CHAPTER 10[1]: THE LAST FEW DECADES
THE 1990s – 2010s

Contents

I. INTRODUCTION

We are now at the scale of current events: changes that have occurred within your own lifetime. Though the time-scale is short, there is plenty to discuss, as culture and technology are changing more rapidly than ever before. Change itself is a major theme, as some people embrace it and others find themselves feeling alienated. Chapter 1 is perhaps the most difficult chapter to write and read objectively, because this is our temporal home land. Everyone has an opinion about the world around us today!

The chapter opens with the development of internet technology, from the world wide web to mobile big data. Web technology is arguably the single most important development in this chapter, as cyberspace creates a whole new environment for human interaction. Networking has transformed the lives of individuals, global institutions, and all echelons of relationships in between.

From there, the discussion turns to geopolitics. The political world map has undergone a tectonic shift, from the bipolar US / USSR tension to a four-quartered world influenced chiefly by the US, EU, Russia, and China. The Arab World continues to command the world's attention as one of the least stable regions. In this century, it has been the site of populist revolutions and the endless War on Terror. Financial crises have swept the globe with unprecedented regularity in the last few decades. Global warming has recently become a hot topic in international discourse. Whatever you believe about climate change, you can't deny that the debate looms large. This chapter will explore the causes and effects of these world headlines.

One of humanity's worst new enemies is the HIV virus. The AIDS epidemic came at a very interesting crossroads in time. Smallpox had just been eradicated. The science of molecular biology was just getting to the point where it could help fight viruses on their own terms. Personal morals and family life were going through explosive reinvention. AIDS dampened the sexual revolution while bringing the gay civil rights movement to mainstream attention.

The chapter closes with a discussion of the gaps between today's living generations. Longer-term trends such as industrialization and the sexual revolution were already introduced in Chapter 2, but technology and norms are changing so quickly now that today's children have a different life experience from their parents. There has also been quite an economic shift in the

last few decades. The nature of education and the workplace, and people's relationships to time and money, are markedly different from one generation to the next. In these last few decades, social discourse has been heavily influenced by identity politics on the left and nationalism and conspiracism on the right.

II. The Web And Mobile Computing

A.   *How the Web was Won*

1.   *The world wide web*

Do you know the difference between the internet and the world wide web? The internet is a hardware network of cables and routers – the physical infrastructure of computer connections. Originally government property, it has been built up gradually since the 1960s. The world wide web is a software component, and it was whipped up in short order by one man.

In the late 1980s, CERN laboratories in Switzerland hired British computer scientist **Timothy Berners-Lee** to help CERN scientists collaborate on massive, complex physics projects. Berners-Lee coded the World Wide Web * as an "information system" to address that challenge, and he was virtually its sole keeper and promoter for the first few years. Berners-Lee and collaborator Robert Cailliau set up the first web server, a **web browser**, and a few web pages by late 1990. A web browser is an "app" that enables any computer to become web-accessible. The very first webpages served to describe the World Wide Web itself. [1]

Berners-Lee's innovation was to write *hypertext* that worked across the internet. Hypertext, which has been around since the 1960's, refers to the placement of links between computer files. It enables a computer user to jump around from one paragraph to another, or even from one computer file to another. Berners-Lee's web was an extension of hypertext that could point among an entire network of computers, even the global internet. He also expanded the concept to links between all kinds of files besides text, such as images, audio and video.

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* Originally capitalized, not much anymore.

Today, the web is more broadly referred to as a system of **hyperlinks**. The World Wide Web gave us the seven letters http://www. The "http" stands for hypertext transfer protocol, the new standard for transmitting information from one computer to another.

The web became available for public use in 1991, and Berners-Lee encouraged programmers to help develop resources for it. A University of Illinois (UI) team made the first mass-market web browser, **Mosaic**. It operated on popular home computers, and it was the first browser to combine graphics with text. This gave the web a quick surge in popularity. However, when UI started charging license fees for others to use Mosaic, Berners-Lee became very concerned that this kind of profit motive would restrict access to the web. [2] Meanwhile, he saw a competing internet system, Gopher, struggling under an effort to monetize. [3]

Berners-Lee and CERN made a bold move shortly after Mosaic's 1993 release. They released the www code to the public, relinquished their rights to profit from it, and declared that the web should be free for everyone. [4] This decision unleashed the beast, making the world wide web larger than any gatekeeper. It surged again and quickly became the internet standard. Berners-Lee's historic decision delayed his own fortune by years. By now, he is deservedly wealthy as the head of several internet- and web-related organizations.

2.   Commercialization

1995 was the next landmark year for the internet and the web. Before that, the American segment of the internet was still under strict government control, and commercial activity was expressly forbidden. [5] As part of the government's divestiture of its network, those commercial restrictions on internet traffic were dropped on 1/01/1995. Just a few months later, Mosaic spinoff **Netscape** enjoyed an explosive initial public offering on the stock market, making the first dot-com overnight millionaires. Businesses and startups immediately realized that they had a goldmine of potential customers. Amazon, eBay, Yahoo!, and Craigslist were some of the largest and most enduring websites to launch by 1995. The release of Microsoft's Windows 1995 included Internet Explorer.

As the web grew, indexing it became an absolute necessity. [*] A browser such as Netscape or Internet Explorer could follow a command to go to a particular website, but it did not provide guidance if the user did not know the address. The next major development was the ***search engine***. A user could indicate what content she was looking for, and the search engine would check pages throughout the web for matching terms. The earliest major search engines were WebCrawler and Lycos in 1994. Google appeared in 1998 and, through use of its superior algorithms for indexing and ranking search results, quickly rose to prominence.

The late 1990's saw a flurry of activity as corporations new and old rushed to get online. Web technology is credited with allowing the global economy to grow at hitherto impossible rates for several years. On the flipside, it also led to overly zealous investing in the ***high-tech bubble*** of 1995 – 2001. When most e-commerce corporations failed to show profits by the early 2000's, this bubble burst, contributing to the recession of 2001.

The websites of the 21st century are much more interactive than the static webpages of the 1990s. Websites such as Facebook, YouTube, Wikipedia, Yelp, and millions of blogs are often described as Web 2.0. The online population is still growing exponentially. As recently as 1990, a majority of Americans had never used computers. [6] Now, more than half the human population accesses the internet, [7] including a quarter of Americans online "almost constantly". [8]

3.   Mobility

Simultaneously with the development of the web, information technology has become increasingly lightweight, wireless, mobile, and personalized. "Laptop" computers [†] were fairly well-known by 1990. Digital (2G) cell phones and SMS text messages were in place by 1993. Wi-Fi was commonplace by the late '90s. This was a wireless connection for use within a home or office, e.g. to allow printers and other smart appliances to communicate with the central computer.

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[*] Many people may remember hardcopy internet yellow pages, a naïve resource that came and went quickly in the mid-1990's. For a good laugh, see this vintage Amazon page offering such a directory for sale. (Accessed and saved 2/09/19).

[†] Why is it that a "desktop" computer sits under a desk, a "laptop" sits on a desktop, and a true laptop computer is called a "phone"?

A few devices integrated cell phone and internet capability as far back as the mid-1990s. The first hand-held computer to really make a splash, though, was the iPhone, released in 2007. Typically for Apple, it was not the iPhone's functionality that was new, but its user-friendly design. It replaced a physical keyboard with a "soft" keyboard on the screen. The iPhone also made it very easy for users to download apps. These software and hardware features combined to make the iPhone a truly general-purpose computer. Smartphones are not as versatile as larger computers, but they don't need to be. Most users have very low-grade computing needs like texting, web browsing, and photo-sharing. More demanding processing or storage is now offered easily on the "cloud" of remote servers. For a growing number of young users, a smartphone is the only computer they need. [9]

In the '10s, tech companies have focused on dynamic apps and personalization. Rather than directing all users to one universal webpage, computers now bring up-to-the-minute information to each user according to location, demographic, and browsing history. If you like Thai food, your phone might start alerting you to nearby Thai restaurants (or even catering trucks) at lunchtime. A smart car can tell you how much traffic is up ahead, and how to avoid it. In fact, real-time traffic information is obtained by tracking all phones or GPS units on the road. This intense gathering and processing of information is a typical application of ***big data***.

4. *Transistor breakthroughs*

How does all this technology work? Most people seem to take their computers for granted, although today's technology would certainly have been called "science fiction" decades ago and "magic" centuries before that. Behind the scenes, though, is a gigantic industry applying some of history's most ridiculously advanced engineering toward one overarching goal: to make transistors increasingly smaller and faster. Transistors have shrunk from 10^{-6} meter in 1990 to 10^{-8} meter (100 atoms wide!) in 2020. Every reduction poses new challenges and necessitates breakthroughs. It's beyond the scope of this book to retrace all these feats (many of them are trade secrets anyway). Some of the most important 21st century techniques have names like anti-reflective coating [10] , strained silicon [11] , atomic layer deposition, and immersion lithography. Whether you've heard of them or not, these are the methods that make your smartphone and multiplayer online video games possible.

Moore's Law continues to describe the pace of advancement fairly accurately – integrated circuits double in processing power about every two years. This makes for a thousand-fold increase in computing capabilities every two decades, a trillion-fold in a lifetime. The computing power that I carry around with me today would have served a major city at the time I was born.

B. *Living in an Online World*

Almost everyone living today understands how the telecommunication revolution has changed our lives and our world. I am only in my 40's as I write this chapter, yet some periods of my past already feel impossibly old-fashioned. It doesn't seem very long ago that "research" meant trips to the library, rooms full of microfilm, or maybe thumbing through the 30-volume encyclopedia at home. Now I am able to research the contents of this entire book from my desk, or out at a café if I prefer. In the 2010's, every child grows up taking for granted that information, music, text messages, pictures, and videos are instantly accessible with the touch of a button.

The computer revolution has done more than bring us numerous toys and conveniences. The world is fundamentally different now that information can flow freely and instantly. It seems that discussing internet philosophy is impossible without using terms like "double-edged." The internet is inherently neither good nor bad, but it is an effective tool for enabling both positive and negative behavior. Even more than television, the web has the potential to expand everyone's perspective. We are much more apt to sympathize with people around the world when we can watch their YouTube videos and read their blogs, yet it is also easier for extremists to find each other and form virtual communities. Submitting our personal information to websites allows for a wonderfully tailored experience ("Oh look, there's a pair of shoes just like the one I looked at last month, on sale only two miles away!") At the same time, big data divulges an awful lot of private information to parties both known and unknown. Web 2.0 put us back in touch with long-lost friends. It also brought "comments sections" into our homes, often worse than a bathroom wall.

Knowledge is power. The information age has gone a long way toward democratizing information. Shoppers can easily look up prices, and body cameras take us right into police

action. Yet ironically our very access to information is in the hands of a high-tech oligopoly. Corporations like Facebook, Amazon, and Google are *de facto* monopolies (especially in developing countries) [12] . Economic arguments could be made that their industries are natural monopolies, but Berners-Lee recently expressed great concern about their size and power. [13]

In this global village, [14] "everyone knows everyone," or at least we all have fairly easy access to one another. This has created a loop back to ancient modes of moral enforcement. In the first prehistoric communities, transgressions were easily punished by ridicule and ostracism. As villages grew larger and some people got lost in the crowd, judgment passed to all-knowing, punishing gods.   In this millennium, online reputation has the power to play the role of omniscient judge. The shady businessman who scams clients faces the possibility of negative reviews that put him out of business. Parents can open up neighborhood maps with icons locating nearby sex offenders. That sounds like a remedy for justice, but public opinion is touchy and inconsistent, especially in the pluralistic online world. Disagreements and mistakes sometimes fall to mob rule and public shaming beyond the scope of the offense. [15]

Life is 90% beautiful, 9% imperfect, and 1% terrible. Updating the technology can't change that balance. These new facts of life have cropped up just in our generation, but the way things look, the world will be online for a long time to come. We'd better appreciate our blessings and the solutions to many old problems, while learning to deal with the new ones.

III. CURRENT GEOPOLITICS

A. Today's Four Superpowers

At the turn of the century, the American / Soviet hemispheres shifted rapidly to a quartered globe dominated by the US, European Union, Russia, and China. The three Eurasian superpowers have arrived from very different arcs of history.

The USSR, the last empire, fragmented into Russia and several other independent states by 1991. Reasons for Soviet failure included a prolonged arms race and space race with the United States, stubborn isolationism, and an economy that grew too large and complex for the government to micro-manage. [16] The new national governments made moves to privatize their most valuable industries – like energy and mining – but the fortune was too great, and the

transition too abrupt, to control. Most Soviet wealth passed quickly into the hands of just a few oligarchs. Russia was in ruins until 2000, when Vladimir Putin assumed the presidency. Putin took advantage of high oil and gas prices to stabilize the economy. [17] He has led a very complicated regime, managing the oligarchs at home and the country's lucrative energy exports and arms sales abroad. Relations with the other superpowers have been especially tense after Russia's invasion of Crimea in 2014 and interference with US elections in 2016.

The European Union assumed its present political form in 1993, [18] with the euro as common currency since 2000. In many ways, the unification of Europe has been a striking success. EU membership has traditionally been highly coveted, especially by less developed countries. It promises the allure of subsidies, economic support, jobs, and access to major markets. To earn EU membership, a candidate state must exhibit a stable democracy and basic human rights without rampant corruption in government. [19] These criteria have allowed the EU to grow by positive reinforcement, methodically pressuring growth, peace, and stability at its fringes.

Even so, the '10s have been a trying period for the union. It is perfect case study of the challenges of equilibration – raising up poor regions by integrating them with richer ones. A debt crisis among its poorer states has put European resolve to the test. In 2019, the EU faced its first secession when one of its wealthiest members, Great Britain, made its "Brexit".

China claims the world's largest population and economy, which grew explosively at double-digit rates for many years. Though the Communist Party is still in control, it began economic liberalization reforms in the 1980s. China is now described as a socialist market economy. [20] Scholars debate why China has been able to make this transition so much more successfully than other recently-industrialized nations. Hypotheses include the Confucian ethic [21] or a civil incentive system that promotes local leaders based on their economic successes. [22] The single-party Chinese government still draws plenty of criticism in other regards. It has a notoriously bad record on human rights, and it grants limited economic freedom beyond its special economic zones on the coast. President Xi Jinping has been consolidating power and now holds multiple key offices without term limits.

On the UN Security Council, the autocratic eastern states still usually vote in lockstep against the west. The superpowers' chess board is the "second world" of large-but-dependent client countries. Governments and corporations tend to be attracted to American, European,

Russian, and Chinese zones of influence. The superpowers compete intensely in these regions for investment opportunities, trade relations, and military alliances. Collectively, then, these emerging nations possess enormous clout. [23]

B. *The War on Terror and the Arab Spring*

Terrorism, jihad, revolution, war … none of these are new, but in the last few decades they have crossed currents in ways never seen before, taking the Islamic struggle to the world stage.

One of the Soviet Union's final campaigns was its failed invasion of Afghanistan in the 1980s. Among the combatants was a young generation of Islamists, the *jihadists*, who hoped to replace the Soviet-backed secular government with a Moslem state. They succeeded, and by 1994 their *Taliban* controlled the region. Inspired by that success, and with years of training under their belts, many jihadists turned their attention to new theaters. The best known among them was Osama bin Laden, who had founded al Qaeda.

By that time, the United States had intervened against Iraq and still had a military presence in Saudi Arabia. Many jihadists, including bin Laden, were offended by that presence. Emboldened by their defeat of one superpower, they put pressure on the US to leave the Arabian Peninsula. A series of strikes and counterstrikes between the US and al Qaeda culminated in the World Trade Center attacks of September 11, 2001. It was the largest terror attack in human history and the United States' deadliest day since its civil war.

In response, US President George W. Bush elevated the conflict to the scale of war. He organized a UN "war on terror", [24] which commenced immediately with the invasion of Afghanistan. Bush then led a much more controversial invasion of Iraq to topple Saddam Hussein. These campaigns quickly achieved their immediate goals: UN forces quickly routed the Taliban government in 2001 and extirpated Hussein's regime in 2003. However, a lack of long-term planning has led to decades of war, instability, and ironically much more terrorism. The new UN-supported governments have been weak. Taliban insurgencies continue to this day in Afghanistan and Pakistan, and al Qaeda has spread into Iraq.

Meanwhile, a homegrown revolutionary spirit was fomenting in the Arabic world. A growing number of college students were graduating into a jobless economy mismanaged by

corrupt authoritarian governments. The people of Tunisia were the first to reach a breaking point. They organized *en masse* to immobilize and impeach their government. Much to everyone's surprise, they were highly successful. The government collapsed within a month of peaceful protests. The Tunisian revolution was a flashpoint that inspired millions. In the ***Arab Spring*** of 2011, protests spread to Algeria, Libya, Egypt, Lebanon, Yemen, Bahrain, Syria, and elsewhere, mostly within the 22 Arab League nations. The Egyptian and Yemeni regimes fell that year. By the end of 2011, some of these dictators were on trial, held accountable for crimes during their reign.

Much like the War on Terror, the Arab Spring was successful only in the short term. Two Arab countries, Libya and Syria, slipped into all-out civil war. Dictators Moammar Qadaffi in Libya and ***Bashar al Assad*** in Syria took up arms against their own citizens. The Libyan conflict was the first to draw foreign intervention. With the aid of French air support, Libyan rebels captured Qadaffi and killed him on the spot.

Leaving power vacuums, the unfortunate long-term consequence of the Arab Spring was to open the door to jihadists. Most Arab dictators had headed secular regimes and had stifled religious opposition. Egypt soon fell into the hands of the Moslem Brotherhood.

Syria's war has continued to rage on for years. Assad and his Ba'ath party, though nominally a secular government, are Shi'ites, a small minority in Syria. The citizen rebels were mostly Sunni, so they attracted unwelcome support from radical groups like al Qaeda and its offshoot, the Islamic State in Iraq and Syria (ISIS). The international community intervened in 2014, bringing the fate of the Arab Spring together with the War on Terror.

The War on Terror has been much costlier than the terrorism itself. The US-led military campaigns have cost trillions of dollars [25] and have killed around a million people. [26] They have been highly divisive in the US and Europe, not only for their costs but for their impact on domestic policies such as protectionism, surveillance, and immigration.

C. Global Financial Crises

The global financial crisis of 2007 – '08 was the world's worst recession since the Great Depression. In broader context, it was just the most recent in a series of unusual financial crises around the world. The 1980s – 2000s were a particularly volatile period. [27]

To try to encapsulate a very complex phenomenon in a nutshell, a financial crisis is a large-scale pattern of unsustainable borrowing. It often results when there is an overabundance of money and low interest rates. Consumers borrow heavily. If they are borrowing for, say, real estate, home prices rise. This attracts *speculators*, financiers who buy and sell real estate for short-term profit. Unfortunately, all this activity is built on a false foundation without adding any value to the economy. Such a *bubble* always reaches a climax of wanton lending, fraud, and white-collar crime before it crashes. False prices collapse, borrowers default on loans, and banks run out of money to lend. It is a vicious cycle that gets much worse very quickly.

National governments, central banks, and insurance companies have become well equipped and willing to be lenders of last resort when banks need help with liquidity. The recent crises have all been international. There is no effective central bank for the world. International crises are further complicated by the fact that they involve multiple currencies. Only since the 1970's, the values of different units of currency – the dollar, pound, euro, yen, etc. – have been "floating" independently of each other. Each country has some control over its own currency, while other factors are determined by the whims of market forces. Currency fluctuations create a whole new dimension of complexity that makes global financial crises much more difficult to manage than domestic ones. For instance, if a Thai lender borrows dollars, and then the Thai baht devalues by 50%, suddenly that lender must repay twice as many bahts! This actually happened in the late '90s.

The era of floating currencies has actually been a continuous period of one crisis precipitating another. A sequence of crises can be traced from Latin America to Japan to Southeast Asia to the United States and then around the world. The Japanese boom and bust was particularly interesting. As investors took their money out of Japan in the 1980s, they took much of it to newly liberalized China. This was the seed money for China's campaign of growth.

This history of crises has shown that, in the age of floating currencies, exchange rates can fluctuate uncontrollably. This can lead to large-scale cross-border money flows, which can precipitate bubbles and crashes. Some economists believe that a central world bank would provide much greater stability, because it would not have to worry about exchange rates and would have greater control over the total money supply. [28] However, a true world bank is not a

politically popular concept. [*] Each nation has a long history with its particular currency, and can use it to exert some degree of influence over the economy in its part of the world. It is very difficult to give up this mark of national sovereignty and relinquish it to a larger authority.

In fact, the 2010s have been characterized by populist right-wing politics. The US, India, Israel, Turkey, Poland, and Brazil have elected leaders on brazenly nationalist platforms since 2008. The UK voted to leave the EU, mostly for localized control over its economy and borders. At least one study has shown a correlation between the financial crisis and this current trend of right-wing populism. [29]

Yet if the economic analysis of floating currencies is correct, financial crises are a global problem that could use a global solution. A *de facto* world bank could have helped prevent or mitigate the wild financial crises of the recent past. It is an institution worth considering for the long run, as globalism becomes increasingly comfortable for those young people who were not born in ultra-nationalistic times.

D. The Global Warming Debate

Since the 19th century, scientists have understood that industry and mining release greenhouse gases that can trap heat at Earth's surface. Early evidence of CO_2 accumulation in the atmosphere was demonstrated in 1960. [30] By the 1980s, the average global temperature was also slightly on the rise, in a pattern consistent with the greenhouse effect. [31] Further signs of warming include reduced sea ice [32] and slowly rising sea levels. [33]

Global warming gained serious political attention in 1990, when a UN committee, the Intergovernmental Panel on Climate Change (IPCC), began issuing *assessment reports*. Each assessment report discusses evidence of climate change and the effects of greenhouse gases, present or predicted environmental impacts, and recommended policies, which serve as the basis for international negotiations. The assessment reports have made climate change a hot-button political issue, because they recommend significant changes in industrial practices worldwide. The Fifth Assessment Report predicts serious environmental damage and advises a wholescale

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[*] The UN-related World Bank is not a bank in the traditional sense, most importantly in that it does not have its own currency.

shift from fossil fuels to renewable sources of energy such as solar, wind, and nuclear energy within this century! [34]

That would be a very difficult and expensive transition. Coal and oil have literally fueled the industrial revolution and all the marvels of the last two centuries. When a UN agency tells us to abandon them, it's a suggestion that will not be taken lightly. Conservatives say that the evidence for climate catastrophe is not strong enough to justify such a sacrifice. After all, climate science involves infinitely complex data and predictions of the future. It is definitely not simple.

Even among the concerned mainstream, action on climate change would require a carefully orchestrated international agreement, and that has not yet come about. Two key accords came close – Kyoto in 1997 and Paris in 2016 – but both failed in practice. No nation or corporation wants to put itself at an industrial disadvantage experimenting with clean energy while its neighbors burn tried-and-true coal. It's a textbook example of what political scientists call *game theory*, where individual players have interests at odds with the collective.

As with any emotional and complex issue, there are now extreme viewpoints. Ultra-conservatives, with President Trump at the helm, dismiss evidence showing any risk of global warming. [35] The Al Gore camp, on the other extreme, takes the most alarmist predictions at face value. [36] The truth probably lies somewhere in between. Billions of people are burning fossil fuels, so of course global warming is a risk, even if the ecological impacts cannot be isolated or predicted. Fossil fuels are non-renewable, so future generations will eventually need to find alternatives anyway. By all measures, industries should be encouraged to phase in renewable energy. Yet this transition will bear its own costs and risks, urging a balanced approach. [37]

Nevertheless, the two political fringes seem to be growing larger and more entrenched. [38] Thus far at least, global warming's greatest proven impact has been to get people hot under the collar.

IV. AIDS: SCIENCE AND SOCIETY

A. *The HIV Virus and the AIDS Epidemic*

Just three years after smallpox was eradicated, a new epidemic caught the attention of the medical community. The US Centers for Disease Control published a study of five mysterious Los Angeles deaths in June, 1981. This is recognized as the date that Acquired Immune Deficiency Syndrome (*AIDS*) became a known disease. [39]

Human Immunodeficiency Virus (*HIV*), the virus that causes AIDS, has actually been a human pathogen since about 1920. The HIV virus first evolved in Central African chimpanzees. It was most likely transmitted to a small number of Africans who hunted and butchered chimps. AIDS took hold as an epidemic along the Congo River. It seems to have made its way to Europe and the Americas by the 1960s. Due to its long latency period and a relatively slow spread, it avoided widespread detection through the 1970s. [40]

Some research suggests that the spread of AIDS was also ironically accelerated by the cure of smallpox! The smallpox vaccine appears to have offered some degree of immunity to HIV. [41] HIV silently spread around the world at the very moment that smallpox was dying out and its vaccine was decreasingly necessary.

We often associate AIDS with America in the 1980s, because that is when it experienced its first major outbreak and caused immediate public alarm. There is anecdotal evidence, at least, that it dampened the sexual revolution. [42] However, the global pandemic was just getting started in 1990. After its magnification in American gay communities, HIV spread much more quickly worldwide. The rate of new infections peaked in 1997, and annual deaths peaked in 2005 – hundreds of times deadlier than 20 years earlier. [43]

HIV is a *retrovirus*, meaning that it infects its host with a nasty trick called *reverse transcription*. In transcription, DNA is used as a template to synthesize RNA, which in turn codes for proteins. A retrovirus is made of RNA. After infecting a victim, HIV reverse-transcribes itself into six genes, and then incorporates itself into the host's own DNA! All subsequent copies of the victim's infected cells also contain the new genes, which get transcribed into copies of the original retrovirus during normal human transcription. [44] HIV is also especially nefarious because it attacks the immune system itself. When the viral count becomes

high enough, it begins to seriously compromise the immune system, the condition that is known as AIDS. In that condition, the victim is susceptible to all manner of infectious agents.

A promising new strain of AIDS medicines emerged in the mid-1990s. They are informally called **drug cocktails** because they combine three or more chemical lines of defense. Drug cocktails are expensive, but have been highly effective at lowering viral counts and mitigating AIDS symptoms in many HIV+ patients. They work by interfering with the virus's ability to reproduce, thus maintaining a viral count below the threshold necessary to cause AIDS. A handful of patients have been cured completely [45] or functionally (without further need of medicine). [46] Now there is a sense that the epidemic is coming under control in the first world. It is still a bad crisis in poorer countries, where drug cocktails are unaffordable and where education and women's rights are still sorely lacking.

To date, the HIV virus has infected about 70 million people worldwide, approximately half of whom have died of AIDS. [47] Though transmission and death rates are on the decline, it is still one of the leading causes of preventable death in the world. Making a full cycle, AIDS is once again most severe in poor African countries.

B. The LGBT Movement

Gay rights is one of the most emotionally divisive issues in modern culture. AIDS played a key role in rallying emotions on both sides. Before AIDS, it was not only possible, but apparently very common for gay men to keep their sexual identities private, even from their families, for their entire lives. When a young gay man contracted AIDS, his family had to confront it with him, often in a wrenchingly emotional medical battle. The disease impacted a large number of families, who had to seriously reevaluate their image of homosexuality. This marked the beginning of widespread support for gay rights among the population at large. [48]

Since the 1990s, at least two significant trends have followed. First, open homosexuality has become increasingly common, to the point of being perfectly ordinary in urban life and the entertainment industry. Second, gay pride has evolved into a full-fledged civil rights movement. A movement is afoot to add sexual orientation as a legally "protected class" in the United States, entitled to the same anti-discriminatory protection as race, gender, or religion. The US military

and Boy Scouts are two institutions that have famously rescinded such discrimination voluntarily.

While AIDS made the gay male community much more visible, women have always been part of the gay rights movement. To reflect increasing inclusivity, the term LGB (lesbian / gay / bisexual) came into favor in the 1980s, now usually with a "T" for "transsexual" and sometimes a "Q" for "queer". LGBT issues have become a linchpin of identity politics, with strong leftist encouragement to protect rights across the sexual spectrum – or seemingly even to invent new sexual / gender / identity permutations. [*]

By far the central thrust of the civil rights movement has been the quest for gay marriage. In 1989, Denmark became the first country to grant a *civil union*, a quasi-marriage for same-sex couples. [49] Since then, a complex variety of gay marriages and civil unions have been legalized in several jurisdictions around the world. After Northern Europe, South America has surprisingly emerged as one of the most progressive regions. Where civil union or same-sex marriage is legal, it generally provides same-sex couples with the same rights as traditional couples, such as inheritance rights, medical benefits, and tax breaks.

Conservative pushback has been considerable. With a small minority and an obvious reproductive handicap, homosexuality had no chance of ever evolving as a mainstream lifestyle. Homophobia never needed a rational basis to persist, because it had never been seriously challenged before. Religious opponents justify their position with a few verses of scripture, or sometimes with alarmist accusations: AIDS is God's punishment on gay men [50], or homosexual men "recruit" boys with molestation. [51] These may be after-the-fact justifications for the underlying psychology of sexual prejudice and resistance to change. [52] Some oppositional leaders express the fear that LGBT rights come at the expense of religious liberty. [53] Public attitudes toward gay rights are split by region [54] and by generation. [55] At present trend rates, principled opposition to rights such as same-sex marriage will mostly die out in "western" cultures this century. On the other extreme, there are no LGBT rights to speak of in many African and southern Asian states. [56]

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[*] Variants of LGBT can be as long as LGBTIQCAPGNGFNBA, and some social networks offer dozens of options for sexual identity!

C. Genetics

The outbreak of the HIV virus just happened to coincide with the development of **genetic engineering**. When smallpox was wiped out in the 1970s, it was accomplished with a vaccine, a solution full of dead viruses that allowed the body to develop immunity to the real thing. On a scientific level, a vaccine may as well have been magic. Vaccines have been known to medicine for centuries, without any deep understanding of how they work. Researchers combat AIDS, on the other hand, with thorough molecular knowledge of what HIV is and how it functions. In fact, today's genetic science owes a great deal to HIV research. [57]

The chemistry of genes has been understood only since the 1950s. By the 1980s, scientists were able to actually "read" or *sequence* portions of DNA. Genome sequencing started modestly, with viruses and bacteria DNA. It progressed rapidly to plants and animals. The most ambitious project of all, the *human genome project,* produced a readout of the entire human genome by 2000.

Identifying the location and function of thousands of genes has revolutionized medicine. Many human traits and disorders have been traced to particular genes. It is now possible to take genetic tests to identify susceptibility to cancers and diseases.

Across the human genome, 99.9% of the genetic code is universal, with the small remainder unique to each person. The identification and analysis of this 0.1% variation is known as *DNA fingerprinting*. This has become another powerful technique, with applications in criminal and disaster investigations and paternity tests. As with many contemporary issues, the ability to genetically identify individuals with a high degree of reliability has double-edged implications for security and privacy.

By comparing the genetic similarities and differences between two individuals, it is possible to ascertain when they last shared a common ancestor. The more recently they diverged, the more similar their genomes are. This kind of analysis can provide very reliable information about evolutionary pre-history, and it underlies much of the knowledge presented in this book.

Once the code of life can be read, it can also be rewritten. Genetic engineering began with the creation of *recombinant DNA* in the 1970s. This technique inserts one or two genes into a pre-existing, living strand of DNA. Such "gene splicing" experiments demonstrate very

convincingly how inter-related all life on Earth really is. DNA can be combined from sources as disparate as humans and yeast. They fit together as if they were long lost soul mates. Though the public imagination is gripped by science-fiction fantasies of half-goat / half-men, in practice genetic chimera are less exotic. Practical examples include pest-resistant plants and bacteria that can produce insulin.

By the 1990s, gene splicing advanced to human medical applications, ***gene therapy***. For example, a healthy gene can be patched into the DNA of someone born with a genetic defect. Gene therapy is very difficult, but has already had success treating blindness [58], hemophilia [59], leukemia [60], and even the effects of aging (in mice) [61]. The first "designer babies" were born in 2018, twin girls engineered at conception to be immune to their father's HIV. [62]

Now here's the strangest irony of all. Gene therapy requires the use of a *vector*, a small piece of genetic material, to carry the healthy gene into the host cells. The vector is often a virus. Since the HIV retrovirus is especially adept at infecting cells and grafting a copy of itself into DNA, it is actually a prime candidate for this purpose. Indeed, a modified form of HIV has been used successfully as a vector for gene therapy to cure a fatal brain disease! [63] Yes, humans are finally exploiting a virus to serve our own purposes – turnabout is fair play.

Along with computer technology, genetics is one of the pillars of 21st century science. The potential is staggering, as we await better biofuels, cloned tissue for safe transplants, and even synthetic meat. The pace of commercialization is steady but slow, limited not just by science and technology but also by legal and ethical regulations. Public attitudes are divided by religion, but people are generally more comfortable experimenting with computer code than with the code of life. [64]

V. OUR GENERATION

Chapter 1 addresses the last 30 years, about the span of one generation. This section will take a close look at today's generation gap and elaborate the differences between your experience and that of your parents or children. Demographers categorize the people living today into six "generations" according to their birth along this approximate timeline:

GI	Silent Generation		Baby Boomers		Generation X		Gen Y / Millennials		Generation Z	
1920s	1930s	1940s	1950s	1960s	1970s	1980s	1990s	2000s	2010s

A.   *Work, School, and Leisure*

The decades after World War II were the "Golden Age of Full Employment" in the industrial world. [65] Generations up to the Baby Boomers could expect lifelong job security from a high school diploma. In today's **gig economy**, one out of four Americans and Europeans work "independently" as freelancers or with multiple part-time jobs. [66] Examples of such freelancers include web designers, consultants, graphic artists, home health care providers, drivers and deliverers, and solo accountants and lawyers.

It is difficult to pinpoint this trend in time, but it seems to have become prevalent only this century. The job market thrived in the hot economy of the 1990s. The recessions of the '00s created extended periods of high unemployment. People without jobs had no choice but to capitalize on their own talents. Meanwhile, the cost of health care and retirement plans ballooned, [67] encouraging many employers to cut back permanently on full-time employees.

"The market" is usually honest, even if it's poorly understood. The economic signal seems to be that entrepreneurship adds more value to the economy than labor, so workers are relocating from inefficient, expensive jobs to create their own wealth. The gigonomic paradigm fits well with the age of mobility and the internet. Job-search and freelance websites make it easy to match an employer's needs to available workers only as such needs arise. For the employer, this is more efficient than having an employee permanently on call for when his or her services may be needed. Today's workers can find many opportunities that were not available decades ago, but they must accept less predictability as a trade-off.

The full-time jobs that are available are also changing. As recently as 1990, manufacturing was the largest industry in most US states. [68] That changed rapidly as factory jobs were automated and / or offshored to Mexico, Eastern Europe, and Asia. The US and EU are now predominantly **service economies**. Health care is the most in-demand service sector, due in large part to the needs of the aging GI and Silent Generations.

College plays a key role in this economy. Employees and employers are both looking to colleges to bring them together, an effort that is not coordinated with schools. With workplace commitments on the decline, employers are investing less in general training [69] and increasingly demanding college degrees instead. Some of the jobs that are easiest for the least educated

people are also those that are easiest to automate or to offshore to less expensive countries. The lucrative jobs, concentrated in computer science, medicine, and finance, require higher education.

As employers demand more education and as more students attend college worldwide, [70] education loses its competitive value, an effect that some economists now recognize as ***degree inflation***. [71] Students compete fiercely for admission to the most prestigious brand name colleges, but those universities focus on academics, not job training. At the less prestigious tier, enterprising colleges compete to keep up with the demand for marketable skills, offering a flood of new majors such as gerontology and cybersecurity. [72]

Degree inflation is compounded by the rising cost of education, which is heavily borrowed. In other words, college degrees now cost more and return less. The average college graduate's debt is worth almost a year's salary, a difficult amount to pay off when a salary barely meets the cost of living. So many students are defaulting that some people call it a student debt crisis in need of government intervention. [73] [74] For-profit colleges are a big part of the problem. These schools hold out the promise of valuable vocational education in high-demand fields such as computer science and health care management. They have proliferated in this century due to online programs. However, they inflate both their prices and their job-placement numbers, [75] and their student loan default rate is twice that of the non-profit sector. [76]

Recent industrialization is having a tremendous effect on Gen X and Millennials in Asia and Latin America, the receiving end of offshoring. Following three decades of extreme gentrification in Asia, [77] the global middle class is larger than ever, and now outnumbers the poor. [78] Developing countries are drawing rapidly from their rural poor to fill jobs in cities. Some demographers describe this urbanization as the largest mass migration in world history. [79] The mature industrial economies are still growing at a healthy average of 2% annually – it's just that the newly-industrialized economies are growing at an unsustainably fast rate while catching up. [80] Fast development has its problems too. Many of the fastest-growing cities are not equipped to handle the human tidal wave. Traffic jams and accidents, pollution, and infrastructure management are straining the limits of their localities.

Wealth is measured not only by income but by the leisure time that it buys. Today's global middle class travels internationally at an unprecedented rate. [81] There is a distinct generation gap in daily leisure time. Today's younger generations spend 50% less time watching

TV and an alarming 80% less time reading than the boomers and silent generation. As you probably guessed, that slack in leisure time is taken up by computers and video games. [82] There is now a niche industry in treating electronic addiction. [83] Video games account for a sizable fraction of millennial men's time away from work. [84]

B. Social Discourse and Milestones

A decade is not a very long time on a societal scale. Many characteristics of 21st-century life are not a break from the 20th, but a shift in focus or a matter of degree. This topic addresses two themes that have become central in today's public dialogue, and then concludes with some recent milestones in centurial trends.

1. Identity politics

It may well be impossible for people to make sense of the world without mentally categorizing the world into "us and them". People have historically used nationality or class to define their ingroups. A large, multicultural society creates numerous sub-nations and sub-classes with which a person may identify. ***Identity politics*** revolves around recognizing certain populations such as "Moslem-European" or "transgender" as distinct from society at large. Today's identity politics has its roots in the 1960s, especially inspired by the movements for women and black Americans. The phrase "identity politics" has only become common in written literature since 1990 [85] as it has become an increasingly mainstream philosophy.

Today's flavor of identity politics is usually associated with the left, and it has come to dominate college culture and academic sociology. [86] It adopts Marxist themes of privilege and victimhood. [87] The goal of an identity-political movement is generally the end of a perceived oppression by the rest of society. This liberation may be accomplished legally, with anti-discrimination legislation, or emotionally, such as with moral persuasion or positive media representation.

The conservative criticism of identity politics is that it divides a society into competing factions rather than looking for common national solutions. That being said, conservative identity politics, in the form of "white nationalism", is on the rise in the 2010s. A moderate

critique is that both ends of the spectrum may be overestimating a small but vocal extreme on the other side.

Most identity politics is inseparable from economics. The rights at issue, like jobs, welfare, and interactions with police and courts, are all strongly related to poverty. Since poverty varies with ethnicity, [88] it is hard to disentangle "minority" issues from the consequences of low-income life.

The conservative approach is to address poverty *per se* with "negative" rights (freedom from discrimination) and accountability for personal decisions. [89] Liberals are more demanding of positive rights – affirmative action from the government. [90] This affirmative action is often expressly aimed at certain ethnic groups, such as with race-based college admissions. Liberals feel this is necessary for minorities to overcome systemic disadvantage. Unfortunately, this can perpetuate a sense of competition among poor people of different colors and creeds. [91]

2. *The mainstreaming of conspiracism*

"Conspiracy theory" is a well-known but not entirely satisfactory term. I will define conspiracism as the belief that reality is controlled or concealed by agents in a secret realm. Such ideas have been around for millennia, but they are strongly on the rise right now. [92] There are at least two independent explanations for this trend: first a rechanneling of religiosity, and more recently the internet.

Conspiracism serves a psychological need that organized religions have historically fulfilled. What is the source of evil, suffering, and strife? In ancient times, the agents of evil were called devils and spirits. Now that witches and cloven-hooved demons are seen as fairy tales, they are being reshaped into more "plausible" forms like deep states, extraterrestrials, and secret societies. Conspiracy theories derive from preconceived notions and strong emotions, especially threat and powerlessness. [93] The evidence used to support a conspiracy theory is always circumstantial. Conspiracism is dogmatic, not open to revision with direct evidence. In fact, evidence against a conspiracy is explained away as a "coverup", making the theory unfalsifiable. [94] In all of these regards, conspiracism is a religious mode of thought. It is an unofficial, secular modernization of spiritual beliefs. It makes sense then that the religious right is the fountainhead of conspiracism – true in Islam as well as Christianity.

Until a few decades ago, conspiracy theorists were an isolated set of individuals. The world wide web invigorated the movement by providing a community as well as endless content. The first major web-enabled conspiracy theory was the "Truther" narrative, alleging that the US government and / or Israeli special forces were the real 9/11 perpetrators. Since then, influenced by the Truthers and trailblazing conspiracy-theory website InfoWars.com, a genre of propaganda videos and websites has grown explosively. Now it is almost a given that every major news story is followed immediately by a counter narrative on blogs and forums.

Conspiracism has expanded from the margins of society to the mainstream, and now impacts policy at the highest levels. A sizeable percentage of Americans who voted for Trump and Britons who voted for Brexit believed that they were voting against a covert plot to make their countries majority-Moslem. [95] Journalists and academics who had long shunned this unscientific rhetoric are now becoming increasingly concerned about its impacts. The full-fledged study of conspiracism by historians, psychologists, and social scientists has only come into its own since the 2000s decade. [96]

4. *Demographic milestones and records*

I close this chapter with several indicators that present a snapshot of the human species today. Most of these factoids are not new trends but recent milestones achieved, or records broken, in centurial trends. This confluence of trends makes our generation distinct from any other.

Here are some of the interesting milestones on the path to global industrialization, a process that is two centuries in the making.

- Around the year 2000, overweight became a more abundant problem than underweight worldwide. [97] Obesity is associated with sedentary industrialized lifestyles and has been gradually increasing for at least a century.
- The population is now aging everywhere, even in developing countries. In fact, the countries that are industrializing now are doing so more quickly than in the past and are aging very swiftly. [98] Aging is caused by declining fertility as well as increasing lifespan. We are well on our way to diverting the anticipated overpopulation crisis, but aging poses its own challenges.

- The world became majority-urban around 2007. [99] To put this in perspective, just 200 years ago 97% of the world's population was rural! Urbanization occurs when a region industrializes and draws laborers away from the surrounding farmlands. China's present urbanization is so rapid that it is called the largest mass migration in human history. [100]

Other markers fall on trendlines dating to the sociological revolution of the 1960s.

- College students became majority female in the 1990s. This is a solid worldwide trend that has taken off very quickly since the 1970s. [101]
- The majority of births are now out of wedlock in 45 countries. This trend is led by Latin America, where nuclear families are being replaced mostly by single-mother households. Elsewhere, the trend represents a rise in unmarried cohabitation, not a shift in family structure. [102]

Finally, here is an astonishing near future record to watch for.

- In its first decade of existence, Facebook acquired over 2 billion monthly active users. [103] At its current rate of growth, by 2020 it is posed to surpass Christianity as the largest organization in human history! [104]

VI. CONCLUSIONS

Chapter 2 introduced the industrial revolution and the Enlightenment. These movements signaled the end of stasis and the beginning of a modern era characterized by change. Changes begot changes, and they only seemed to keep accelerating. Those of us alive today, then, are seeing the world transformed more quickly than ever before. Even within the span of our lifetime, a few events and trends have created a whole new world at the turn of this millennium.

Some of the changes are long overdue. The world's last empire collapsed in the early 1990s. Since then, the nations of Earth have welcomed dozens of new republics. [105] Now, for the first time ever, the average human being enjoys a middle-class life free from starvation and disease. We've gotten a handle on runaway population growth. At the same time, we face new

challenges such as AIDS, an aging population, and early signs that we'll have to change the course of our fossil-fueled industries.

With innovations led by the world wide web, the computer age has realized its full potential as one of the most important revolutions in human history. The light-speed flow of information has made business, technology, government, education, communication, and entertainment all much more efficient than ever before. Ordinary people play an increasing role in shaping society, trends, and business. For this reason, "You" were named Time Magazine's Person of the Year in 2006.

Sociology has completed a long and ironic cycle. Our ancestors' social skills and morals evolved in small bands, which grew slowly into villages and tribes, then impersonal nations and empires with foreign empires on the horizon. Industrial transportation and telecommunications started to shrink the world, and by today we all interact in the same virtual village. We must rethink relationships between individuals and society now that privacy is precious and mystery is history. As it becomes harder to keep secrets, the "soul" that was once weighed by gods is now a web presence available for all to judge.

E-commerce affects international relations too. With an increasing amount of world control in the hands of the private sector, cultures and economies are blending irrevocably, a course of globalization that no state can contain. Today's economic growth is concentrated in China, where over a billion people's lives are being transformed by industrialization. Although economies are still growing everywhere, the changes wrought by automation and Sinification are not easy for everyone. Many working-class people in the mature economies find themselves struggling to figure out the new gig / service economy. Frustration, especially in the aftermath of the last financial crisis, has fueled a populist backlash in the 2010s.

Several hold-over tyrants remain, and this is the primary factor inflaming radical Islamism. The superpowers have gotten entangled with militant organizations like al Qaeda and ISIS. Unable to compete militarily, these groups must resort to terrorism and lone-wolf attacks. This has necessarily directed state espionage inward. Governments cannot monitor telecommunications for criminals and terrorists without gathering data on their own citizens. The balance of privacy vs. security has never been such a salient and difficult issue.

As a takeaway, it is important to appreciate what we have. Conflict and suffering are disheartening, and they are still with us. However, today more people live in comfort and peace

than at any other moment in history, and that trend appears to be improving. I often hear people sigh and ask, "What's wrong with the world today?!" Now that you have this book in your hands, you can compare the present to all stages of the past. Early humans evolved quickly exactly because life was "solitary, poor, nasty, brutish, and short." [106] If you had been born centuries or millennia ago, your odds of suffering tyranny, slavery, disease, poverty, or war would have been much higher than today. [107]

Just as importantly, this is the golden age of discovery. The human mind has always had a drive for enlightenment, but a true understanding of world history was nowhere near the grasp of pre-scientific people. With mature science and cutting-edge technology, scientists have finished reconstructing the journey presented in this book just in the last few decades. You and I are among the first people to see "the whole story" from beginning to end.

The world will never be perfect, but I can't imagine living in any other era. I hope that this book has helped make you, too, happy to be alive in this most amazing of times.

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