched the wrong movie. That’s the worst that can happen to you. But if you think about applying these algorithms to highstakes domains –”

“Which is increasingly happening?” I cut in.

“Which I think is increasingly happening. Then you have to make sure that the methods that we develop, and the standards about the way we use these methods and the way we verify them, are incredibly rigorous.”

Already, according to the Wall Street Journal, at least fifteen states in the US use automated risk-assessment tools to aid judges in making parole decisions. Predpol is, amongst others, a company that uses algorithms to predict areas where crime in the future is likely to happen on the basis of crimes committed in the past. Pegged is a company that offers this kind of technology (powered by artificial intelligence and fuelled by huge amounts of data) to help find the best candidates for any particular job. Algorithms are being used as contract negotiators, making split-second decisions over which terms to offer and accept. Algorithms are not only becoming more complex, they are also taking on more and more important jobs.

“I think there is a huge revolution to come,” Jure said. “In how decisions are made in society.” He wasn’t saying that algorithms should take over, only that they should be used to support human decisions. “This bail example – I can say algorithms do better. I’m advocating, let’s use these algorithms to help the human judges. They have a really hard time; they have like a minute to make a decision. They often have no feedback on whether they made the right decision, and there is no knowledge-sharing between the judges. I think it’s clear that when human and machine have access to the same data, machine will beat the human. We see this over and over. Just give it enough data.” Humans have given agency, genuine decisional power, to processes that are so complex they are hidden.

“Weapons of math destruction” is how the writer Cathy O’Neil describes the nasty and pernicious kinds of algorithms that are not subject to the same challenges that human decision-makers are. Parole algorithms (not Jure’s) can bias decisions on the basis of income or (indirectly) ethnicity. Recruitment algorithms can reject candidates on the basis of mistaken identity. In some circumstances, such as policing,

they might create feedback loops, sending police into areas with more crime, which causes more crime to be detected.

The problem is that in many cases, we simply don't know. The researcher had taken a personal risk to show me what he had created, because his algorithm, like most that really affect us, is proprietary and hidden; they are expensive pieces of intellectual property that we cannot understand, and we cannot challenge. A "black box society", as the academic Frank Pasquale describes it: a society harmed by a whole new kind of secrecy that obscures the automated judgements that affect our lives.

If, as Jure suspects, machine judgement will become measurably better than human judgement for important decisions, the argument for using it will only grow stronger. And somewhere in that gap between inputs and outputs – the actual decision making part of the process itself – is something that can shape our lives in meaningful ways yet has become less and less understandable.

"We need", Jure said emphatically, "to step up and come up with the means to evaluate – vet – algorithms in unbiased ways. We need to be able to interpret and explain their decisions. We don't want an optimal algorithm. We want one simple enough that an expert can look at it and say nothing crazy is happening here. I think we need to get serious about how do we get these things ready for societal deployment, for high-stakes decision environments? How do we debug these things to ensure some level of quality?"

There is something happening here that is deeper than any single algorithm. They are at the forefront of what, at times, appears to be almost a new philosophy. "God is the machine," the researcher told me. "The black box is the truth. If it works, it works. We shouldn't even try to work out what the machine is spitting out – they'll pick up patterns we won't even know about."

Adapted from TSL The Times Literary Supplement (The Death of the Gods: The new global power grab by Carl Miller)

It's the (Democracy-Poisoning) Golden Age of Free Speech

At a time when anyone can broadcast live or post their thoughts to a social network, we should be living in a utopia of public discourse. We're not.

For most of modern history, the easiest way to block the spread of an idea was to keep it from being mechanically disseminated. Shutter the newspaper, pressure the broadcast chief, install an official censor at the publishing house. Or, if push came to shove, hold a loaded gun to the announcer's head.

This actually happened once in Turkey. It was the spring of 1960, and a group of military officers had just seized control of the government and the national media, imposing an information blackout to suppress the coordination of any threats to their coup. But inconveniently for the conspirators, a highly anticipated soccer game between Turkey and Scotland was scheduled to take place in the capital two weeks after their takeover. Matches like this were broadcast live on national radio, with an

announcer calling the game, play by play. People all across Turkey would huddle around their sets, cheering on the national team.

Canceling the match was too risky for the junta; doing so might incite a protest. But what if the announcer said something political on live radio? A single remark could tip the country into chaos. So the officers came up with the obvious solution: They kept several guns trained on the announcer for the entire 2 hours and 45 minutes of the live broadcast.

It was still a risk, but a managed one. After all, there was only one announcer to threaten: a single bottleneck to control of the airwaves.

Variations on this general playbook for censorship—find the right choke point, then squeeze—were once the norm all around the world. That's because, until recently, broadcasting and publishing were difficult and expensive affairs, their infrastructures riddled with bottlenecks and concentrated in a few hands.

But today that playbook is all but obsolete. Whose throat do you squeeze when anyone can set up a Twitter account in seconds, and when almost any event is recorded by smartphone-wielding members of the public? When protests broke out in Ferguson, Missouri, in August 2014, a single livestreamer named Mustafa Hussein reportedly garnered an audience comparable in size to CNN's for a short while. If a Bosnian Croat war criminal drinks poison in a courtroom, all of Twitter knows about it in minutes.

In today's networked environment, when anyone can broadcast live or post their thoughts to a social network, it would seem that censorship ought to be impossible. This should be the golden age of free speech.

And sure, it is a golden age of free speech—if you can believe your lying eyes. Is that footage you're watching real? Was it really filmed where and when it says it was? Is it being shared by alt-right trolls or a swarm of Russian bots? Was it maybe even generated with the help of artificial intelligence? (Yes, there are systems that can create increasingly convincing fake videos.)

Or let's say you were the one who posted that video. If so, is anyone even watching it? Or has it been lost in a sea of posts from hundreds of millions of content producers? Does it play well with Facebook's algorithm? Is YouTube recommending it?

Maybe you're lucky and you've hit a jackpot in today's algorithmic public sphere: an audience that either loves you or hates you. Is your post racking up the likes and shares? Or is it raking in a different kind of "engagement": Have you received thousands of messages, mentions, notifications, and emails threatening and mocking you? Have you been doxed for your trouble? Have invisible, angry hordes ordered 100 pizzas to your house? Did they call in a SWAT team—men in black arriving, guns drawn, in the middle of dinner?

Standing there, your hands over your head, you may feel like you've run afoul of the awesome power of the state for speaking your mind. But really you just pissed off 4chan. Or entertained them. Either way, congratulations: You've found an audience.

Here's how this golden age of speech actually works: In the 21st century, the capacity to spread ideas and reach an audience is no longer limited by access to expensive, centralized broadcasting infrastructure. It's limited instead by one's ability to garner and distribute attention. And right now, the flow of the world's attention is structured, to a vast and overwhelming degree, by just a few digital platforms: Facebook, Google (which owns YouTube), and, to a lesser extent, Twitter.

These companies—which love to hold themselves up as monuments of free expression—have attained a scale unlike anything the world has ever seen; they've come to dominate media distribution, and they increasingly stand in for the public sphere itself. But at their core, their business is mundane: They're ad brokers. To virtually anyone who wants to pay them, they sell the capacity to precisely target our eyeballs. They use massive surveillance of our behavior, online and off, to generate increasingly accurate, automated predictions of what advertisements we are most susceptible to and what content will keep us clicking, tapping, and scrolling down a bottomless feed.

So what does this algorithmic public sphere tend to feed us? In tech parlance, Facebook and YouTube are “optimized for engagement,” which their defenders will tell you means that they're just giving us what we want. But there's nothing natural or inevitable about the specific ways that Facebook and YouTube corral our attention. The patterns, by now, are well known. As BuzzFeed famously reported in November 2016, “top fake election news stories generated more total engagement on Facebook than top election stories from 19 major news outlets combined.”

Humans are a social species, equipped with few defenses against the natural world beyond our ability to acquire knowledge and stay in groups that work together. We are particularly susceptible to glimmers of novelty, messages of affirmation and belonging, and messages of outrage toward perceived enemies. These kinds of messages are to human community what salt, sugar, and fat are to the human appetite. And Facebook gorges us on them—in what the company's first president, Sean Parker, recently called “a social-validation feedback loop.”

There are, moreover, no nutritional labels in this cafeteria. For Facebook, YouTube, and Twitter, all speech—whether it's a breaking news story, a saccharine animal video, an anti-Semitic meme, or a clever advertisement for razors—is but “content,” each post just another slice of pie on the carousel. A personal post looks almost the same as an ad, which looks very similar to a New York Times article, which has much the same visual feel as a fake newspaper created in an afternoon.

What's more, all this online speech is no longer public in any traditional sense. Sure, Facebook and Twitter sometimes feel like places where masses of people experience things together simultaneously. But in reality, posts are targeted and delivered privately, screen by screen by screen. Today's phantom public sphere has been fragmented and submerged into billions of individual capillaries. Yes, mass discourse has become far easier for everyone to participate in—but it has simultaneously become a set of private conversations happening behind your back. Behind everyone's backs.

Not to put too fine a point on it, but all of this invalidates much of what we think about free speech—conceptually, legally, and ethically.

The most effective forms of censorship today involve meddling with trust and attention, not muzzling speech itself. As a result, they don't look much like the old forms of censorship at all. They look like viral or coordinated harassment campaigns, which harness the dynamics of viral outrage to impose an unbearable and disproportionate cost on the act of speaking out. They look like epidemics of disinformation, meant to undercut the credibility of valid information sources. They look like bot-fueled campaigns of trolling and distraction, or piecemeal leaks of hacked materials, meant to swamp the attention of traditional media.

These tactics usually don't break any laws or set off any First Amendment alarm bells. But they all serve the same purpose that the old forms of censorship did: They are the best available tools to stop ideas from spreading and gaining purchase. They can also make the big platforms a terrible place to interact with other people. Even when the big platforms themselves suspend or boot someone off their networks for violating “community standards”—an act that does look to many people like old-fashioned censorship—it's not technically an infringement on free speech, even if it is a display of immense platform power. Anyone in the world can still read what the far-right troll Tim “Baked Alaska” Gionet has to say on the internet. What Twitter has denied him, by kicking him off, is attention.

Many more of the most noble old ideas about free speech simply don't compute in the age of social media. John Stuart Mill's notion that a “marketplace of ideas” will elevate the truth is flatly belied by the virality of fake news. And the famous American saying that “the best cure for bad speech is more speech”—a paraphrase of Supreme Court justice Louis Brandeis—loses all its meaning when speech is at once mass but also nonpublic. How do you respond to what you cannot see? How can you cure the effects of “bad” speech with more speech when you have no means to target the same audience that received the original message?

This is not a call for nostalgia. In the past, marginalized voices had a hard time reaching a mass audience at all. They often never made it past the gatekeepers who put out the evening news, who worked and lived within a few blocks of one another in Manhattan and Washington, DC. The best that dissidents could do, often, was to engineer self-sacrificing public spectacles that those gatekeepers would find hard to ignore—as US civil rights leaders did when they sent schoolchildren out to march on the streets of Birmingham, Alabama, drawing out the most naked forms of Southern police brutality for the cameras.

But back then, every political actor could at least see more or less what everyone else was seeing. Today, even the most powerful elites often cannot effectively convene the right swath of the public to counter viral messages. During the 2016 presidential election, as Joshua Green and Sasha Issenberg reported for Bloomberg, the Trump campaign used so-called dark posts—nonpublic posts targeted at a specific audience—to discourage African Americans from voting in battleground states. The Clinton campaign could scarcely even monitor these messages, let alone

directly counter them. Even if Hillary Clinton herself had taken to the evening news, that would not have been a way to reach the affected audience. Because only the Trump campaign and Facebook knew who the audience was.

It's important to realize that, in using these dark posts, the Trump campaign wasn't deviantly weaponizing an innocent tool. It was simply using Facebook exactly as it was designed to be used. The campaign did it cheaply, with Facebook staffers assisting right there in the office, as the tech company does for most large advertisers and political campaigns. Who cares where the speech comes from or what it does, as long as people see the ads? The rest is not Facebook's department.

Mark Zuckerberg holds up Facebook's mission to "connect the world" and "bring the world closer together" as proof of his company's civic virtue. "In 2016, people had billions of interactions and open discussions on Facebook," he said proudly in an online video, looking back at the US election. "Candidates had direct channels to communicate with tens of millions of citizens."

This idea that more speech—more participation, more connection—constitutes the highest, most unalloyed good is a common refrain in the tech industry. But a historian would recognize this belief as a fallacy on its face. Connectivity is not a pony. Facebook doesn't just connect democracy-loving Egyptian dissidents and fans of the videogame Civilization; it brings together white supremacists, who can now assemble far more effectively. It helps connect the efforts of radical Buddhist monks in Myanmar, who now have much more potent tools for spreading incitement to ethnic cleansing—fueling the fastest-growing refugee crisis in the world.

The freedom of speech is an important democratic value, but it's not the only one. In the liberal tradition, free speech is usually understood as a vehicle—a necessary condition for achieving certain other societal ideals: for creating a knowledgeable public; for engendering healthy, rational, and informed debate; for holding powerful people and institutions accountable; for keeping communities lively and vibrant. What we are seeing now is that when free speech is treated as an end and not a means, it is all too possible to thwart and distort everything it is supposed to deliver.

Creating a knowledgeable public requires at least some workable signals that distinguish truth from falsehood. Fostering a healthy, rational, and informed debate in a mass society requires mechanisms that elevate opposing viewpoints, preferably their best versions. To be clear, no public sphere has ever fully achieved these ideal conditions—but at least they were ideals to fail from. Today's engagement algorithms, by contrast, espouse no ideals about a healthy public sphere.

Some scientists predict that within the next few years, the number of children struggling with obesity will surpass the number struggling with hunger. Why? When the human condition was marked by hunger and famine, it made perfect sense to crave condensed calories and salt. Now we live in a food glut environment, and we have few genetic, cultural, or psychological defenses against this novel threat to our health. Similarly, we have few defenses against these novel and potent threats to the ideals of democratic speech, even as we drown in more speech than ever.

The stakes here are not low. In the past, it has taken generations for humans to develop political, cultural, and institutional antibodies to the novelty and upheaval of previous information revolutions. If *The Birth of a Nation* and *Triumph of the Will* came out now, they'd flop; but both debuted when film was still in its infancy, and their innovative use of the medium helped fuel the mass revival of the Ku Klux Klan and the rise of Nazism.

By this point, we've already seen enough to recognize that the core business model underlying the Big Tech platforms—harvesting attention with a massive surveillance infrastructure to allow for targeted, mostly automated advertising at very large scale—is far too compatible with authoritarianism, propaganda, misinformation, and polarization. The institutional antibodies that humanity has developed to protect against censorship and propaganda thus far—laws, journalistic codes of ethics, independent watchdogs, mass education—all evolved for a world in which choking a few gatekeepers and threatening a few individuals was an effective means to block speech. They are no longer sufficient.

But we don't have to be resigned to the status quo. Facebook is only 13 years old, Twitter 11, and even Google is but 19. At this moment in the evolution of the auto industry, there were still no seat belts, airbags, emission controls, or mandatory crumple zones. The rules and incentive structures underlying how attention and surveillance work on the internet need to change. But in fairness to Facebook and Google and Twitter, while there's a lot they could do better, the public outcry demanding that they fix all these problems is fundamentally mistaken. There are few solutions to the problems of digital discourse that don't involve huge trade-offs—and those are not choices for Mark Zuckerberg alone to make. These are deeply political decisions. In the 20th century, the US passed laws that outlawed lead in paint and gasoline, that defined how much privacy a landlord needs to give his tenants, and that determined how much a phone company can surveil its customers. We can decide how we want to handle digital surveillance, attention-channeling, harassment, data collection, and algorithmic decision-making. We just need to start the discussion. Now.

Adapted from Wired magazine

How Google Discovered the Value of Surveillance

In 2002, still reeling from the dot-com crash, Google realized they'd been harvesting a very valuable raw material — your behavior.

In 2000 a group of computer scientists and engineers at Georgia Tech collaborated on a project called the "Aware Home." It was meant to be a "living laboratory" for the study of "ubiquitous computing." They imagined a "human-home symbiosis" in which many animate and inanimate processes would be captured by an elaborate network of "context aware sensors" embedded in the house and by wearable computers worn by the home's occupants. The design called for an "automated wireless collaboration" between the platform that hosted personal

information from the occupants' wearables and a second one that hosted the environmental information from the sensors.

There were three working assumptions: first, the scientists and engineers understood that the new data systems would produce an entirely new knowledge domain. Second, it was assumed that the rights to that new knowledge and the power to use it to improve one's life would belong exclusively to the people who live in the house. Third, the team assumed that for all of its digital wizardry, the Aware Home would take its place as a modern incarnation of the ancient conventions that understand "home" as the private sanctuary of those who dwell within its walls.

All of this was expressed in the engineering plan. It emphasized trust, simplicity, the sovereignty of the individual, and the inviolability of the home as a private domain. The Aware Home information system was imagined as a simple "closed loop" with only two nodes and controlled entirely by the home's occupants. Because the house would be "constantly monitoring the occupants' whereabouts and activities...even tracing its inhabitants' medical conditions," the team concluded, "there is a clear need to give the occupants knowledge and control of the distribution of this information." All the information was to be stored on the occupants' wearable computers "to insure the privacy of an individual's information."

By 2018, the global "smart-home" market was valued at \$36 billion and expected to reach \$151 billion by 2023. The numbers betray an earthquake beneath their surface. Consider just one smart-home device: the Nest thermostat, which was made by a company that was owned by Alphabet, the Google holding company, and then merged with Google in 2018. The Nest thermostat does many things imagined in the Aware Home. It collects data about its uses and environment. It uses motion sensors and computation to "learn" the behaviors of a home's inhabitants. Nest's apps can gather data from other connected products such as cars, ovens, fitness trackers, and beds. Such systems can, for example, trigger lights if an anomalous motion is detected, signal video and audio recording, and even send notifications to homeowners or others. As a result of the merger with Google, the thermostat, like other Nest products, will be built with Google's artificial intelligence capabilities, including its personal digital "assistant." Like the Aware Home, the thermostat and its brethren devices create immense new stores of knowledge and therefore new power — but for whom?

Wi-Fi-enabled and networked, the thermostat's intricate, personalized data stores are uploaded to Google's servers. Each thermostat comes with a "privacy policy," a "terms-of-service agreement," and an "end-user licensing agreement." These reveal oppressive privacy and security consequences in which sensitive household and personal information are shared with other smart devices, unnamed personnel, and third parties for the purposes of predictive analyses and sales to other unspecified parties. Nest takes little responsibility for the security of the information it collects and none for how the other companies in its ecosystem will put those data to use. A detailed analysis of Nest's policies by two University of London scholars concluded that were one to enter into the Nest ecosystem of connected devices and

apps, each with their own equally burdensome and audacious terms, the purchase of a single home thermostat would entail the need to review nearly a thousand so-called contracts.

Should the customer refuse to agree to Nest's stipulations, the terms of service indicate that the functionality and security of the thermostat will be deeply compromised, no longer supported by the necessary updates meant to ensure its reliability and safety. The consequences can range from frozen pipes to failed smoke alarms to an easily hacked internal home system.

By 2018, the assumptions of the Aware Home were gone with the wind. Where did they go? What was that wind? The Aware Home, like many other visionary projects, imagined a digital future that empowers individuals to lead more-effective lives. What is most critical is that in the year 2000 this vision naturally assumed an unwavering commitment to the privacy of individual experience. Should an individual choose to render her experience digitally, then she would exercise exclusive rights to the knowledge garnered from such data, as well as exclusive rights to decide how such knowledge might be put to use. Today these rights to privacy, knowledge, and application have been usurped by a bold market venture powered by unilateral claims to others' experience and the knowledge that flows from it. What does this sea change mean for us, for our children, for our democracies, and for the very possibility of a human future in a digital world? It is the darkening of the digital dream into a voracious and utterly novel commercial project that I call surveillance capitalism.

Surveillance capitalism runs contrary to the early digital dream, consigning the Aware Home to ancient history. Instead, it strips away the illusion that the networked form has some kind of indigenous moral content, that being "connected" is somehow intrinsically pro-social, innately inclusive, or naturally tending toward the democratization of knowledge. Digital connection is now a means to others' commercial ends. At its core, surveillance capitalism is parasitic and self-referential. It revives Karl Marx's old image of capitalism as a vampire that feeds on labor, but with an unexpected turn. Instead of labor, surveillance capitalism feeds on every aspect of every human's experience. Google invented and perfected surveillance capitalism in much the same way that a century ago General Motors invented and perfected managerial capitalism. Google was the pioneer of surveillance capitalism in thought and practice, the deep pocket for research and development, and the trailblazer in experimentation and implementation, but it is no longer the only actor on this path. Surveillance capitalism quickly spread to Facebook and later to Microsoft. Evidence suggests that Amazon has veered in this direction, and it is a constant challenge to Apple, both as an external threat and as a source of internal debate and conflict.

As the pioneer of surveillance capitalism, Google launched an unprecedented market operation into the unmapped spaces of the internet, where it faced few impediments from law or competitors, like an invasive species in a landscape free of natural predators. Its leaders drove the systemic coherence of their businesses at a

breakneck pace that neither public institutions nor individuals could follow. Google also benefited from historical events when a national security apparatus galvanized by the attacks of 9/11 was inclined to nurture, mimic, shelter, and appropriate surveillance capitalism's emergent capabilities for the sake of total knowledge and its promise of certainty.

Surveillance capitalists quickly realized that they could do anything they wanted, and they did. They dressed in the fashions of advocacy and emancipation, appealing to and exploiting contemporary anxieties, while the real action was hidden offstage. Theirs was an invisibility cloak woven in equal measure to the rhetoric of the empowering web, the ability to move swiftly, the confidence of vast revenue streams, and the wild, undefended nature of the territory they would conquer and claim. They were protected by the inherent illegibility of the automated processes that they rule, the ignorance that these processes breed, and the sense of inevitability that they foster.

Surveillance capitalism is no longer confined to the competitive dramas of the large internet companies, where behavioral futures markets were first aimed at online advertising. Its mechanisms and economic imperatives have become the default model for most internet-based businesses. Eventually, competitive pressure drove expansion into the offline world, where the same foundational mechanisms that expropriate your online browsing, likes, and clicks are trained on your run in the park, breakfast conversation, or hunt for a parking space. Today's prediction products are traded in behavioral futures markets that extend beyond targeted online ads to many other sectors, including insurance, retail, finance, and an ever-widening range of goods and services companies determined to participate in these new and profitable markets. Whether it's a "smart" home device, what the insurance companies call "behavioral underwriting," or any one of thousands of other transactions, we now pay for our own domination.

Surveillance capitalism's products and services are not the objects of a value exchange. They do not establish constructive producer-consumer reciprocities. Instead, they are the "hooks" that lure users into their extractive operations in which our personal experiences are scraped and packaged as the means to others' ends. We are not surveillance capitalism's "customers." Although the saying tells us "If it's free, then you are the product," that is also incorrect. We are the sources of surveillance capitalism's crucial surplus: the objects of a technologically advanced and increasingly inescapable raw-material-extraction operation. Surveillance capitalism's actual customers are the enterprises that trade in its markets for future behavior.

Google is to surveillance capitalism what the Ford Motor Company and General Motors were to mass-production-based managerial capitalism. New economic logics and their commercial models are discovered by people in a time and place and then perfected through trial and error. In our time Google became the pioneer, discoverer, elaborator, experimenter, lead practitioner, role model, and diffusion hub of surveillance capitalism. GM and Ford's iconic status as pioneers of

twentieth-century capitalism made them enduring objects of scholarly research and public fascination because the lessons they had to teach resonated far beyond the individual companies. Google's practices deserve the same kind of examination, not merely as a critique of a single company but rather as the starting point for the codification of a powerful new form of capitalism.

With the triumph of mass production at Ford and for decades thereafter, hundreds of researchers, businesspeople, engineers, journalists, and scholars would excavate the circumstances of its invention, origins, and consequences. Decades later, scholars continued to write extensively about Ford, the man and the company. GM has also been an object of intense scrutiny. It was the site of Peter Drucker's field studies for his seminal *Concept of the Corporation*, the 1946 book that codified the practices of the twentieth-century business organization and established Drucker's reputation as a management sage. In addition to the many works of scholarship and analysis on these two firms, their own leaders enthusiastically articulated their discoveries and practices. Henry Ford and his general manager, James Couzens, and Alfred Sloan and his marketing man, Henry "Buck" Weaver, reflected on, conceptualized, and proselytized their achievements, specifically locating them in the evolutionary drama of American capitalism.

Google is a notoriously secretive company, and one is hard-pressed to imagine a Drucker equivalent freely roaming the scene and scribbling in the hallways. Its executives carefully craft their messages of digital evangelism in books and blog posts, but its operations are not easily accessible to outside researchers or journalists. In 2016 a lawsuit brought against the company by a product manager alleged an internal spying program in which employees are expected to identify coworkers who violate the firm's confidentiality agreement: a broad prohibition against divulging anything about the company to anyone. The closest thing we have to a Buck Weaver or James Couzens codifying Google's practices and objectives is the company's longtime chief economist, Hal Varian, who aids the cause of understanding with scholarly articles that explore important themes. Varian has been described as "the Adam Smith of the discipline of Googlenomics" and the "godfather" of its advertising model. It is in Varian's work that we find hidden-in-plain-sight important clues to the logic of surveillance capitalism and its claims to power.

In two extraordinary articles in scholarly journals, Varian explored the theme of "computer-mediated transactions" and their transformational effects on the modern economy. Both pieces are written in amiable, down-to-earth prose, but Varian's casual understatement stands in counterpoint to his often-startling declarations: "Nowadays there is a computer in the middle of virtually every transaction...now that they are available these computers have several other uses." He then identifies four such new uses: "data extraction and analysis," "new contractual forms due to better monitoring," "personalization and customization," and "continuous experiments."

Varian's discussions of these new "uses" are an unexpected guide to the strange logic of surveillance capitalism, the division of learning that it shapes, and the character of the information civilization toward which it leads. "Data extraction and

analysis,” Varian writes, “is what everyone is talking about when they talk about big data.”

Google was incorporated in 1998, founded by Stanford graduate students Larry Page and Sergey Brin just two years after the Mosaic browser threw open the doors of the world wide web to the computer-using public. From the start, the company embodied the promise of information capitalism as a liberating and democratic social force that galvanized and delighted second-modernity populations around the world.

Thanks to this wide embrace, Google successfully imposed computer mediation on broad new domains of human behavior as people searched online and engaged with the web through a growing roster of Google services. As these new activities were informed for the first time, they produced wholly new data resources. For example, in addition to key words, each Google search query produces a wake of collateral data such as the number and pattern of search terms, how a query is phrased, spelling, punctuation, dwell times, click patterns, and location.

Early on, these behavioral by-products were haphazardly stored and operationally ignored. Amit Patel, a young Stanford graduate student with a special interest in “data mining,” is frequently credited with the groundbreaking insight into the significance of Google’s accidental data caches. His work with these data logs persuaded him that detailed stories about each user — thoughts, feelings, interests — could be constructed from the wake of unstructured signals that trailed every online action. These data, he concluded, actually provided a “broad sensor of human behavior” and could be put to immediate use in realizing cofounder Larry Page’s dream of Search as a comprehensive artificial intelligence.

Google’s engineers soon grasped that the continuous flows of collateral behavioral data could turn the search engine into a recursive learning system that constantly improved search results and spurred product innovations such as spell check, translation, and voice recognition. As Kenneth Cukier observed at that time, Other search engines in the 1990s had the chance to do the same, but did not pursue it. Around 2000 Yahoo! saw the potential, but nothing came of the idea. It was Google that recognized the gold dust in the detritus of its interactions with its users and took the trouble to collect it up...Google exploits information that is a by-product of user interactions, or data exhaust, which is automatically recycled to improve the service or create an entirely new product.

What had been regarded as waste material — “data exhaust” spewed into Google’s servers during the combusive action of Search — was quickly reimagined as a critical element in the transformation of Google’s search engine into a reflexive process of continuous learning and improvement.

At that early stage of Google’s development, the feedback loops involved in improving its Search functions produced a balance of power: Search needed people to learn from, and people needed Search to learn from. This symbiosis enabled Google’s algorithms to learn and produce ever-more relevant and comprehensive search results. More queries meant more learning; more learning produced more relevance. More relevance meant more searches and more users. By the time the young

company held its first press conference in 1999, to announce a \$25 million equity investment from two of the most revered Silicon Valley venture capital firms, Sequoia Capital and Kleiner Perkins, Google Search was already fielding seven million requests each day. A few years later, Hal Varian, who joined Google as its chief economist in 2002, would note, “Every action a user performs is considered a signal to be analyzed and fed back into the system.” The Page Rank algorithm, named after its founder, had already given Google a significant advantage in identifying the most popular results for queries. Over the course of the next few years it would be the capture, storage, analysis, and learning from the by-products of those search queries that would turn Google into the gold standard of web search.

The key point for us rests on a critical distinction. During this early period, behavioral data were put to work entirely on the user’s behalf. User data provided value at no cost, and that value was reinvested in the user experience in the form of improved services: enhancements that were also offered at no cost to users. Users provided the raw material in the form of behavioral data, and those data were harvested to improve speed, accuracy, and relevance and to help build ancillary products such as translation. I call this the behavioral value reinvestment cycle, in which all behavioral data are reinvested in the improvement of the product or service. The cycle emulates the logic of the iPod; it worked beautifully at Google but with one critical difference: the absence of a sustainable market transaction. In the case of the iPod, the cycle was triggered by the purchase of a high-margin physical product. Subsequent reciprocities improved the iPod product and led to increased sales. Customers were the subjects of the commercial process, which promised alignment with their “what I want, when I want, where I want” demands. At Google, the cycle was similarly oriented toward the individual as its subject, but without a physical product to sell, it floated outside the marketplace, an interaction with “users” rather than a market transaction with customers.

This helps to explain why it is inaccurate to think of Google’s users as its customers: there is no economic exchange, no price, and no profit. Nor do users function in the role of workers. When a capitalist hires workers and provides them with wages and means of production, the products that they produce belong to the capitalist to sell at a profit. Not so here. Users are not paid for their labor, nor do they operate the means of production. Finally, people often say that the user is the “product.” This is also misleading. Users are not products, but rather we are the sources of raw-material supply. Surveillance capitalism’s unusual products manage to be derived from our behavior while remaining indifferent to our behavior. Its products are about predicting us, without actually caring what we do or what is done to us.

At this early stage of Google’s development, whatever Search users inadvertently gave up that was of value to the company they also used up in the form of improved services. In this reinvestment cycle, serving users with amazing Search results “consumed” all the value that users created when they provided extra behavioral data. The fact that users needed Search about as much as Search needed

users created a balance of power between Google and its populations. People were treated as ends in themselves, the subjects of a nonmarket, self-contained cycle that was perfectly aligned with Google's stated mission "to organize the world's information, making it universally accessible and useful."

By 1999, despite the splendor of Google's new world of searchable web pages, its growing computer science capabilities, and its glamorous venture backers, there was no reliable way to turn investors' money into revenue. The behavioral value reinvestment cycle produced a very cool search function, but it was not yet capitalism. The balance of power made it financially risky and possibly counterproductive to charge users a fee for search services. Selling search results would also have set a dangerous precedent for the firm, assigning a price to indexed information that Google's web crawler had already taken from others without payment. Without a device like Apple's iPod or its digital songs, there were no margins, no surplus, nothing left over to sell and turn into revenue.

Google had relegated advertising to steerage class: its AdWords team consisted of seven people, most of whom shared the founders' general antipathy toward ads. The tone had been set in Sergey Brin and Larry Page's milestone paper that unveiled their search engine conception, "The Anatomy of a Large-Scale Hypertextual Web Search Engine," presented at the 1998 World Wide Web Conference: "We expect that advertising funded search engines will be inherently biased towards the advertisers and away from the needs of the consumers. This type of bias is very difficult to detect but could still have a significant effect on the market...we believe the issue of advertising causes enough mixed incentives that it is crucial to have a competitive search engine that is transparent and in the academic realm."

Google's first revenues depended instead on exclusive licensing deals to provide web services to portals such as Yahoo! and Japan's BIGLOBE. It also generated modest revenue from sponsored ads linked to search query keywords. There were other models for consideration. Rival search engines such as Overture, used exclusively by the then-giant portal AOL, or Inktomi, the search engine adopted by Microsoft, collected revenues from the sites whose pages they indexed. Overture was also successful in attracting online ads with its policy of allowing advertisers to pay for high-ranking search listings, the very format that Brin and Page scorned.

Prominent analysts publicly doubted whether Google could compete with its more-established rivals. As the New York Times asked, "Can Google create a business model even remotely as good as its technology?" A well-known Forrester Research analyst proclaimed that there were only a few ways for Google to make money with Search: "build a portal [like Yahoo!]...partner with a portal...license the technology...wait for a big company to purchase them."

Despite these general misgivings about Google's viability, the firm's prestigious venture backing gave the founders confidence in their ability to raise money. This changed abruptly in April 2000, when the legendary dot-com economy began its steep plunge into recession, and Silicon Valley's Garden of Eden unexpectedly became the epicenter of a financial earthquake.

By mid-April, Silicon Valley's fast-money culture of privilege was under siege with the implosion of what came to be known as the "dot-com bubble." It is easy to forget exactly how terrifying things were for the valley's ambitious young people and their slightly older investors. Startups with outsized valuations just months earlier were suddenly forced to shutter. Prominent articles such as "Doom Stalks the Dotcoms" noted that the stock prices of Wall Street's most-revered internet "high flyers" were "down for the count," with many of them trading below their initial offering price: "With many dotcoms declining, neither venture capitalists nor Wall Street is eager to give them a dime..." The news brimmed with descriptions of shell-shocked investors. The week of April 10 saw the worst decline in the history of the NASDAQ, where many internet companies had gone public, and there was a growing consensus that the "game" had irreversibly changed.

As the business environment in Silicon Valley unraveled, investors' prospects for cashing out by selling Google to a big company seemed far less likely, and they were not immune to the rising tide of panic. Many Google investors began to express doubts about the company's prospects, and some threatened to withdraw support. Pressure for profit mounted sharply, despite the fact that Google Search was widely considered the best of all the search engines, traffic to its website was surging, and a thousand résumés flooded the firm's Mountain View office each day. Page and Brin were seen to be moving too slowly, and their top venture capitalists, John Doerr from Kleiner Perkins and Michael Moritz from Sequoia, were frustrated. According to Google chronicler Steven Levy, "The VCs were screaming bloody murder. Tech's salad days were over, and it wasn't certain that Google would avoid becoming another crushed radish."

The specific character of Silicon Valley's venture funding, especially during the years leading up to dangerous levels of startup inflation, also contributed to a growing sense of emergency at Google. As Stanford sociologist Mark Granovetter and his colleague Michel Ferrary found in their study of valley venture firms, "A connection with a high-status VC firm signals the high status of the startup and encourages other agents to link to it." These themes may seem obvious now, but it is useful to mark the anxiety of those months of sudden crisis. Prestigious risk investment functioned as a form of vetting — much like acceptance to a top university sorts and legitimates students, elevating a few against the backdrop of the many — especially in the "uncertain" environment characteristic of high-tech investing. Loss of that high-status signaling power assigned a young company to a long list of also-rans in Silicon Valley's fast-moving saga.

Other research findings point to the consequences of the impatient money that flooded the valley as inflationary hype drew speculators and ratcheted up the volatility of venture funding. Studies of pre-bubble investment patterns showed a "big-score" mentality in which bad results tended to stimulate increased investing as funders chased the belief that some young company would suddenly discover the elusive business model destined to turn all their bets into rivers of gold. Startup mortality rates in Silicon Valley outstripped those for other venture capital centers

such as Boston and Washington, DC, with impatient money producing a few big wins and many losses. Impatient money is also reflected in the size of Silicon Valley startups, which during this period were significantly smaller than in other regions, employing an average of 68 employees as compared to an average of 112 in the rest of the country. This reflects an interest in quick returns without spending much time on growing a business or deepening its talent base, let alone developing the institutional capabilities. These propensities were exacerbated by the larger Silicon Valley culture, where net worth was celebrated as the sole measure of success for valley parents and their children.

For all their genius and principled insights, Brin and Page could not ignore the mounting sense of emergency. By December 2000, the Wall Street Journal reported on the new “mantra” emerging from Silicon Valley’s investment community: “Simply displaying the ability to make money will not be enough to remain a major player in the years ahead. What will be required will be an ability to show sustained and exponential profits.”

The declaration of a state of exception functions in politics as cover for the suspension of the rule of law and the introduction of new executive powers justified by crisis. At Google in late 2000, it became a rationale for annulling the reciprocal relationship that existed between Google and its users, steeling the founders to abandon their passionate and public opposition to advertising. As a specific response to investors’ anxiety, the founders tasked the tiny AdWords team with the objective of looking for ways to make more money. Page demanded that the whole process be simplified for advertisers. In this new approach, he insisted that advertisers “shouldn’t even get involved with choosing keywords — Google would choose them.”

Operationally, this meant that Google would turn its own growing cache of behavioral data and its computational power and expertise toward the single task of matching ads with queries. New rhetoric took hold to legitimate this unusual move. If there was to be advertising, then it had to be “relevant” to users. Ads would no longer be linked to keywords in a search query, but rather a particular ad would be “targeted” to a particular individual. Securing this holy grail of advertising would ensure relevance to users and value to Advertisers.

Absent from the new rhetoric was the fact that in pursuit of this new aim, Google would cross into virgin territory by exploiting sensitivities that only its exclusive and detailed collateral behavioral data about millions and later billions of users could reveal. To meet the new objective, the behavioral value reinvestment cycle was rapidly and secretly subordinated to a larger and more complex undertaking. The raw materials that had been solely used to improve the quality of search results would now also be put to use in the service of targeting advertising to individual users. Some data would continue to be applied to service improvement, but the growing stores of collateral signals would be repurposed to improve the profitability of ads for both Google and its advertisers. These behavioral data available for uses beyond service improvement constituted a surplus, and it was on

the strength of this behavioral surplus that the young company would find its way to the “sustained and exponential profits” that would be necessary for survival. Thanks to a perceived emergency, a new mutation began to gather form and quietly slip its moorings in the implicit advocacy-oriented social contract of the firm’s original relationship with users.

Google’s declared state of exception was the backdrop for 2002, the watershed year during which surveillance capitalism took root. The firm’s appreciation of behavioral surplus crossed another threshold that April, when the data logs team arrived at their offices one morning to find that a peculiar phrase had surged to the top of the search queries: “Carol Brady’s maiden name.” Why the sudden interest in a 1970s television character? It was data scientist and logs team member Amit Patel who recounted the event to the New York Times, noting, “You can’t interpret it unless you know what else is going on in the world.”

The team went to work to solve the puzzle. First, they discerned that the pattern of queries had produced five separate spikes, each beginning at forty-eight minutes after the hour. Then they learned that the query pattern occurred during the airing of the popular TV show *Who Wants to Be a Millionaire?* The spikes reflected the successive time zones during which the show aired, ending in Hawaii. In each time zone, the show’s host posed the question of Carol Brady’s maiden name, and in each zone the queries immediately flooded into Google’s servers.

As the New York Times reported, “The precision of the Carol Brady data was eye-opening for some.” Even Brin was stunned by the clarity of Search’s predictive power, revealing events and trends before they “hit the radar” of traditional media. As he told the Times, “It was like trying an electron microscope for the first time. It was like a moment-by-moment barometer.” Google executives were described by the Times as reluctant to share their thoughts about how their massive stores of query data might be commercialized. “There is tremendous opportunity with this data,” one executive confided.

Just a month before the Carol Brady moment, while the AdWords team was already working on new approaches, Brin and Page hired Eric Schmidt, an experienced executive, engineer, and computer science Ph.D., as chairman. By August, they appointed him to the CEO’s role. Doerr and Moritz had been pushing the founders to hire a professional manager who would know how to pivot the firm toward profit. Schmidt immediately implemented a “belt-tightening” program, grabbing the budgetary reins and heightening the general sense of financial alarm as fund-raising prospects came under threat. A squeeze on workspace found him unexpectedly sharing his office with none other than Amit Patel.

Schmidt later boasted that as a result of their close quarters over the course of several months, he had instant access to better revenue figures than did his own financial planners. We do not know (and may never know) what other insights Schmidt might have gleaned from Patel about the predictive power of Google’s behavioral data stores, but there is no doubt that a deeper grasp of the predictive power of data quickly shaped Google’s specific response to financial emergency,

triggering the crucial mutation that ultimately turned AdWords, Google, the internet, and the very nature of information capitalism toward an astonishingly lucrative surveillance project.

Google's earliest ads had been considered more effective than most online advertising at the time because they were linked to search queries and Google could track when users actually clicked on an ad, known as the "click-through" rate. Despite this, advertisers were billed in the conventional manner according to how many people viewed an ad. As Search expanded, Google created the self-service system called AdWords, in which a search that used the advertiser's keyword would include that advertiser's text box and a link to its landing page. Ad pricing depended upon the ad's position on the search results page.

Rival search startup Overture had developed an online auction system for web page placement that allowed it to scale online advertising targeted to keywords. Google would produce a transformational enhancement to that model, one that was destined to alter the course of information capitalism. As a Bloomberg journalist explained in 2006, "Google maximizes the revenue it gets from that precious real estate by giving its best position to the advertiser who is likely to pay Google the most in total, based on the price per click multiplied by Google's estimate of the likelihood that someone will actually click on the ad." That pivotal multiplier was the result of Google's advanced computational capabilities trained on its most significant and secret discovery: behavioral surplus. From this point forward, the combination of ever-increasing machine intelligence and ever-more-vast supplies of behavioral surplus would become the foundation of an unprecedented logic of accumulation. Google's reinvestment priorities would shift from merely improving its user offerings to inventing and institutionalizing the most far-reaching and technologically advanced raw-material supply operations that the world had ever seen. Henceforth, revenues and growth would depend upon more behavioral surplus.

Google's many patents filed during those early years illustrate the explosion of discovery, inventiveness, and complexity detonated by the state of exception that led to these crucial innovations and the firm's determination to advance the capture of behavioral surplus. One patent submitted in 2003 by three of the firm's top computer scientists is titled "Generating User Information for Use in Targeted Advertising." The patent is emblematic of the new mutation and the emerging logic of accumulation that would define Google's success. Of even greater interest, it also provides an unusual glimpse into the "economic orientation" baked deep into the technology cake by reflecting the mindset of Google's distinguished scientists as they harnessed their knowledge to the firm's new aims. In this way, the patent stands as a treatise on a new political economics of clicks and its moral universe, before the company learned to disguise this project in a fog of euphemism.

The patent reveals a pivoting of the backstage operation toward Google's new audience of genuine customers. "The present invention concerns advertising," the inventors announce. Despite the enormous quantity of demographic data available to

advertisers, the scientists note that much of an ad budget “is simply wasted...it is very difficult to identify and eliminate such waste.”

Advertising had always been a guessing game: art, relationships, conventional wisdom, standard practice, but never “science.” The idea of being able to deliver a particular message to a particular person at just the moment when it might have a high probability of actually influencing his or her behavior was, and had always been, the holy grail of advertising. The inventors point out that online ad systems had also failed to achieve this elusive goal. The then-predominant approaches used by Google’s competitors, in which ads were targeted to keywords or content, were unable to identify relevant ads “for a particular user.” Now the inventors offered a scientific solution that exceeded the most-ambitious dreams of any advertising executive:

There is a need to increase the relevancy of ads served for some user request, such as a search query or a document request...to the user that submitted the request...The present invention may involve novel methods, apparatus, message formats and/or data structures for determining user profile information and using such determined user profile information for ad serving.

In other words, Google would no longer mine behavioral data strictly to improve service for users but rather to read users’ minds for the purposes of matching ads to their interests, as those interests are deduced from the collateral traces of online behavior. With Google’s unique access to behavioral data, it would now be possible to know what a particular individual in a particular time and place was thinking, feeling, and doing. That this no longer seems astonishing to us, or perhaps even worthy of note, is evidence of the profound psychic numbing that has inured us to a bold and unprecedented shift in capitalist methods.

The techniques described in the patent meant that each time a user queries Google’s search engine, the system simultaneously presents a specific configuration of a particular ad, all in the fraction of a moment that it takes to fulfill the search query. The data used to perform this instant translation from query to ad, a predictive analysis that was dubbed “matching,” went far beyond the mere denotation of search terms. New data sets were compiled that would dramatically enhance the accuracy of these predictions. These data sets were referred to as “user profile information” or “UPI.” These new data meant that there would be no more guesswork and far less waste in the advertising budget. Mathematical certainty would replace all of that.

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