6 GOVERNANCE AND ORDER IN A NETWORKED WORLD

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Niall Ferguson

" s the world slouching toward a grave systemic crisis?" asked the historian Philip Zelikow at the annual gathering of the Aspen Strategy Group earlier this summer, the kind of "deep system-wide crisis . . . when people all over the world no longer think the old order work[s]."¹ Among the reasons he gave for anticipating such a crisis was "the digital revolution and the rise of a networked world." To grasp the scale and nature of this coming crisis, we must begin by recognizing how drastically the balance of power has shifted in our time from hierarchically ordered empires and superpowers (the euphemism for empire developed to suit American and Soviet sensibilities) to distributed networks.²

To be sure, the formal "org. chart" of global power is still dominated by the vertically structured super-polities that gradually evolved out of the republics and monarchies of early modern Europe, the colonies they established in the New World, and the older empires of Asia. Though not the most populous nation in the world, the United States is certainly the world's most powerful state, despite—or perhaps because of—the peculiarities of its political system. Its nearest rival, the People's Republic of China, is usually seen as a profoundly different kind of state, for while the United States has two major parties, the People's Republic has one, and only one. The US government is founded on the separation

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of powers, not least the independence of its judiciary; the PRC subordinates all other institutions, including the courts, to the dictates of the Communist Party. Yet both states are republics, with roughly comparable vertical structures of administration and not wholly dissimilar concentrations of power in the hands of the central government relative to state and local authorities. Economically, the two systems are certainly converging, with China looking ever more to market mechanisms, while the US federal government in recent years has steadily increased the statutory and regulatory power of public agencies over producers and consumers. And, to an extent that disturbs libertarians on both left and right, the US government exerts control and practices surveillance over its citizens in ways that are functionally closer to contemporary China than to the America of the Founding Fathers. In these respects, "Chimerica" is no chimera. Once these economies seemed like opposites, with one doing the exporting, the other the importing, one doing the saving, the other the consuming.³ Since the financial crisis, however, there has been a certain convergence. Today the real estate bubble, the excessive leverage, the shadow banks-not to mention the technology "unicorns"—are almost as likely to be encountered in China as in America. In Chimerica 1.0, opposites attracted. In Chimerica 2.0, the odd couple have become strangely alike, as often happens in a marriage.

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Sitting alongside the United States and the People's Republic in the hierarchy of nation-states are the French Republic, the Russian Federation, and the United Kingdom of Great Britain and Northern Ireland. These are the five permanent members of the United Nations Security Council, and they are thereby set above all the other 188 members of the UN—an institution in which all nations are equal, but some are more equal than others. However, that is clearly not a sufficient description of today's world order. In terms of military capability, there is another, somewhat larger elite of nuclear powers to which, in addition to the "P5," also belong India, Israel, Pakistan, and North Korea. Iran aspires to join them. In terms of economic power, the hierarchy is different again. The Group of Seven countries (Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States) were once consid-

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ered the dominant economies in the world, but today that club is relatively less dominant as a result of the rise of the "BRICS" (Brazil, Russia, India, China, and South Africa), the biggest of the so-called emerging markets. The Group of 20 was formed in 1999 to bring most of the world's big economies together, but with the Europeans overrepresented (as the EU is a member in its own right, as are the four biggest EU member-states).

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Yet to think of the world only in such terms is to overlook its profound transformation by the proliferation of distributed networks in the past forty years. Picture, instead, a network graph (similar to that depicted by figure 6.1) based on economic complexity and interdependence that delineates the relative sophistication of all the world's economies in terms of technological advancement as well as their connectedness through trade and cross-border investment. Such a graph would have a strongly hierarchical architecture because of the power-law-like distribution of economic resources and capabilities in the world and the significant variation in economic openness between countries. Yet it would also unmistakably be a network, with most nodes connected to the rest of the world by more than one or two edges.⁴

Even more striking is the rise of an entirely new global economy based on the internet and composed of "bits" as opposed to "atoms." Amazon began as an online bookstore in Seattle in 1995. Today it has more than three hundred million users and the largest revenues of any internet company in the world. Google started life in a garage in Menlo Park, California, in 1998. Today it has the capacity to process over 4.2 billion search requests every day. In 2005 YouTube was a start-up in a room above a pizzeria in San Mateo, California. Today it allows people to watch 8.8 billion videos a day. Facebook was dreamed up at Harvard just over a decade ago. Today it has close to two billion users who log on at least once a month—more than the population of China.⁵ In the United States, Facebook penetration is as high as 82 percent of internet users between the ages of eighteen and twenty-nine, 79 percent of those age thirty to forty-nine, 64 percent of the fifty to sixty-four age group, and 48 percent of those sixty-five and older. If there are six degrees of

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Graph of the global export "product space," where dot size is proportional to total world trade in that good. Dots are shaded according to product type. The central component is dominated by "machinery and electrical" and "transportation" (including cars); the right-hand cluster is the textile, footwear, and headgear industry.

Source: Alexander J. G. Simoes and Cesar A. Hidalgo, "The Economic Complexity Observatory: An Analytical Tool for Understanding the Dynamics of Economic Development," 2011, workshops at the twenty-fifth AAAI Conference on Artificial Intelligence, https://pdfs.semanticscholar.org/7733/68ce1faa36d9ac833b3c3412d136033b91c1.pdf.

separation for humanity as a whole, for Facebook users the average figure is now 3.57.

The key question is how far this networking of the world now poses a threat to the hierarchical world order of nation-states comparable to the threat that online social networks have recently posed to established domestic-political hierarchies—notably in 2011 in the Middle East, in 2014 in Ukraine, in 2015 in Brazil, and in 2016 in Britain and America. To put the question more simply: can a networked world have order? Some—notably Anne-Marie Slaughter—say that it can.⁶ In the light of historical experience, I very much doubt it.

FIGURE 6.1 Economic Complexity

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It seems to me that in this information age, people know what's going on everywhere pretty fast, and they can communicate. Everybody has a cell phone. They can organize—and they do. This means that since there's diversity everywhere, you can't suppress it, or ignore it, or if you try to, it breaks you. So you have to learn how to govern over diversity. —George P. Shultz

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According to folklore, Mahatma Gandhi was once asked by a reporter what he thought of Western civilization. He replied that he thought it would be a good idea. The same might be said about world order. In his book of that title, Henry Kissinger argues that the world is in a parlous condition verging on international anarchy. Four competing visions of world order-the European, the Islamic, the Chinese, and the American—are each in varying stages of metamorphosis, if not decay. Consequently, there is no real legitimacy to any of these visions. The emergent properties of this new world disorder are the formation of regional blocs and the danger that friction between them might escalate into some kind of large-scale conflict, comparable in its origins and potential destructiveness to the First World War.7 Contrary to those who claim (on the basis of a misreading of statistics of conflict) that the world is steadily becoming more peaceful and that "wars between states . . . are all but obsolete," Kissinger argues that the contemporary global constellation of forces is in fact highly flammable.⁸ First, whereas "the international economic system has become global . . . the political structure of the world has remained based on the nation-state." (This was a tension laid bare in the 2008 financial crisis when, as governor of the Bank of England, Mervyn King wittily remarked that international banks were "global in life, but national in death.") Second, we are acquiescing in the proliferation of nuclear weapons far beyond the Cold War "club," thus "multiply[ing] the possibilities of nuclear confrontation." Finally, we now have the new realm of cyberspace, which Kissinger

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likens to Hobbes's "state of nature" in which "asymmetry and a kind of congenital world disorder are built into relations between . . . powers."

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Kissinger's warning cannot be lightly dismissed. The world today frequently resembles a giant network on the verge of a cataclysmic outage. Globalization is in crisis. Populism is on the march. Authoritarian states are ascendant. Technology meanwhile marches inexorably ahead, threatening to render most human beings redundant or immortal or both. How do we make sense of all this? In pursuit of answers, many commentators resort to crude historical analogies. To some, Donald Trump is Hitler, about to proclaim an American dictatorship.¹⁰ To others, Trump is Nixon, on the verge of being impeached.¹¹ But it is neither 1933 nor 1973 all over again. Easily centralized technology made totalitarian government possible in the 1930s. Forty years later, it had already become much harder for a democratically elected president to violate the law with impunity. Nevertheless, the media in the 1970s still consisted of a few television networks, newspapers, and press agencies. And in more than half the world those organs were centrally controlled. It is impossible to comprehend the world today without understanding how it has changed as a result of new information technology. This has become a truism. The crucial question is: How has it changed? The answer is that technology has enormously empowered distributed networks of all kinds relative to traditional hierarchical power structures-but that the consequences of that change will be determined by the structures, emergent properties, and interactions of these networks.

The global impact of the internet has few analogues in history better than the impact of printing on sixteenth-century Europe. The personal computer and smartphone have empowered the individual as much as the pamphlet and the book did in Luther's time. Indeed, the trajectories for the production and price of PCs in the United States between 1977 and 2004 are remarkably similar to the trajectories for the production and price of printed books in England from 1490 to 1630 (see figure 6.2).¹² In the era of the Reformation and thereafter, connectivity was enhanced exponentially by rising literacy, so that a growing share of the population was able to access printed literature of all kinds, rather than having to rely on orators and preachers to hear new ideas.

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Source: Jeremiah Dittmar, February 2012, "The Welfare Impact of a New Good: The Printed Book," working paper.

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There are three major differences between our networked age and the era that followed the advent of European printing. First, and most obviously, our networking revolution is much faster and more geographically extensive than the wave of revolutions unleashed by the German printing press. In a far shorter space of time than it took for 84 percent of the world's adults to become literate, a remarkably large proportion of humanity has gained access to the internet. As recently as 1998, only around 2 percent of the world's population was online. Today the proportion is two in five. The pace of change is roughly an order of magnitude faster than in the post-Gutenberg period: what took centuries after 1490 took just decades after 1990. The rate of growth of the global network may be slowing in terms of the numbers of new internet users and smartphone owners added each year, but it shows no sign of stopping. In other respects-for example, the transitions from text to image and video and from keyboard to microphone interface-it is speeding up. Literacy will ultimately cease to be a prerequisite for connectedness.

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Nor is this technological revolution confined to developed countries. In terms of connectivity, if little else, the world's poor are catching up fast. Among the poorest 20 percent of households in the world, roughly seven out of ten have cell phones. The Indian telecom company Bharti Airtel has a customer base as large as the US population. Indeed, the number of internet users in India now exceeds that in America. It took just eight years for all Kenyan households (and close to 90 percent of individuals) to have cell phones. It took four years for Safaricom's pioneering M-Pesa payment system to reach 80 percent of households.¹³ Even impoverished and chaotic Somalia went from 5 to 50 percent cell phone penetration inside five years.¹⁴ Selling the world's poor mobile telephony is proving easier than providing them with clean water—a strong argument for leaving the provision of clean water to the private sector rather than weak, corrupt governments.¹⁵

Second, the distributional consequences of our revolution are quite different from those of the early modern revolution. Late-fifteenthcentury Europe was not an ideal place to enforce intellectual property rights, which in those days existed only when technologies could be

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secretively monopolized by a guild. The printing press created no billionaires: Gutenberg was not Gates. Moreover, only a subset of the media made possible by the printing press—newspapers and magazines sought to make money from advertising, whereas the most important ones made possible by the internet do. Nevertheless, few people foresaw that the giant networks made possible by the internet, despite their propaganda about the democratization of knowledge, would be profoundly inegalitarian. A generation mostly removed from conflict—the baby boomers—had failed to learn the lesson that it is not unregulated networks that reduce inequality but wars, revolutions, hyperinflations, and other forms of expropriation.¹⁶

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To be sure, innovation has driven down the costs of information technology. Globally, the costs of computing and digital storage fell at annual rates of 33 and 38 percent per annum between 1992 and 2012.¹⁷ However, contrary to the hopes of those who envisioned a big bazaar of crowd-sourced applications, the internet has evolved into a vast scalefree network, complete with hyperconnected nodes that are more like super-hubs.¹⁸ Oligopolies have developed in the realms of both hardware and software, as well as service provision and wireless networks. The nexus between the seemingly indestructible AT&T and the reinvented Apple illustrates an old truth: corporations will pursue monopoly, duopoly, or oligopoly if they are left free to do so. Even those corporations committed to an "open architecture" web-such as Amazon, Facebook, and Google-seek monopolistic power in their segments: respectively, e-commerce, social networks, and search.¹⁹ Poor governance and regulation explain huge differentials in cellular service and internet costs between countries.²⁰ They also explain why a small number of countries dominate the information and communications technology industry (though it is striking that the United States ranks seventh—some way behind Ireland, South Korea, Japan, and the UK in terms of the relative importance of information technology to its economy as a whole).²¹

These dynamics explain why the ownership of the world's electronic network is so concentrated. As of the fall of 2017, Google (or rather the

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renamed parent company Alphabet Inc.) is worth \$665 billion by market capitalization. Around 11 percent of its shares, worth around \$76 billion, are owned by its founders, Larry Page and Sergey Brin. The market capitalization of Facebook is approaching \$500 billion; 14 percent of the shares, worth \$71 billion, are owned by its founder, Mark Zuckerberg. Despite their appearance as great levelers, social networks are thus, in the words of social network theoretician Charles Kadushin, "inherently unfair and exclusionary."22 Because of preferential attachment—the tendency for well-connected hubs to get even better connected-the ultimate social network truism does indeed come from the book of Matthew: "For unto every one that hath shall be given, and he shall have abundance: but from him that hath not shall be taken away even that which he hath" (Matthew 25:28-29). Unlike in the past, there are now two kinds of people in the world: those who own and run the networks and those who merely use them. The commercial masters of cyberspace may still pay lip service to a flat world of netizens, but in practice, companies such as Google are hierarchically organized, even if their org. charts are quite different from those of General Motors in Alfred Sloan's day.

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In traditional societies, the advent of market forces disrupts often hereditary networks and as a result promotes social mobility and reduces inequality. Meritocracy prevails. But when networks and markets are aligned, as in our time, inequality explodes as the returns on the network flow overwhelmingly to the insiders who own it.²³ Granted, the young and very wealthy people who own the modern networks tend to have somewhat left-wing political views. (Peter Thiel is the rare exception: a libertarian who was willing to sup with the populists in 2016.) However, few of them would welcome Scandinavian rates of personal income tax, much less an egalitarian revolution. The masters of the internet would seem to relish being rich almost as much as the wolves of precrisis Wall Street a decade ago, though their consumption is less conspicuous than their pangs of conscience. It is hard to imagine an investment banker following the example of Sam Altman of Y Combinator and going on a pilgrimage to Middle America, as if doing penance for the 2016 election result.²⁴ Yet the San Francisco to which Altman returns remains a city of glaring inequality, not least because of the distortions that ensure that

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decent housing is ludicrously expensive. (Ownership of real property is second only to ownership of intellectual property as a determinant of wealth inequality, but the most valuable housing is located closest to the geographical clusters where the most valuable intellectual property is generated.) And all that the big technology companies seem willing to offer the millions of truck and taxi drivers they intend to replace with driverless cars is some form of basic income. The sole consolation is that the largest shareholders of the FANG companies (Facebook, Amazon, Netflix, and Google) are US institutional investors, which, insofar as they are the managers of the savings of the American middle class, have therefore given that class a significant stake in the profits of the information technology industry. An important qualification, however, is that foreign investors probably own at least 14 percent of the equity of major US corporations and, in the case of companies with very large foreign sales (such as Apple, which earns around two-thirds of its revenue abroad), almost certainly much more.²⁵ No serious student of capital markets, however, would attribute to these foreign investors even a shred of influence over the companies' corporate governance.

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Thirdly, and finally, the printing press had the effect of disrupting religious life in western Christendom before it disrupted anything else. By contrast, the internet began by disrupting commerce; only very recently did it begin to disrupt politics, and it has only really disrupted one religion, namely Islam.

Generations succeeding generations, technology and the humanities grow farther apart. Technology took the lead, and technology has now become the master of the scene. —Charles Hill

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In many ways, networks were the key to what happened in American politics in 2016. There was the grassroots network of support that Donald Trump's campaign built—and that built itself—on the platforms of

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Facebook, Twitter, and Breitbart. These were, to use Trump's words, the "forgotten" men and women who turned out on November 8 to defeat the "global special interests" and "failed and corrupt political establishment" that Trump's opponent Hillary Clinton was alleged to personify. A role was also played by the jihadist network, as the Islamic State-affiliated terror attacks during the election year lent credibility to Trump's pledges to "strip out the support networks for radical Islam in this country" and to ban Muslim immigration.

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As a very wealthy man who could nevertheless play the role of demagogue with aplomb, Trump himself embodied a central paradox of the age. He was at once a minor oligarch and a major brand. Trump is perhaps unique in having assumed the office of president with a tangled network of businesses, investments, and corporate links-to as many as 1,500 people and organizations.²⁶ At the same time, Trump's campaign succeeded where his opponents failed in harnessing the networks of Silicon Valley, to the dismay of the people who owned and thought they also controlled the networks. Their agony in the weeks after the election was palpable. Google at first sought to woo the new administration, only to denounce its executive orders limiting travel and migration to the United States from certain Muslim-majority countries.²⁷ Mark Zuckerberg absented himself from a meeting with the new president attended by other technology CEOs. Presumably it was some comfort to him that the Women's March against Trump had also organized itself through Facebook.²⁸ It is hard to believe that there will not be some kind of clash between the Trump administration and the big information and communications technology companies, especially if the administration overturns its predecessor's decision in 2015 that the Federal Communications Commission should regulate the internet as a public utility, like the old railroad or telephone networks. There seems an obvious conflict of interest between telecom and cable companies and bandwidth-greedy platform content providers such as Netflix over the issue of "net neutrality" (the principle that all bits of data should be treated alike, regardless of their content or value).²⁹ Antitrust action against the FANG companies could be Trump's next move, though it

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would be surprising if a Republican administration went down that route. What seems highly unlikely is that Silicon Valley companies will continue to enjoy the exemptions from being treated as publishers that they were granted under the Telecommunications Act (1996).

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Yet in two respects there is a clear similarity between our time and the revolutionary period that followed the advent of printing. Like the printing press, modern information technology is transforming not only the market—most recently, by facilitating the sharing (i.e., shortterm rentals) of cars and apartments—but also the public sphere. Never before have so many people been connected together in an instantly responsive network through which "memes" can spread even more rapidly than natural viruses.³⁰ However, the notion that taking the whole world online would create a utopia of netizens, all equal in cyberspace, was always a fantasy—as much a fantasy as the Lutheran vision of a priesthood of all believers. The reality is that the global network has become a transmission mechanism for all kinds of manias and panics, just as the combination of printing and literacy for a time increased the prevalence of millenarian cults and witch crazes. The cruelties of the Islamic State seem less idiosyncratic when compared with those of some governments and sects in the sixteenth and seventeenth centuries.³¹

Secondly, as in the period during and after the Reformation, our time is seeing an erosion of territorial sovereignty.³² In the sixteenth and seventeenth centuries, Europe was plunged into a series of religious wars because the principle formulated at the Peace of Augsburg (1555) *cuius regio, eius religio*, "to each ruler, the religion he chooses"—was honored mainly in the breach. In the twenty-first century, we see a similar phenomenon of escalating intervention in the domestic affairs of sovereign states.

There was, after all, a third network involved in the US election of 2016, and that was Russia's intelligence network. At the time of writing, it is clear that the Russian government did its utmost to maximize the damage to Hillary Clinton's reputation stemming from her and her campaign's sloppy email security, using WikiLeaks as the conduit through which stolen documents were passed to the American media. To visit

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the WikiLeaks website is to enter the trophy room of this operation. Here is the Hillary Clinton Email Archive, there are the Podesta Emails. Not all the leaked documents are American, to be sure. But you will look in vain for leaks calculated to embarrass the Russian government. Julian Assange may still skulk in the Ecuadorean embassy in London, but the reality is that he lives, an honored guest of President Vladimir Putin, in the strange land of Cyberia—the twilight zone inhabited by Russia's online operatives.

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Russian hackers and trolls pose a threat to American democracy similar to the one that Jesuit priests posed to the English Reformation: a threat from within sponsored from without. "We're at a tipping point," according to Admiral Michael S. Rogers, head of the National Security Agency and US Cyber Command.³³ Cyberactivities are now at the top of the director of national intelligence's list of threats. And WikiLeaks is only a small part of the challenge. The Pentagon alone reports more than ten million attempts at intrusion each day.³⁴ Of course, most of what the media call cyberattacks are merely attempts at espionage. To grasp the full potential of cyberwarfare, one must imagine an attack that could shut down a substantial part of the US power grid. Such a scenario is not far-fetched. Something similar was done in December 2015 to the Ukrainian electricity system, which was infected by a form of computer malware called BlackEnergy.

Computer scientists have understood the disruptive potential of cyberwarfare since the earliest days of the internet. At first it was adolescent hackers who caused mayhem, geeks like Robert Tappan Morris, who almost crashed the World Wide Web in November 1988 by releasing a highly infectious software worm.³⁵ Another was "Mafia Boy," the fifteen-year-old Canadian who shut down the Yahoo website in February 2000. Blaster, Brain, Melissa, Iloveyou, Slammer, Sobig—the names of the early viruses betrayed their authors' youth.³⁶ It is still the case that many cyberattacks are carried out by nonstate actors: teenage vandals, criminals, "hacktivists," or terrorist organizations. (The October 21, 2016, attack launched against the domain name service provider Dynamic Network Services Inc., which used Chinese-manufactured webcams as

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"bots," was almost certainly a case of vandalism.³⁷) However, the most striking development of 2016 was the rise of Cyberia.

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As the country that built the internet, the United States was bound to lead in cyberwarfare, too. It began to do so as early as the first Reagan administration.³⁸ During the 2003 Iraq invasion, US spies penetrated Iraqi networks and sent messages urging generals to surrender.³⁹ Seven years later it was the United States and Israel that unleashed the Stuxnet virus against Iran's nuclear enrichment facilities.⁴⁰ The problem is not just that two can play at that game. The problem is that no one knows how many people can play at any number of cybergames. In recent years, the United States has found itself under cyberattack from Iran, North Korea, and China. However, these attacks were directed against companies (notably Sony Pictures), not the US government. The Russians were the first to wage war directly against the US government, seeking to compensate for their relative economic and military decline by exploiting the "wide asymmetrical possibilities" that the internet offers for "reducing the fighting potential of the enemy."⁴¹ They learned the ropes in attacks on Estonia, Georgia, and Ukraine. In 2016, however, the Kremlin launched a sustained assault on the American political system, using as proxies not only WikiLeaks but also the Romanian blogger "Guccifer 2.0."42

Let us leave aside the question of whether or not the Russian interference—as opposed to the fake news discussed in the previous chapter decided the election in favor of Trump; suffice to say it helped him, though both fake and real news damaging to Clinton could presumably have been disseminated without Russia's involvement. Let us also leave aside the as yet unresolved questions of how many members of the Trump campaign were complicit in the Russian operation, and how much they knew.⁴³ The critical point is that Moscow was undeterred. For specialists in national security, this is only one of many features of cyberwar that are perplexing. Accustomed to the elegant theories of "mutually assured destruction" that evolved during the Cold War, they are struggling to develop a doctrine for an entirely different form of conflict in which there are countless potential attackers, many of them

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hard to identify, and multiple gradations of destructiveness. As then deputy secretary of defense William Lynn observed in 2010, "Whereas a missile comes with a return address, a computer virus generally does not." For Joseph Nye of Harvard's Kennedy School, deterrence may be salvageable, but that is true only if the United States is prepared to make an example of an aggressor. The three other options Nye proposes are to ramp up cybersecurity, to try to "entangle" potential aggressors in trade and other relationships (so as to raise the cost of cyberattacks to them), and to establish global taboos against cyber akin to the ones that have (mostly) discouraged the use of biological and chemical weapons.⁴⁴ This analysis is not very comforting. Given the sheer number of cyberaggressors, defense seems doomed to lag behind offense, in an inversion of conventional military logic. And the Russians have proved themselves to be indifferent to both entanglement and taboos, even if China may be more amenable to Nye's approach. Indeed, the Russian government seems willing to enter into partnerships with organized criminals in pursuit of its objectives.45

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How frightened should we be of Cyberia? For Anne-Marie Slaughter, our hypernetworked world is, on balance, a benign place, and the "United States . . . will gradually find the golden mean of network power."46 True, there are all kinds of networked threats ("terrorism . . . drug, arms, and human trafficking . . . climate change and declining biodiversity . . . water wars and food insecurity . . . corruption, money laundering, and tax evasion . . . pandemic disease"). But if America's leaders can only "think in terms of translating chessboard alliances into hubs of connectedness and capability," all should come right. The key, she argues, is to convert hierarchies into networks, turning NATO into "the hub of a network of security partnerships and a center for consultation on international security issues," and reforming the United Nations Security Council, the International Monetary Fund, and the World Bank by opening them up to "newer actors."⁴⁷ The institutions of world order established after the Second World War need to metamorphose into "hubs of a flatter, faster, more flexible system, one that operates at the level of citizens as well as states," incorporating "good web

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actors, corporate, civic, and public." One example she gives is the Global Covenant of Mayors for Climate and Energy, which connects more than 7,100 cities around the world.⁴⁸ Another is the Open Government Partnership launched by the Obama administration in 2011, which now includes seventy countries committed to "transparency, civic participation, and accountability."⁴⁹

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Can the "good actors" join together in a new kind of geopolitical network, pitting their "webcraft" against the bad actors? Joshua Cooper Ramo is doubtful. He agrees with Slaughter that "the fundamental threat to American interests isn't China or al-Qaeda or Iran. It is the evolution of the network itself." However, he is less sanguine about how easily the threat can be combated. Cyberdefense lags ten years behind cyberattack, not least because of a new version of the impossible trinity: "Systems can be fast, open, or secure, but only two of these three at a time."50 The threat to world order can be summed up as "very fast networks x artificial intelligence x black boxes x the New Caste x compression of time x everyday objects x weapons."51 In The Seventh Sense, Ramo argues for the erection of real and virtual "gates" to shut out the Russians, the online criminals, the teenage net vandals, and other malefactors. Yet he himself quotes the three rules of computer security devised by the NSA cryptographer Robert Morris, Sr.: "RULE ONE: Do not own a computer. RULE TWO: Do not power it on. RULE THREE: Do not use it."52 If we all continue to ignore those new categorical imperatives-and especially our leaders, most of whom have not even enabled two-factor authentication on their email accounts-how will any gates keep out the likes of Assange and Guccifer?

An intellectual arms race is now under way to devise a viable doctrine of cybersecurity. It seems unlikely that those steeped in the traditional thinking of national security will win it. Perhaps the realistic goal is not to deter attacks or retaliate against them but to regulate all the various networks on which our society depends so that they are resilient—or, better still, "anti-fragile," a term coined by Nassim Taleb to describe a system that grows stronger under attack.⁵³ Those like Taleb who inhabit the world of financial risk management saw in 2008 just how fragile the

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international financial network was: the failure of a single investment bank nearly brought the whole system of global credit tumbling down. The rest of us have now caught up with the bankers and traders; we are all now as interconnected as they were a decade ago. Like the financial network, our social, commercial, and infrastructural networks are under constant attack from fools and knaves, and there is very little indeed that we can do to deter them. The best we can do is to design and build our networks so that they can withstand the ravages of Cyberia. That means resisting the temptation to build complexity when (as in the case of financial regulation) simplicity is a better option.⁵⁴ Above all, it means understanding the structures of the networks we create.

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When half the nodes of a random graph the size of most real-world networks are removed, the network is destroyed. But when the same procedure is carried out against a scale-free model of a similar size, "the giant connected component resists even after removing more than 80 per cent of the nodes, and the average distance within it [between nodes] is practically the same as at the beginning."⁵⁵ That is a vitally important insight for those whose task is to design networks that can be anti-fragile in the face of a deliberate, targeted attack.

Dictatorships are now empowered by this electronic revolution. They now have technologies that were way beyond their wildest, happiest dreams before, to enable them. —Charles Hill

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In March 2017 the members of the House of Commons Home Affairs Committee, led by its chair Yvette Cooper, attacked Google, Facebook, and Twitter for not doing enough to censor the internet on their behalf. Cooper complained that Facebook had failed to take down a page with the title "Ban Islam." As she put it, "We need you to do more and to have more social responsibility to protect people."⁵⁶ In the same week, the

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German justice minister Heiko Maas unveiled a draft law that would impose fines of up to fifty million euros on social networks that fail to delete "hate speech" or "fake news." In his words, "Too little illegal content is being deleted and it's not being deleted sufficiently quickly."⁵⁷

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One can argue for and against censorship of odious content. One can marvel that companies and government agencies would spend money on online advertising so indiscriminately that their carefully crafted slogans end up on jihadist websites. However, arguing that Google and Facebook should do the censoring is not just an abdication of responsibility; it is evidence of unusual naïveté. As if these two companies were not already mighty enough, European politicians apparently want to give them the power to limit their citizens' free expression.

There are three essential points to understand about the IT revolution. The first is that it was almost entirely a US-based achievement, albeit with contributions from computer scientists who flocked to Silicon Valley from all over the world and Asian manufacturers who drove down the costs of hardware. Second, the most important of the US tech companies are now extraordinarily dominant. Third, as we have seen, this dominance translates into huge amounts of money. Confronted with this American network revolution, the rest of the world had two options: capitulate and regulate or exclude and compete. The Europeans chose the former. You will look in vain for a European search engine, a European online retailer, a European social network. The biggest EUbased internet company is Spotify, the Stockholm-based music and video streaming company founded in 2006.58 The FANG has been sunk deep into the EU, and all the European Commission can do now is to harass the US giants with antitrust charges, backdated tax bills, and tighter rules on privacy and data protection, not to mention employment rights.⁵⁹ To be sure, the Europeans led the way in insisting that American companies could not operate in their territory independently of national or European law. It was a Frenchman, Marc Knobel, who established that Yahoo could not advertise Nazi memorabilia on its auction sites, not least because the server through which French users accessed the site was located in Europe (in Stockholm), but also because

Yahoo was not (as it claimed) incapable of distinguishing French from other users.⁶⁰ A number of European countries—not only France but also Britain and Germany—have passed laws that require internet service providers to block proscribed content (such as pedophile pornography) from being viewed by their citizens. Yet the European political elites now effectively rely on US companies such as Facebook to carry out censorship on their behalf, seemingly oblivious to the risk that Facebook's "community standards" may end up being stricter than European law.

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The Chinese, by contrast, opted to compete. This was not the response predicted by Americans, who assumed that Beijing would simply try to "control the Internet"—an endeavor President Bill Clinton famously likened to "trying to nail Jell-O to the wall."61 "The Internet is a porous web," wrote one American academic in 2003, "and if people in China... want to get information from sites in Silicon Valley, even the most omnipotent of governments will be hard pressed to stop them."62 This was not quite right. Certainly, there has been censorship. Since 2012, when Lu Wei was put in charge of the Central Leading Group for Cyberspace Affairs, China has increased the effectiveness of its Great Firewall, which blocks access to tens of thousands of Western websites, as well as its Golden Shield, which carries out online surveillance, and its Great Cannon, which can be used to attack hostile websites. Microblogs and social networks such as Sina Weibo are policed aggressively, with prison sentences for those convicted of posting false or subversive information online. In September 2016, to give just one example of how the authorities operate, NetEase was forced by the government to close down all of its online forums, except for those on real estate and home.63

Yet censorship is not the key to the Chinese response to the networked age. The core of the strategy has been, by fair means and foul, to limit the access of the big American IT companies to the Chinese market and to encourage local entrepreneurs to build a Chinese answer to FANG. While Yahoo and Microsoft accepted government mandated "self-discipline," Google pulled out of China in 2010 after repeated

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wrangles with the Chinese authorities over censorship and attacks on human rights activists' Gmail accounts.⁶⁴ Ever since it registered the domain name www.facebook.cn in 2005, Facebook has tried to establish itself in China, but it was blocked in 2009, when Western social media companies were accused of fomenting unrest in mainly Muslim Xinjiang.⁶⁵ The result is that the internet in China today is dominated by BAT: Baidu (the search engine, founded by Robin Li in 2000), Alibaba (Jack Ma's answer to Amazon, founded in 1999), and Tencent (created the year before by Ma Huateng, best known for its WeChat messaging app). These conglomerates are much more than clones of their US counterparts. Each has shown itself to be innovative in its own rightand with a combined market value in excess of \$473 billion and annual revenues of \$20 billion, they are almost as large in scale as their US counterparts. WeChat is used by 86 percent of Chinese internet users and is fast replacing the once mandatory Asian business card with easyto-snap QR codes. Alibaba's revenue in China exceeded Amazon's in the United States in 2015; its share of total retail revenue in China (over 6 percent) is twice that of Amazon's in the United States.⁶⁶

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Needless to say, Silicon Valley gnashes its fangs at being shut out of the vast Chinese market. Zuckerberg has not yet abandoned hope, giving interviews in fluent Mandarin and even jogging through the smog of Tiananmen Square, but the recent experience of Uber cannot encourage him. Last year, after incurring losses in excess of \$1 billion a year, Uber ran up the white flag, accepting that it could not beat the homegrown ride-sharing business Didi Chuxing.⁶⁷ This outcome was a result partly of Didi's great agility and deeper pockets, but partly also of regulatory changes that seemed designed to put Uber at a disadvantage in the Chinese market.⁶⁸ The frustration of Silicon Valley with these setbacks is understandable. Yet it is hard not to be impressed by the way China took on Silicon Valley and won. It was not only smart economically; it was smart politically and strategically, too. In Beijing, Big Brother now has the big data he needs to keep very close tabs on Chinese netizens. Meanwhile, if the NSA wants to collect metadata from the Middle Kingdom, it has to get past the Great Firewall of China.

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The conventional wisdom in the West remains that the networked age is as inimical to the rule of the Chinese Communist Party as it was to the Soviet Union. But there are those who beg to differ.⁶⁹ For one thing, the CCP itself is a sophisticated network in which nodes are interconnected by edges of patronage and peer or coworker association. On the basis of between-ness centrality, for example, Xi Jinping is as powerful as any leader since Jiang Zemin, and much more powerful than Deng Xiaoping, with whom he is sometimes wrongly compared by Western commentators.⁷⁰ Network analysis is allowing students of Chinese government to move away from simplistic theories about factions and to realize the subtlety of modern guanxi. Cheng Li has emphasized the importance of mentor-protégé ties in Xi's ascent to power-those relationships between senior party figures and their right-hand men (*mishu*). Those who distinguish between an elitist "Jiang-Xi camp" and the populist "Hu-Li camp" are exaggerating the rigidities of faction. Xi himself rose from being secretary to the minister of defense, Geng Biao, to later hold county-level and provincial positions in Hebei, Fujian, Zhejiang, and Shanghai, where he built up his own network of protégés, including figures as different as the "economic technocrat" Liu He and the "conservative military hawk" Liu Yuan.⁷¹ As Franziska Keller argues, China is better understood in terms of such networks of mentorship than in terms of factions (see figure 6.3). Other important networks include the one formed by members of Xi's leading small groups and the one connecting corporations to banks via the bond market.⁷²

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Far from wanting to nail Jell-O to the wall, the Chinese approach to social media is increasingly to take advantage of what microblogs reveal about citizens' concerns. When researchers from Hong Kong, Sweden, and the United States mined a dataset of more than thirteen billion blog posts on Sina Weibo between 2009 and 2013, they were surprised to find that 382,000 posts alluded to social conflicts and as many as 2.5 million mentioned mass protests such as strikes. The hypothesis is that the authorities are now using social media to monitor dissent as well as to police corruption. Significantly, of 680 officials accused of corruption on Weibo, those eventually charged were mentioned nearly ten times more often than those not charged.⁷³ Another dataset—of 1,460 officials

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FIGURE 6.3 The Chinese Communist Party Central Committee Members' Network

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The size of the node is proportional to the number of connections (degree); the size of the name proportional to between-ness centrality. Note how ties between mentors and mentees matter much more than family ties.

Source: Franziska Barbara Keller, "Moving Beyond Factions: Using Social Network Analysis to Uncover Patronage Networks among Chinese Elites," *Journal of East Asian Studies* 16, no. 1 (May 2016).

investigated for corruption between 2010 and 2015—provides a further insight into the networks that run China, in this case the network of "tigers and flies" (i.e., big and small offenders) whose misconduct has become a key target of Xi Jinping's government.⁷⁴ The possibility exists that information and computer technology could enable Beijing to

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build a system of "social credit," analogous to financial credit in the West, that would (in official parlance) "allow the trustworthy to roam everywhere under heaven while making it hard for the discredited to take a single step."⁷⁵ China already has established systems of *hukou* (household registration) and *dang'an* (personal records), as well as schemes for rewarding outstanding workers and party cadres. Integrating these with the data that the authorities can easily glean from the BAT companies would provide a system of social control beyond the dreams of the mid-twentieth-century totalitarian states.

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At the same time, China's leaders seem much more adept in webcraft than their American counterparts. While the Trans Pacific Partnership may be revived, but without the United States as a member, Chinese initiatives such as the Belt and Road scheme and the Asian Infrastructure Investment are steadily attracting new participants. A fascinating test of the Chinese approach will be how far they are able to leapfrog ahead of the United States in the rapidly growing sector of financial technology. Since ancient times, states have exploited their ability to monopolize the issuance of currency, whether coins stamped with the king's likeness, banknotes depicting past presidents, or electronic entries on a screen. However, blockchain-based digital currencies such as bitcoin and ethereum offer many advantages over a fiat currency like the US dollar or the Chinese yuan. As a means of payment—especially for online transactions—a digital currency has the potential to be faster and cheaper than a credit card or wire transfer. As a store of value, bitcoin has many of the key attributes of gold, notably finite supply. As a unit of account, to be sure, it is less than stable, but that is because it has become an attractive speculative object. Worse, bitcoin seems extraordinarily wasteful of computer resources because of the way that it is "mined" or "hashed" and authenticated.⁷⁶ On the other hand, bitcoin's distributed ledger technology appears to solve the problem of authentication and security so well that bitcoin can also function as a fraudproof messaging technology, while ethereum can even automate the enforcement of contracts without the need for the bureaucratic monitoring that is an integral and expensive part of the existing system of

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national and international payments.⁷⁷ In short, "trust is distributed, personalized, socialized... without the need for a central institution for verification."78 Of course, the Chinese authorities are no more ready to hand their payments system over to bitcoin than they were to hand their taxi system over to Uber. Indeed, alarmed that Chinese "miners" accounted for 40 percent of the global bitcoin network, with close to three-quarters of bitcoin trades occurring on the BTCC (Bitcoin China) exchange, financial regulators announced a regulatory tightening on the sector late in the summer of 2017. Within one month, the major privately operated Chinese exchanges "voluntarily" ceased domestic operations. However, Beijing clearly appreciates the potential of blockchain as a technology. That is why the People's Bank of China and a number of provincial governments are close to launching an "official crypto-currency"—"bityuan," perhaps—in one or two provinces in the near future.⁷⁹ If these experiments are successful, it would represent the beginning of a new epoch in monetary history and a serious challenge to the dollar's future as the principal international currency.

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We live in a strategy-free world with respect to national security, and I think in many respects we live in a strategy-free world with geoeconomic issues, too. —John B. Taylor

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At times, it seems as if we are condemned to try to understand our own time with conceptual frameworks more than half a century old. Since the financial crisis, many economists have been reduced to recycling the ideas of John Maynard Keynes, who died in 1946. Confronted with populism, writers on American and European politics repeatedly confuse it with fascism, as if the era of the world wars is the only history they have ever studied. Analysts of international relations seem to be stuck with terminology that dates from roughly the same period: realism or

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idealism, containment or appeasement, deterrence or disarmament. George Kennan's "Long Telegram" was dispatched just two months before Keynes's death; Hugh Trevor Roper's *Last Days of Hitler* was published the following year. Philip Zelikow hankers after a new Marshall Plan.

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Yet all this was seventy years ago. Our own era is profoundly different from the mid-twentieth century. The near-autarkic, commanding and controlling states that emerged from the Depression, World War II, and the early Cold War exist today, if at all, only as pale shadows of their former selves. The bureaucracies and party machines that ran them are defunct or in decay. The so-called administrative state is their final incarnation. Today, the combination of technological innovation and international economic integration has created entirely new forms of network—ranging from the criminal underworld to the rarefied "overworld" of the World Economic Forum—that were scarcely dreamed of by Keynes, Kennan, or Trevor Roper.

Winston Churchill famously observed, "The longer you can look back, the farther you can look forward." We, too, must look back longer and ask ourselves the question: Is our age likely to repeat the experience of the period after 1500, when the printing revolution unleashed wave after wave of revolution?⁸⁰ Will the new networks liberate us from the shackles of the administrative state as the revolutionary networks of the sixteenth, seventeenth, and eighteenth centuries freed our ancestors from the shackles of spiritual and temporal hierarchy? Or will the established hierarchies of our time succeed more quickly than their imperial predecessors in co-opting the networks and enlisting them in their ancient vice of waging war?

A libertarian utopia of free and equal netizens—all interconnected, sharing all available data with maximum transparency and minimal privacy settings—has a certain appeal, especially to the young. It is romantic to imagine these netizens spontaneously rising up against the world's corrupt elites, then unleashing the might of artificial intelligence to liberate themselves from the drudgery of work, too. Those who try to look forward without looking back very easily fall into the trap of wish-

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ful thinking. Since the mid-1990s, computer scientists and others have fantasized about the possibility of a "global brain"—a self-organizing "planetary superorganism."81 In 1997 Michael Dertouzos looked forward to an era of "computer-aided peace."82 "New information technologies open up new vistas of non-zero sumness," wrote one enthusiast in 2000. Governments that did not react swiftly by decentralizing would be "swiftly . . . punished."⁸³ N. Katherine Hayles was almost euphoric. "As inhabitants of globally interconnected networks," she wrote in 2006, "we are joined in a dynamic co-evolutionary spiral with intelligent machines as well as with the other biological species with whom we share the planet." This virtuous upward spiral would ultimately produce a new "cognisphere."84 Three years later, Ian Tomlin envisioned "infinite forms of federations between people . . . that overlook . . . differences in religion and culture to deliver the global compassion and cooperation that is vital to the survival of the planet."85 "The social instincts of humans to meet and share ideas," he declared, "might one day be the single thing that saves our race from its own self destruction."86 "Informatization," wrote another author, would be the third wave of globalization.⁸⁷ "Web 3.0" would produce "a contemporary version of a 'Cambrian explosion'" and act as "the power-steering for our collective intelligence."88

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Histories of futurology give us little reason to expect much, if any, of this to come true. Certainly, if Moore's Law continues to hold, computers should be able to simulate the human brain by around 2030. But why would we expect this to have the sort of utopian outcomes imagined in the preceding paragraph? Moore's Law has been in operation at the earliest since Charles Babbage's "Analytical Engine" was (partly) built before his death in 1871, and certainly since World War II. It cannot be said that there has been commensurate exponential improvement in our productivity, much less our moral conduct as a species. There is a powerful case to be made that the innovations of the earlier industrial revolutions were of more benefit to mankind than the most recent one.⁸⁹ And if the principal consequence of advanced robotics and artificial intelligence really is going to be large-scale unemployment, the

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chances are surely quite low that a majority of mankind will uncomplainingly devote themselves to harmless leisure pursuits in return for some modest basic income.⁹⁰ Only the sedative-based totalitarianism imagined by Aldous Huxley would make such a social arrangement viable.⁹¹ A more likely outcome is a repeat of the violent upheavals that ultimately plunged the last great networked age into the chaos that was the French Revolution.⁹²

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Moreover, the suspicion cannot be dismissed that, despite all the hype of the networked age, less benign forces have already learned how to use and abuse the "cognisphere" to their advantage. In practice, the internet depends for its operation on submarine cables, fiber-optic wires, satellite links, and enormous warehouses full of servers. There is nothing utopian about the ownership of that infrastructure, nor the oligopolistic arrangements that make ownership of major web platforms so profitable. Vast new networks have been made possible but, like the networks of the past, they are hierarchical in structure, with small numbers of super-connected hubs towering over the mass of sparsely connected nodes. And it is no longer a mere possibility that this network can be instrumentalized by corrupt oligarchs or religious fanatics to wage a new and unpredictable kind of war in cyberspace. That war has commenced. Nor can it be ruled out that a "planetary superorganism" created by the Dr. Strangeloves of artificial intelligence may one day run amok, calculating—not incorrectly—that the human race is by far the biggest threat to the long-run survival of the planet itself and exterminating the lot of us.93

The lesson of history is that trusting in networks to run the world is a recipe for anarchy: at best, power ends up in the hands of the Illuminati, but more likely it ends up in the hands of the Jacobins. Some today are tempted to give at least "two cheers for anarchism."⁹⁴ Those who lived through the wars of the 1790s and 1800s learned an important lesson that we would do well to relearn: unless one wishes to reap one revolutionary whirlwind after another, it is better, for the sake of order, to impose some kind of hierarchical order on the world and to give it some legitimacy.

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At the Congress of Vienna, the five great powers agreed to establish such an order, and the pentarchy they formed provided a remarkable stability for the better part of the century that followed. Just over two hundred years later, we confront the same choice they faced. Those who favor a world run by networks will end up not with the utopia of their dreams but with a world divided between FANG and BAT and prone to all the pathologies discussed above, in which malignant subnetworks exploit the opportunities of the World Wide Web to spread virus-like memes and mendacities.

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The alternative is that another pentarchy of great powers recognizes their common interest in resisting the spread of jihadism, criminality, and cybervandalism, to say nothing of climate change and other shared threats. In the wake of the 2017 WannaCry episode, even the Russian government must understand that no state can hope to rule Cyberia for long: the malware was developed by the American NSA as a cyberweapon called EternalBlue, but was stolen and leaked by a group calling itself the Shadow Brokers. It took a British researcher to find its "kill switch," but only after hundreds of thousands of computers had been infected, including American, British, Chinese, French, and Russian machines. What could better illustrate the common interest of the great powers in combating internet anarchy? They surely have as strong an incentive in this area as they do to combine against nuclear proliferation, the development and use of biological and chemical weapons, and the perils of pollution, not forgetting the spread of Islamic extremism.

Conveniently, the architects of the post-1945 order created the institutional basis for such a new pentarchy in the form of the permanent members of the UN Security Council, an institution that retains the all-important ingredient of legitimacy. Unlike the Marshall Plan which the United States could implement with any willing partner on a bilateral basis—the UNSC was a failure in the sense that it did not remotely live up to the hopes of Franklin Roosevelt. The Soviet Union used its veto power the most often of the P5, casting eighty vetoes between 1946 and 1969. Between 1970 and 1991, however, the United States nearly equaled that total. In short, the idea of a hierarchy of powers,

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which had worked so well between 1815 and 1914, was unworkable in the polarized climate of the Cold War. Ideas that did work in the 1940s are probably of limited utility today; you need a current account surplus for a Marshall Plan. But ideas that did not work in the 1940s are another matter. Whether or not the five great powers can make common cause once again, as their predecessors did in the nineteenth century, is the great geopolitical question of our time.⁹⁵

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Reflecting on governance, and thinking back to my own experience in various jobs, I look over there at Sam Nunn and Bill Perry. Why did things seem to function relatively well in that era? I think one of the reasons is that we trusted each other. As we dealt with each other, if I said to Sam I would do something, I would go out of my way to be sure I did it, so he could be sure he could trust me. We made a deal. —George P. Shultz

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