

ALAN
GREENSPAN

ADRIAN
WOOLDRIDGE

CAPITALISM IN AMERICA

A HISTORY

'An inspiring, rip-roaring
read – like the astonishing
story it describes'

LIAM HALLIGAN,
DAILY TELEGRAPH



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Capitalism in America

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ALSO BY ALAN GREENSPAN

The Map and the Territory
The Age of Turbulence

ALSO BY ADRIAN WOOLDRIDGE

The Great Disruption
Masters of Management
Measuring the Mind

(WITH JOHN MICKLETHWAIT)

The Fourth Revolution
God Is Back
The Right Nation
The Company
A Future Perfect
The Witch Doctors

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Greenspan:
For my beloved Andrea

Wooldridge:
For my American-born daughters, Ella and Dora

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INTRODUCTION

LET'S START THIS HISTORY with a flight of fancy. Imagine that a version of the World Economic Forum was held in Davos in 1620. The great and the good from across the world are assembled in the Alpine village: Chinese scholars in their silk robes, British adventurers in their doublets and jerkins, Turkish civil servants in their turbans and caftans . . . all edge along the icy paths, frequently tumbling over, or gather in the inns and restaurants, animated by alcohol.

The subject of the conference is an explosive one: who will dominate the world in the coming centuries? Everyone wants to make the case for their corner of the planet. You rush from panel discussion to panel discussion (and then stumble from after-party to after-party) to absorb the Davos wisdom.

The Chinese have a compelling argument. Peking has a population of more than a million at a time when the biggest European cities (London, Paris, Nice) have no more than three hundred thousand. The imperial civil service is selected from an immense country on the basis of the world's most demanding examinations. Chinese scholars have compiled an eleven-thousand-volume encyclopedia. Chinese sailors have built the world's biggest ships.

Others make a good case too. A Turk boasts that the Ottoman Empire, the most important of an arc of Islamic countries extending from Turkey and Arabia to sub-Saharan Africa and Asia, is expanding westward and will soon hold Europe under its sway. A Mughal says that his empire mixes people from every race and religion in a cocktail of creativity. A Spaniard boasts that Spain is sweeping all before it—blessed by the one true Church, it is bringing the rest of Europe under its benign rule and extending its power even to Latin America (where a huge store of gold and silver is funding yet further expansion). A plucky Briton makes the most unlikely case of all. His tiny country has broken with a corrupt and ossified continent and is developing dynamic new institutions: a powerful Parliament, a mighty navy (backed up by a few pirates), and a new species of organization, the chartered corporation, which can trade all over the world.

In all of the arguing in Davos, one region goes unmentioned: North America. The region is nothing more than an empty space on the map—a vast wilderness sitting above Latin America, with its precious metals, and between the Atlantic and Pacific oceans, with their trading routes and treasure troves of fish. The wilderness is populated by aboriginal peoples who have had no contact with the Davos crowd. There are a few Europeans in New England and Virginia—but they report that the life is hard and civilization nonexistent. The entire North American continent produces less wealth than the smallest German principality.

Today the United States is the world's biggest economy: a mere 5 percent of the world's population, it produces a quarter of its GDP expressed in U.S. dollars. America has the world's highest standard of living apart from a handful of much smaller countries such as Qatar and Norway. It also dominates the industries that are inventing the future—intelligent robots, driverless cars, and life-extending drugs.

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America's share of the world's patents has increased from 10 percent when Ronald Reagan was elected in 1980 to 20 percent today.

The American economy is as diverse as it is huge. The United States leads the world in a wide range of industries—natural resources as well as information technology, paper, and pulp as well as biotechnology. Many leading economies are dangerously focused on one city: most obviously the United Kingdom but also South Korea and Sweden. The United States has numerous centers of excellence: New York for finance, San Francisco for technology, Houston for energy, and Los Angeles for films.

American capitalism is also the world's most democratic. The United States was the birthplace of the engines of popular capitalism, from mass production to franchising to mutual funds. In many countries capitalism has always been associated with a plutocratic elite. In America, it has been associated with openness and opportunity: making it possible for people who were born in obscurity to rise to the top of society and for ordinary people to enjoy goods and services that were once confined to the elites. R. H. Macy, a former whaling skipper with a tattoo on one of his hands, sold "goods suitable for the millionaire at prices in reach of the millions." Henry Ford, a farmer's son, trumpeted the Model T as "a car for the common man." Amadeo Giannini, an Italian immigrant, founded the Bank of America in order to bring banking to "the little guy." Pierre Omidyar, another immigrant, created an electronic bazaar, eBay, for ordinary people to engage in free exchange.

America's rise to greatness has been marred by numerous disgraces, prime among them the mistreatment of the aboriginal peoples and the enslavement of millions of African Americans. Yet judged against the broad sweep of history, it has been a huge positive. America has not only provided its own citizens with a prosperous life. It has

exported prosperity in the form of innovations and ideas. Without America's intervention in the Second World War, Adolf Hitler might well have subdued Europe. Without America's unwavering commitment to the Cold War, Joseph Stalin's progeny might still be in power in Eastern Europe and perhaps much of Asia. Uncle Sam provided the arsenal of democracy that saved the twentieth century from ruin.

This is a remarkable story. But it is also a story with a sting in the tail: today, productivity growth has all but stalled. Tyler Cowen has talked about a "great stagnation." Lawrence Summers has revived Alvin Hansen's phrase, "secular stagnation." Robert Gordon's study of the American economy since the Civil War is called *The Rise and Fall of American Growth*. America is being defeated by China and other rising powers in one industry after another. The number of new companies being created has reached a modern low. The labor market is becoming stickier. Regulations are multiplying.

America has bounced back from previous disappointments. In the 1930s, the country suffered from one of the longest and deepest depressions in history. Then it emerged from the Second World War as by far the world's most powerful economy. In the 1970s, it was plagued by stagflation and bruised by competition with Germany and Japan. In the 1980s and 1990s, it seized the opportunities provided by information technology and globalization to regain its position as the world's most dynamic economy. Whether it can pull off this trick again is still unclear.

This book will tell the most remarkable story of the past four hundred years: how a collection of thirteen colonies in the middle of nowhere transformed itself into the mightiest economy the world has seen. It will also try to use the lessons of history to address the great question of our time: whether the United States will preserve its pre-eminence or whether its leadership will inevitably pass to other (almost certainly less liberal) powers.

A GREAT AGE FOR BEGINNINGS

Three hundred years ago America was nothing more than a collection of sparsely populated settlements hanging off the edge of the known world—an afterthought to educated minds and a sideshow in great power politics. Though rich in natural resources, it was far away from the centers of civilization; though huge, it was mostly inaccessible. Yet luck smiled on the young country. America owed its birth to a succession of lucky breaks. The rebellion that created the United States might not have gotten off the ground at all if the British establishment had listened to Edmund Burke and pursued a more moderate policy. The rebels were the beneficiaries of a global war between the British and the French. The independence struggle would have faltered if George Washington had not been such a great leader of men. The lucky breaks continued after the country's birth. Thomas Jefferson's purchase of the Louisiana Territory from France in 1803 doubled the size of the country, adding fertile farmland, the Mississippi River, and the port of New Orleans. America bought Florida from Spain in 1821, annexed Texas in 1845 and Oregon in 1846, and with its victory in the Mexican-American War, added California in 1850.

America was lucky in its paternity: it was far better to be the child of the country that produced the first Industrial Revolution and the first parliamentary government than, say, the child of Spain or Belgium. To this day Americans invoke the evils of monarchical tyranny and the virtues of the Revolution. Yet in many ways the American Revolution was only a half revolution: America inherited many of Britain's best traditions, from limited government to the common law to a respect for individual rights that, according to one eminent historian, Alan Macfarlane, stretches back to the thirteenth

century.¹ America engaged in a ceaseless exchange of informal knowledge with Britain, importing British immigrants, who frequently brought industrial secrets with them, and sending Americans to visit British factories, steelworks, and exhibitions. It looked to British models for its stock market, commodity exchanges, and patent laws. Divided by a common language, America and Britain are nevertheless united by a common culture.

The luckiest break of all was timing. The United States was born in the age of the Enlightenment, when old verities were being rethought and established institutions remodeled. The country's bloody struggle for independence (1775–83) began a year before the publication of the greatest work of free-market economics ever written, Adam Smith's *The Wealth of Nations* (1776). For most of recorded history, people had acquiesced in, and in some ways embraced, a society that was static and predictable. From the birth of Jesus to about 1820, economic growth amounted to no more than 0.11 percent a year or 11 percent a century, according to Angus Maddison.² A young fifteenth-century vassal could look forward to tilling the same plot of his landlord's soil until disease, famine, natural disaster, or violence dispatched him. And the vassal could fully expect that his children and his children's children would till the same plot.

Adam Smith advanced a vision of a dynamic society in which wealth multiplied and opportunities abounded. In doing so, he performed a remarkable intellectual somersault. Until this point, people had generally regarded the pursuit of self-interest as, at best, unseemly, and at worst, sinful. Smith countered that, provided it took place within the constraints of law and morality, the pursuit of self-interest boosts the well-being of the entire nation.

No country has embraced this insight more fully than the one that was born shortly after Adam Smith advanced this argument. The new country was conceived in a revolt against a mercantilist

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regime that believed that a nation's economic success was measured by the size of its stock of gold, which was, in turn, driven by the extent of positive trade balances fostered by protectionist policies. The U.S. Constitution, written in 1787 and ratified in 1788, established that the entire country was a unified common market with no internal tariffs or taxes on interstate commerce. America was the first country to be born in an age of growth—an age when the essential economic problem was to promote the forces of change rather than to divvy up a fixed set of resources.

The second force shaping America was the Enlightenment's great antagonist, religion, particularly the Protestant religion. More than any other country America was the child of the European Reformation. Whereas the Catholic Church encouraged its members to approach God through the medium of the priest, the Protestant Church encouraged the faithful to approach God through the medium of the Bible. Protestants were supposed to read the Good Book at home and come to their own judgment on religious affairs rather than rely on the authority of their superiors. The Massachusetts Puritans founded schools and universities on a scale unmatched in any other country. A Massachusetts law obliged all heads of households to teach their children to read. "After God has carried us safe to New England, and we had builded our houses, provided necessities for our livelihood, reared convenient places for God's worship, and settled Civil Government," stated a 1643 letter from Harvard University to England that is the first known example of a university funding letter, "one of the next things we longed for and looked for was to advance learning and perpetuate it to posterity."

America had one more piece of luck in its early years: the Founders realized that the only way to thrive in a mobile world was to establish some fixed points to navigate by. They provided citizens with a set of rights that the government couldn't violate and a

Constitution that kept power in check. The more you opened the way to the rule of the people, the more you had to make sure that the people didn't abuse their power. And the more you opened the door to commercial passions, the more you had to make sure that merchants didn't debase the currency or cheat their customers.

The Founders injected property rights into the country's DNA. Thomas Jefferson's phrase about man's "inalienable right" to "life, liberty and the pursuit of happiness" was a gloss on John Locke's phrase, in his "Second Treatise," about man having "by nature a power" to preserve "his life, liberty and estate, against the injuries and attempts of other men." The Constitution divided power in large part to protect propertied people from the predations of the masses or a dictator. This vigorous protection of property not only encouraged entrepreneurialism at home, because people had a reasonable certainty of keeping their gains, it also encouraged foreign investors to put their money in America on the grounds that they wouldn't see their capital stolen and their contractual rights ignored.

America's passion for protecting property extended to the fruits of their imaginations. The Founding Fathers built patent protection into Article I, Section 8, of the Constitution. America extended intellectual property rights to people who would never have had them in Europe, setting the patent fee at only 5 percent of the amount charged in Britain. It also required inventors to publicize the details of their patents so that innovations could be disseminated even as the right to profit from making them was protected.

The preoccupation with patents points to another advantage: America was born in an age of business. The country was founded by business corporations such as the Virginia Company and the Massachusetts Bay Company: the first American "freemen" were, in fact, company stockholders, and the first "commonwealths" were company general assemblies. Americans were the first people to use the

word “businessman” in the modern sense. In the eighteenth century, the English used the term to refer to people who were engaged in public affairs: David Hume described Pericles as a “man of business.” In the 1830s, Americans began to use the phrase to refer to people who were engaged in mercantile transactions.³

Thereafter Americans reserved the same respect for businesspeople that the British reserved for gentlemen, the French for intellectuals, and the Germans for scholars. America’s willingness to “put something heroic into their way of trading,” as Alexis de Tocqueville put it, produced a cult of the entrepreneur. Americans were instinctive supporters of Joseph Schumpeter’s idea that the real motors of historical change were not workers, as Marx had argued, nor abstract economic forces, as his fellow economists tended to imply, but people who build something out of nothing, inventors like Thomas Edison, who had 1,093 patents, and company builders like Henry Ford, Thomas Watson, and Bill Gates.

America didn’t progress in a straight line after the War of Independence. The infant republic was torn between two different visions of the future—Thomas Jefferson’s vision of a decentralized agrarian republic of yeomen farmers, and Alexander Hamilton’s (astonishingly prescient) vision of an urban republic with industrial mills driving economic growth and a powerful bank irrigating the economy. America was also divided into two strikingly different economies—the capitalist economy of the North and the slave-owning economy of the South. This division became more pronounced over time as the North invested more heavily in machinery and the South invested more heavily in cotton growing and tried to expand the slave system into new territories such as Kansas. The Civil War eventually decided which version of America would emerge—and the United States tirelessly spread its version of a business civilization across the entire continent.

PEOPLE OF PLENTY

America's business civilization took root in a country that enjoyed an abundance of the three great factors of production: capital, land, and labor. America's banking sector expanded from 338 banks with total assets of \$160 million in 1818 to 27,864 banks with assets of \$27.3 billion in 1914. America also became the world's leading importer of capital, particularly from America's predecessor as the headquarters of capitalism, the United Kingdom. The country's official land area kept growing rapidly in the first half of the nineteenth century, from 864,746 square miles in 1800 to 2,940,042 in 1850. Americans brought 400 million acres of virgin territory under cultivation between the end of the Civil War and the outbreak of the First World War—a quantity of land almost twice the size of Western Europe.

The land contained a vast store of natural resources. America has more miles of navigable rivers than the rest of the world combined. The greatest of these rivers—the Missouri, Ohio, Arkansas, Tennessee, and of course, the mighty Mississippi—flow diagonally rather than perpendicularly, drawing the country together into a natural geographical unit.⁴ The Appalachian Mountains, from Pennsylvania to Kentucky to the hills of West Virginia, are filled with coal. Montana is so rich in precious metals that its official nickname is the Treasure State. The Mesabi Range in Minnesota is stuffed full of iron ore. Texas sits on a lake of oil (a lake that is now getting bigger thanks to the invention of fracking). The Midwest is a wheat bowl.

It's easy to see the impact of resource wealth in American history. You can see it in the succession of commodity-driven crazes—most notably the gold rush of 1849 and the oil booms of the early 1900s and 1950s—that have gripped the country. You can see it in giant export industries such as wheat. But one of the most important

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impacts was invisible: America didn't suffer from the resource constraints that have slowed down growth in other countries. From 1890 to 1905, when America's steel industry was booming, Minnesota's share of the country's iron ore production rose from 6 percent to 51 percent and the domestic price of iron ore fell by half, ensuring that the country's steel magnates were paying significantly less for their raw materials than their British competitors.

America was also a people magnet. Colonial America had one of the highest birthrates in the world thanks to the abundance of land and shortage of labor. Population growth kicked into a still higher gear when America began to suck people from abroad. In the nineteenth century, the population multiplied by a factor of almost fifteen, from 5.3 million to 76 million, a total larger than any European country except Russia. By 1890, 80 percent of New York's citizens were immigrants or the children of immigrants, as were 87 percent of Chicago's.

A striking proportion of America's entrepreneurial heroes were immigrants or the children of immigrants. Alexander Graham Bell and Andrew Carnegie were born in Scotland. Nikola Tesla, the discoverer of AC electricity, was Serbian. George Mitchell, the inventor of fracking and one of the most consequential businessmen of recent decades, was the son of a Greek goatherd.

Having arrived in the country, the settlers were unusually mobile: brought up in countries where land was in short supply, they were seized by a mixture of land lust and wanderlust when they realized that land was abundant. This addiction to mobility survived the creation of a more prosperous civilization: in their *Middletown* studies of a typical town in the Midwest, Muncie, Indiana, Robert and Helen Lynd discovered that Americans became more mobile as time went on, with 35 percent of families moving in 1893–98 and 57 percent in 1920–24. In the decades after 1900, millions of black Americans fled

the indentured servitude of sharecropping in the South for booming northern industrial towns such as Detroit and Chicago. (From the 1980s onward this flow was reversed as millions of people of all colors fled the Rust Belt for the booming Sun Belt.)

In the second half of the nineteenth century, the country combined its various advantages—cultural and demographic, political and geographical—to turn itself into the world's most powerful economy. Railroads knitted the country together into the world's biggest single market: by 1905, 14 percent of the world's railway mileage passed through a single American city, Chicago. America produced the world's biggest corporations: U.S. Steel, formed in 1901, the world's first billion-dollar company, employed some 250,000 people. America did more than any other country to transform two new technologies—electricity and the internal combustion engine—into a cornucopia of consumer products: cars and trucks, washing machines and radios.

HOW TO GET RICH

In telling this story, this book will focus on three organizing themes: productivity, creative destruction, and politics. Productivity describes society's ability to get more output from a given input. Creative destruction defines the process that drives productivity growth. Politics deals with the fallout of creative destruction. The first is a technical economic issue. The second is an economic issue that also touches on some of the most profound problems of social philosophy. The third takes us far from the world of charts and numbers into the world of practical politics. Anyone who regards economic history as history with the politics left out is reading the wrong book.

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Productivity is the ultimate measure of economic success.⁵ The level of productivity determines the average standard of living in a society and distinguishes advanced countries from developing countries. The most commonly used measure of productivity is labor productivity, which is measured by output (value added) per every hour worked (OPH). Two big determinants of the level of labor productivity are the amount of capital (plant and equipment) employed in making things and the number of hours people work, adjusted for their level of education and skills.

In the 1950s, “growth economists,” led by Moses Abramovitz and Robert Solow, discovered that the inputs of capital and labor do not fully account for all the growth in GDP. They dubbed the unexplained leftover multifactor productivity (MFP) or, sometimes, total factor productivity. The heart of MFP is innovation. MFP arises mainly from innovations applied to the inputs of capital and labor.

The problem with calculating GDP and MFP over a long period is that the further back you go in time, the more difficult it is to find solid statistics. The U.S. government only began collecting systematic data on national income and product accounts in the 1930s, when it called on the expertise of Simon Kuznets of Stanford University and the National Bureau of Economic Research. For prior data, historians have to rely mainly on the decennial census, which started in the 1790s. Historians supplement official census data with scattered data on industrial production, crops, livestock, and hours worked, but, as Paul David identified, such data were not very accurate before the 1840s. Despite these limitations, a legion of economic historians has, more or less, constructed a useful statistical history of GDP, both nominal and real, for the early years of the republic (see appendix).⁶ We draw on that work throughout this book.

CREATIVE DESTRUCTION

Creative destruction is the principal driving force of economic progress, the “perennial gale” that uproots businesses—and lives—but that, in the process, creates a more productive economy. With rare exceptions the only way to increase output per hour is to allocate society’s resources to areas where they will produce the highest returns—or, in more formal language, to direct society’s gross domestic savings (plus savings borrowed from abroad) to fund cutting-edge technologies and organizations. Creation and destruction are Siamese twins. The process involves displacing previously productive assets and their associated jobs with newer technologies and their jobs. Thus Henry Bessemer’s novel steel technology of 1855 displaced previous, more costly steelmaking.

The world owes the idea of creative destruction to Joseph Schumpeter and his great work *Capitalism, Socialism and Democracy* (1942). “The process of creative destruction is the essential fact about capitalism,” Schumpeter argued. “It is what capitalism consists in and what every capitalist concern has got to live in.” Yet for all his genius, Schumpeter didn’t go beyond brilliant metaphors to produce a coherent theory of creative destruction: modern economists have therefore tried to flesh out his ideas and turn metaphors into concepts that acknowledge political realities, which is to say, the world as it really is.

There is no better place to study this perennial gale than late-nineteenth-century America, when the country produced a throng of business titans who reorganized entire industries on a continental stage. It was a time in which the federal government focused overwhelmingly on protecting property rights and enforcing contracts rather than on “taming” the process of creative destruction. Thanks to relentless innovation the unit cost (a proxy for output per hour) of

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Bessemer steel fell sharply, reducing its wholesale price from 1867 to 1901 by 83.5 percent. And cheap steel set off a cycle of improvements: steel rails lasted more than ten times longer than wrought-iron rails at only a modest increase in price, allowing more people and products to be carried by rail for less money. A similar cascade of improvements in almost every area of life produced a doubling of living standards in a generation.

The most obvious way to drive creative destruction is to produce more powerful machines. A striking number of the machines that have revolutionized productivity look like improvised contraptions. Cyrus McCormick's threshing machine, described by the *London Times* as a cross between a flying machine and a wheelbarrow,⁷ helped to produce a 500 percent increase in output per hour for wheat and a 250 percent increase in output for corn from its invention in 1831 to the end of the nineteenth century. In the process, it helped to displace as much as a quarter of the world's agricultural labor force. In 1800, a farmer working hard with a scythe could harvest only a single acre in a day. By 1890 two men using two horses could cut, rake, and bind twenty acres of wheat in the same time. The sewing machine, which was invented in 1846 and produced in large numbers by the 1870s, increased productivity by more than 500 percent. New tabulating machines meant that the 1890 census was compiled in less than a year, compared with an estimated thirteen years for the 1880 census. Teleprinters, which appeared in 1910, displaced 80 to 90 percent of Morse code operators by 1929.

Better business processes are as important as better machines. Mass production was arguably America's greatest contribution to human productivity. In nineteenth-century Europe, the production of complicated systems such as guns or clocks remained in the hands of individual master craftsmen. In America, Eli Whitney and other innovators broke down the manufacture of the machine into the

manufacture of uniform parts. In 1913, Henry Ford added a moving assembly line, which brought the job to the man. America's success in producing better machines and smoother production processes has been recognized by even the crudest intellects. Stalin described America as a "country of machines."⁸ Hitler claimed that Nazism was "Fordism plus the Fuhrer."

These big forces are supplemented by more subtle ones. Most important is better information. In recent years we have grown so accustomed to receiving timely information that we treat it like the air we breathe. But for most of human history information has been so costly to acquire that people were often operating in the dark. The Battle of New Orleans, the last major engagement in the War of 1812, which turned Andrew Jackson into a national hero and cost seven hundred British troops their lives, took place two weeks after the war had ended with the Treaty of Ghent.

The *Journal of Commerce*, first published in 1827, became an indispensable source for breaking news on trade by deploying deep water schooners to intercept incoming ships before they docked. Samuel Morse's telegraph, first demonstrated in 1844, reduced the potential time it took to transmit information to seconds. Western Union telegraph communication joined the coasts in 1861 at Fort Laramie, Wyoming. Transcontinental freight and people travel became a reality only a few years later, in 1869. The golden spike was ceremoniously driven in at Promontory Summit, Utah Territory, joining the Union Pacific and Central Pacific rail networks, into which new telegraph lines were added. The opening of the transatlantic cable (after several false starts) in 1866, finally created a transatlantic financial community with traders in New York, San Francisco, and London communicating with each other in real time.

The information revolution has removed all sorts of inefficiencies and uncertainties that used to slow down business transactions.

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Retailers can order new products as soon as old ones leave the shelves. Suppliers can keep a constant watch on the supply chain. Instant communication between the retail checkout counter and the factory floor and between shippers and truckers hauling freight reduces delivery times and eliminates the need for keeping large inventories of idle stock.

A second aspect of creative destruction is the reduction in the cost of basic inputs into the economy. Andrew Carnegie and John D. Rockefeller were heroes of creative destruction because, by dint of superior organization and ceaseless innovation, they reduced the cost of the basic economic inputs of steel and energy, respectively, sending ripples of lower prices and more abundant resources through the economy.

A third is the more efficient use of those inputs. In the glory days of America's industrial might, people measured success in terms of the size of factories or the height of skyscrapers. Over time, size has become an ever-weaker proxy for economic vigor: the amount of materials needed to produce a given unit of output has declined in recent decades. The development of integrated circuits has allowed us to cram more functions into sleek electronic boxes. Advances in material science have allowed us to produce lighter cars (per unit of horsepower) and more efficient buildings. By our estimates, the decline in materials used per dollar of real GDP added 0.26 percentage points a year to real GDP growth between 1879 and 2015. That added 40 percent to real GDP by 2015. The annual gains were markedly greater from 1879 to 1899, where effectiveness added 0.52 percentage points a year to real GDP growth. That added 10.6 percent to the level of real GDP in 1899.

An additional aspect of creative destruction is the reduction in transportation costs. Cold-rolled steel sheet is worth more on a car located in a car dealership than rolling off a steel mill in Pittsburgh.

Improved transport accordingly brings two obvious benefits: it allows entrepreneurs to bring the factors of production together more easily and get the fruit of the combination of those factors, the finished products, to the consumers more swiftly. In the early years of the republic, productivity improvements were limited by the speed that horses could run or ships could sail. Improved roads or rigging could only improve productivity a little, since hooves or sails could only go so fast. Productivity increased when steamships replaced sails, not only because steamboats could go faster than sailboats in inland waterways, but also because they could sail upstream as well as downstream. The transcontinental railroad reduced the time it took to transport people and goods across the continent from six months to six days.⁹ The addition of local lines gradually plugged a larger proportion of the country's human and physical resources into a national rail line and dramatically increased the flow of people and goods around the country. Motorcars and highways eventually supplanted railway lines because they are more fluid and flexible: they can take goods to your front door rather than just to the local railway station. The miniaturization revolution has reduced transportation costs still further: the computer industry is inherently more global than, say, the concrete industry because it's so easy to move light, precious computer parts from one part of the world to another.

A fifth source of productivity improvement is location. In today's flattened world of global supply chains and instant communications, we tend to forget what was all too evident to our forebears: that clever location can boost productivity. Entrepreneurs made their fortunes simply by building mills next to waterfalls (which provided free power), or by locating their factories near rivers (which provided free transportation), or by the smart layout of their facilities. The same productivity-boosting logic applies to fractions of an inch as it

does to yards or miles. In the nineteenth century, entrepreneurs created economic value by building a railroad to bring iron ore from Minnesota's Mesabi Range and coal from West Virginia to the furnaces in Pittsburgh, where they were added together to produce steel. Today they create economic value by fitting ever-smaller silicon chips ever closer together within an integrated circuit in order to produce ever-greater amounts of computing capacity.

THE CUNNING OF HISTORY

In the real world, creative destruction seldom works with the smooth logic of Moore's law. It can take a long time for a new technology to change an economy: the spread of Samuel Morse's telegraph was complicated by the size of the country and the difficulty of the terrain. Though telegraph wires quickly blanketed the East Coast and the more densely inhabited parts of the West Coast, giving people access to almost instant communications, the center of the country remained an information void. In the late 1850s, it still took more than three weeks to convey a message from one coast to the other by a combination of telegraph and stagecoach. Sometimes old technologies can work in tandem with new ones: starting in 1860, the Pony Express, with its riders leaping from one horse to another fresh one, reduced the time it took to get a message across the country to under ten days.¹⁰ The ponies were much more flexible than more advanced methods of transport such as wagons or trains: railroads could ride up steep ravines and negotiate narrow trails.

As the mention of the Pony Express suggests, new technologies can often reinforce old ones. The *Nation* magazine addressed the paradox of the popularity of the horse in the age of steam in October 1872:

Our talk has been for so many years of the railroad and steamboat and telegraphy, as the great “agents of progress,” that we have come almost totally to overlook the fact that our dependence on the horse has grown almost *pari passu* with our dependence on steam. We have opened up great lines of steam and communication all over the country, but they have to be fed with goods and passengers by horses. We have covered the ocean with great steamers, but they can neither load nor discharge their cargoes without horses.¹¹

For several decades America’s equine population grew more than twice as fast as its human population, from 4.3 million horses and mules in 1840 to 27.5 million in 1910. That meant that the ratio of horses and mules to people increased over seventy years of pell-mell progress from one to every five humans to one to every three.¹² People used horses to drive mills, pull plows, walk alongside canal boats, herd cattle, fight battles, and above all, carry burdens for short distances. It took the combination of three kinds of power to displace horses from the heart of the American economy. Steam power replaced horses for long-distance hauling. Electric power replaced them for urban transport. And “horseless carriages” replaced them for short hauls.

There is often a significant time lag between the invention of a new technology and the boost in productivity that it produces. Four decades after Thomas Edison’s spectacular illumination of Lower Manhattan in 1882, electricity had done little to make the country’s factories more productive. Introducing electricity was not just a matter of plugging factories into the electricity grid. It involved redesigning entire production processes and replacing vertical factories with horizontal ones to get the best out of the new power source.¹³

Some of the most important improvements in productivity take

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place without much fuss. Both steelmaking and farming witnessed astonishing improvements long after commentators had given up talking about the “age of steel” or the “agricultural revolution.” The oxygen furnaces that replaced open-hearth furnaces after the Second World War (and which as the name suggests used oxygen rather than air) reduced the time taken to produce a batch of steel from eight to nine hours to thirty-five to forty minutes. Between 1920 and 2000, labor requirements per ton of raw steel decreased by a factor of a thousand, from more than 3 worker-hours per metric ton to just 0.003.

Some of the most important improvements are felt in the convenience of everyday life rather than in discrete economic sectors such as “industry” or “agriculture.” Herodotus described an Egyptian king who only had six years to live. “Perceiving that his doom was fixed, [he] had lamps . . . lighted every day at eventime . . . and enjoyed himself . . . turning the nights into days, and so living twelve years in the space of six.” The spread of electricity from 1900 onward had the same effect on the American population as a whole.¹⁴ Home appliances and convenience foods reduced the time spent on preparing meals, doing the laundry, and cleaning the house from fifty-eight hours a week in 1900 to eighteen hours a week by 1975.¹⁵ The Bureau of Labor Statistics estimated that bar code scanners at checkout counters increased the speed that cashiers could ring up payments by 30 percent and reduced labor requirements of cashiers and baggers by 10 to 15 percent.

THE DOWNSIDE OF CREATIVE DESTRUCTION

The destructive side of creative destruction comes in two distinct forms: the destruction of physical assets as they become surplus to requirements, and the displacement of workers as old jobs are

abandoned. To this should be added the problem of uncertainty. The “gale of creative destruction” blows away old certainties along with old forms of doing things: nobody knows which assets will prove to be productive in the future and which will not. New technologies almost always bring speculative bubbles that can pop, sometimes with dangerous consequences.

Partly because people are frightened of change and partly because change produces losers as well as winners, creative destruction is usually greeted by what Max Weber called “a flood of mistrust, sometimes of hatred, above all of moral indignation.”¹⁶ The most obvious form of resistance comes from workers who try to defend their obsolescent jobs. Before the Civil War, American workers didn’t have much chance to organize because companies were small; elite craft guilds defined the labor market; relations were face-to-face; and strikes were rare. After the Civil War, as big business took off, unskilled workers began to form trade unions to increase their pay and improve their conditions. Battles with bosses sometimes resulted in violence and frequently poisoned class relations.

American unions were much weaker than their European equivalents. They were harried by the courts, which repeatedly ruled that combinations of labor were illegal, and plagued by internal conflicts between skilled and unskilled workers, immigrants and native-born workers, and various regional interest groups. The unions finally achieved significant power in the 1930s with a succession of pro-labor bills. During the long period of prosperity after the Second World War, about a third of America’s private-sector workers were unionized, and the unions played an important role in making public policy. Yet America’s individualistic tradition remained powerful. The Taft-Hartley Act of 1947 outlawed “closed shops.” The southern states were much more antiunion than the northern states. And after the wave of deregulation starting in the 1970s, American trade-union member-

ship went into decline. Trade unions didn't place much of a brake on progress during the long era of managerial capitalism after the Second World War because the United States was reaping the benefits of mass production and maturing technologies, such as electricity. Yet the same trade unions became a powerful constraint on growth when mass production needed to be replaced by flexible production, and managerial capitalism by a more entrepreneurial capitalism.

Resistance can come from business titans as well as labor barons. One of the great paradoxes of creative destruction is that people who profit from it one moment can turn against it the next: worried that their factories will become obsolete or their competitors will produce better products, they do everything they can—from lobbying the government to appealing to the courts—to freeze competition and turn their temporary advantage into a permanent one. In the 1880s, Andrew Hickenlooper, the head of the Cincinnati Gas Company and sometime president of the American Gas Association, conducted a vigorous campaign to defend the “gas meter” against the “dynamo.” He bullied the city fathers into refusing to give contracts to electricity companies (or rival gas companies, for that matter) and conducted a propaganda campaign in the press about the dangers of the new technology: wires could deliver death by electric shocks or set cities on fire.¹⁷

ENTER THE POLITICIANS

America has been better at both the creative and the destructive side of creative destruction than most other countries: it has been better at founding businesses and taking those businesses to scale, but it has also been better at winding down businesses when they fail. The most obvious expression of this is the country's unusual tolerance of

bankruptcy. Many of nineteenth-century America's greatest entrepreneurs, including Charles Goodyear, R. H. Macy, and H. J. Heinz, suffered from repeated business failures before finally making it.

America's appetite for creative destruction has many roots. The fact that America is such a big country meant that people were willing to pull up stakes and move on: from its earliest days, the West was littered with ghost towns as people built new towns and then quickly abandoned them. The fact that it is a relatively new country meant that vested interests had less power: there were fewer people, particularly in the West, with established ways of life to defend. In Britain, railroads had to make strange loops to avoid ancient settlements. In America, they could carve a straight line from "Nowhere-in-Particular to Nowhere-at-All," as the London *Times* once put it. America sometimes paid a heavy price, not just aesthetically but also economically, for this attitude, with jerry-built settlements put up with little consideration for the future and abandoned with even less, but at the very least it avoided stagnation.

The country's political system has powerfully reinforced these geographical and cultural advantages. The biggest potential constraint on creative destruction is political resistance. The losers of creative destruction tend to be concentrated while the winners tend to be dispersed. Organizing concentrated people is much easier than organizing dispersed ones. The benefits of creative destruction can take decades to manifest themselves, while the costs are often immediate. Adding to this is the fact that a perennial gale is disconcerting to everyone, winners as well as losers: people have a strong preference for sticking with the familiar rather than embracing change (and explaining to them that you can't preserve the familiar if you can't afford it is hard).

America has been much better than almost every other country at resisting the temptation to interfere with the logic of creative

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destruction. In most of the world, politicians have made a successful business out of promising the benefits of creative destruction without the costs. Communists have blamed the costs on capitalist greed. Populists have blamed them on sinister vested interests. European-style socialists have taken a more mature approach, admitting that creation and destruction are bound together, but claiming to be able to boost the creative side of creative destruction while eliminating the destructive side through a combination of demand management and wise intervention. The result has usually been disappointing: stagnation, inflation, or some other crisis.

For much of its history the United States was immune from these short-term political pressures. The Founding Fathers did a remarkable job in protecting the economy from political interference by providing citizens with inalienable rights and by constraining political power in various ways. America's economic culture promoted the vigorous virtues of prudence and self-reliance. The gold standard provided such a stable framework for monetary policy that America did without a central bank for seventy-seven years, from 1836 (when Andrew Jackson vetoed a third bank) to 1913. Income tax was nonexistent. Most educated Americans believed in the law of the survival of the fittest.

The Progressive movement challenged some of these long-standing assumptions. Woodrow Wilson introduced a federal income tax in 1913. The New Deal put an end to the era of *laissez-faire*. The postwar era saw a much more activist government than the government of the 1920s. Dwight Eisenhower embarked on a huge highway-building program. LBJ promised to build the "Great Society."

The shift away from *laissez-faire* was nevertheless much less dramatic than it was in Europe, let alone in Latin America. The American Constitution has repeatedly kept the government activists in check. The Supreme Court struck down FDR's National Industrial Recovery

Act, which imposed extensive state controls on the economy. Republican congressmen prevented Harry Truman from introducing a national health service after the Second World War. Liberal activists have repeatedly been followed by more conservative successors—FDR by Dwight Eisenhower (by way of Truman), Lyndon Johnson by Richard Nixon, and Jimmy Carter by Ronald Reagan. America's powerful tradition of laissez-faire liberalism also reasserted itself after the Second World War. Friedrich Hayek's *The Road to Serfdom* (1944) was condensed in *Reader's Digest* and read by millions. Milton Friedman became a television star. Ronald Reagan campaigned on the idea that government was the problem rather than the solution.

But can America continue to preserve its comparative advantage in the art of creative destruction? That is looking less certain. The rate of company creation is now at its lowest point since the 1980s. More than three-quarters of America's major economic sectors are witnessing a decline in the level of competition. The dependency ratio is going up as the baby boomers retire. Entitlements are rising inexorably, and by crowding out capital investment, are reducing productivity and economic growth in the process. And America's defenses against populism are weakening every day as professional politicians sell their votes to the highest bidder and voters demand unfiltered democracy to discipline a corrupt system. Donald Trump is the closest thing that America has produced to a Latin American-style populist, promising to keep out foreign competition and forcing companies to offer their workers a "fair" deal.

RESTORING AMERICA'S LOST DYNAMISM

This book will conclude by suggesting some policies that can restore America's fading dynamism. The most important reform would be

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to follow Sweden in 1991 in reforming entitlements. Sweden addressed its fiscal crisis by shifting from social benefits (entitlements) to a system of defined contributions. In 2017, entitlements claimed more than 14 percent of U.S. GDP, compared with less than 5 percent in 1965, diverting ten percentage points of GDP and economic activity from investment to consumption and swelling America's already worrying budget deficit. In the 2017 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds, the actuaries note that in order to make the system truly actuarially sound, benefit levels need to be reduced by 25 percent indefinitely into the future, or taxation rates need to be raised. A symbol of the political sensitivity of such a diagnosis is the fact that it appears toward the end of a 296-page report.

Close behind in second place is the reform of the financial system: another financial crisis on the scale of 2008 or 1929 would undermine the legitimacy of the entire system, as well as wreak short-term havoc. As we will detail later in this book, all such crises are set off by financial intermediaries' having too little capital in reserve and fostering modern versions of a contagious run on the bank. The non-financial sectors of the American economy have historically had equity-to-asset ratios in the range of 40 to 50 percent of assets. Contagious default of firms with such capital balancing is quite rare. Periodic contagious defaults are a regrettable characteristic of financial institutions that have much lower equity-to-asset ratios. The best way to prevent the crisis from recurring is to force banks to hold substantially more capital and collateral. History does not support the contention that such a requirement would significantly constrain lending and economic growth, as is often alleged. Unfortunately, policy makers have chosen a different solution—creating complicated regulations such as the Dodd-Frank Act (2010) that are driven by pressure

groups with a wish list of demands rather than being a focused attempt to solve the problem at hand. Dodd-Frank adds yet further to the complexity of a regulatory structure that has been jerry-built over the decades.

Yet whenever America has flirted with national decline in the past—in the 1930s, for example, or the 1970s—it has always grappled with its problems and come back stronger. The underlying vigor of the national economy, and indeed of the national character, has always trumped failures of policy making. In 1940, America's future looked dismal: the country had just been through a decade of economic stagnation and financial turmoil. Yet a decade later the economy was once again firing on all cylinders and America was by far the world's most successful economy.

One way to counter the growing mood of pessimism is to look at Silicon Valley, where entrepreneurs are inventing the future of everything from smartphones to robotics. Another way is to look at the past. Two hundred years ago America's settlers were confronted with problems that make today's problems look quaint: how to make a living out of a vast unforgiving landscape and how to forge a political system that reconciled states' rights with national government, individual initiative with collective responsibility.

The story of how they succeeded is as exhilarating as it is instructive.

One

A COMMERCIAL REPUBLIC: 1776–1860

THE TERM “COLONY” CONJURES up images of exploitation and marginalization. Yet Colonial America was in many respects among the most fortunate places on earth, blessed by rich resources and a relatively liberal regime. From 1600 to 1766 the colonies enjoyed the world’s fastest growth rate, growing more than twice as fast as the mother country. And by the time they were ready for divorce, Americans were the world’s richest people, with an average output per head of \$4.71 a day measured in 2017 dollars.¹ Americans were two to three inches taller than Europeans. They were also more fertile, with six to seven births for every woman compared with four to five in Britain, leading Benjamin Franklin to speculate that by the mid-1800s “the greater number of Englishmen will be on this side of the Water.” Planted in a huge continent, Americans enjoyed a relative abundance of basic resources of life, land, game, fish, timber, and minerals. Cut off from their colonial master by three thousand miles of ocean, they were also relatively free to do their own thing.

The British colonists failed to reproduce Britain’s closed society

on the other side of the Atlantic: there were simply too few colonial administrators or Anglican clergymen to impose their will on the natives.² In Britain, the learned professions and craftsmen's guilds could crush ideas and regulate competition. In America, they were too weak to get much purchase on society. Colonists were addicted to independence. "They acquire no attachment to place but wandering about seems engrafted in their nature," one observer commented, "and it is weakness incident to it that they should forever imagine the lands further off are still better than those upon which they are already settled."³

At the same time the colonies strived for sophistication. The "quality" tried their best to live like English gentry, importing furniture, china, clothes, and tea from the mother country. America was second to none when it came to higher education: by 1800 the new country had dozens of universities, at a time when England only had two. Twenty-nine of the fifty-six delegates to the Continental Congress had college degrees.⁴ Educated Americans were as sophisticated as any in the world. They studied the great texts of Western thought—the Greek and Roman classics, the Bible and its various commentaries. They were particularly keen on immersing themselves in British thinkers, giving pride of place to jurists such as William Blackstone and philosophers such as John Locke, but also found some time for the French philosophes. When they finally decided that they needed to form a new country, they created the most impressive constitution the world has seen.

The Constitution addressed the most enduring questions in political philosophy. How can you secure a balance between wisdom and popular participation? How can you balance the rights of individuals against the will of the majority? It also addressed a new set of questions that were provoked by the dissolution of the old, stable world: How do you provide for the needs of commerce and pop-

ular power? And how do you provide certain fixed points in a world in flux?

The Constitution turned the United States into something unique in history: a fledgling democratic society that set strict limits on what the majority could do. The majority cannot trample on people's rights to own private property, engage in trade, and keep the fruits of their labor (including their mental labor). This did far more than anything else to guarantee America's future prosperity—far more than conventional economic advantages such as abundant land and raw materials. It encouraged people to engage in trade by reducing the risk that they could have the fruits of their labor stolen from them. The Founders got the details right as well as the architecture. They established the world's biggest single market by banning internal tariffs (something the Europeans didn't get around to until the 1980s). This allowed its industries to grow huge and its regions to specialize. They also extended property rights to the all-important world of ideas.

SCRAPING A LIVING

For all its advantages, the country that was born in the American Revolution was still, to a significant extent, a subsistence economy. Touring the country in 1794 to 1796, Talleyrand, the great French diplomat, was struck by America's backwardness. America is “but in her infancy with regard to manufactures: a few iron works, several glass houses, some tan yards, a considerable number of trifling and imperfect manufactories of kerseymere [a coarse kind of knitting] and, in some places, of cotton . . . point out the feeble efforts that have hitherto been made [to] furnish the country with manufactured articles of daily consumption.”⁵

America's financial system was primitive compared with the mother country's. Britain established its national bank in 1694, when it gave the governor and company of the Bank of England a monopoly of issuing banknotes, and introduced the gold standard in 1717, when the master of the mint, Sir Isaac Newton, defined the pound in terms of gold weight (£4.25 per troy ounce). America didn't have any banks whatsoever until the 1780s, when Robert Morris chartered the Bank of North America (1781), Alexander Hamilton established the Bank of New York (1784), and John Hancock and Samuel Adams chartered the Massachusetts Bank (1784). It didn't adopt a clear monetary policy until the 1830s. The Constitution included a clause (Article I, Section 8) granting Congress the right to "coin money" and "regulate the value thereof." The Coinage Act of 1792 defined the U.S. "dollar" primarily in terms of silver rather than gold (a dollar equaled 371.25 grains of silver) but also made room for gold by authorizing gold coins for larger denominations (\$2.50 and \$10.00) and fixing the value of the dollar at 24.75 grains of pure gold and the ratio of the price of gold to silver at fifteen to one. This ratio proved unsustainable: as the relative market price of silver declined, gold, which was more valuable abroad than at home, was exported in such large quantities that it looked as if America might run out of circulating gold coin. In 1834, the federal government finally cleared up the mess by revising the ratio to sixteen to one and adopting Britain's gold standard.

More than 90 percent of Americans lived in the countryside, either on farms or plantations. Only three cities, Philadelphia, Boston, and New York, had populations of more than 16,000, making them flyspecks compared with London (750,000) or Peking (almost 3 million).⁶ Most Americans grew their own food, spun their own cloth, made their own clothes, cobbled their own shoes, and most tiresomely of all, made their own soap and candles from vats of boiled

animal fat. They relied on wood for construction and fuel, animals for power, and when manufacturing began to take off, on water to drive their rudimentary mills. Their plows were no more sophisticated than the plows that the ancient Romans had used: branches of trees embellished with bits of iron and strips of cowhide. Their roads were rutted trails littered with rocks and tree stumps: a rainstorm could turn them into seas of mud; a prolonged drought could leave them dusty and dry.

For the most part, life was a slog, hard, relentless, and unforgiving. Farmers could only survive if all members of the family—children as well as adults, women as well as men, old as well as young—pulled their full weight. Slackers were punished or told to make their own way in the world. The most basic daily chores—getting water for a bath or washing clothes or disposing of household waste—were back-breaking and time-consuming. The rhythm of people's days was dictated by the rise and fall of the sun (the main sources of light, candles and whale-oil lamps, were inefficient and expensive). Their idea of speed was defined by “hoof and sail.” Travelers had to endure endless inconveniences: they were jogged up and down on horseback, tossed around like sacks of potatoes in stagecoaches, shaken into sickness on boats, or left stranded when horses lost their shoes and stagecoaches lost their axles. Thomas Jefferson had to ford five rivers in order to travel from his home in Monticello, Virginia, to Washington, D.C., for his inauguration in 1801.⁷

Americans were the prisoners of climate. Modern historians, snug in their air-conditioned offices, tend to pooh-poo Montesquieu's argument, in *The Spirit of the Laws* (1748), that climate is destiny. To George Washington and his contemporaries, it was a statement of the obvious. In the Northeast, the winter could leave people snowed in for months. In the Midwest, tornadoes could wreck communities. In the South, there were only two seasons: hot and hellish. (Slavery was

in some ways a horrific response to a basic climatic fact: you could not get free men to harvest labor-intensive crops in the heat and humidity.) The weather was a fickle master as well as an imperious one. A sudden flood could make the roads impassable. A late frost could destroy a crop.

In the early years after the Revolution Americans were also prisoners of a narrow sliver of land on the Eastern Seaboard. They didn't dare to venture inland because the territory was largely an unmapped wilderness controlled by competing European powers and private companies. The wilderness contained all manner of dangers—Native Americans angry at being displaced by white men; bears and wolves eager to taste human flesh; the soldiers and mercenaries of hostile powers. Above all, the wilderness contained emptiness: without accurate maps it was easy to get lost.

Americans were prisoners of ignorance as well as climate: they simply didn't have up-to-date information about what was going on in the world. News about important events could take weeks to travel from one region to another, let alone from Europe to the United States. It took nearly a week for the news of George Washington's death to reach New York. It took over a month for the news that Napoleon was willing to sell "Louisiana" to travel from James Monroe in Paris to Thomas Jefferson in Washington, D.C.

Robert McNamara talked about the "fog of war." In the early decades of the republic, Americans tried to make their living surrounded by the fog of everyday life. They fought battles when the war was already won. They paid over the top for "rare" commodities even when ships loaded with those commodities were about to arrive. This was all the more dangerous because life was so volatile. The flow of imports into the East Coast depended on a small number of ships, which might be disrupted by wars between rival powers or bad weather.

This fog of ignorance applied to the government as well as to

ordinary people. During the American Revolution the rebels didn't have the basic information about the country they were freeing. How many people were there? How did they make their living? Were they capable of supporting themselves? The new government was quick to start collecting data on the population: the Constitution included a provision for a decennial census in order to apportion congressional seats, and America conducted its first census soon after its birth, in 1790. The government didn't start collecting data on manufacturing and agriculture until 1840. Paul David of Stanford University labeled the era before 1840 a "statistical dark age."

People's most important economic relationship was with the natural world, particularly with animals, water, and wind. Americans, urban as well as rural, were surrounded by a menagerie of creatures: pigs, sheep, hens, ducks, and horses. Pigs scavenged in the streets. Dogs ran wild. Every house above a hovel had a horse. These animals were small and sinewy compared with today's specimens, adapted to surviving in tough conditions rather than producing the maximum amount of meat, milk, or eggs. In 1800, the average cow probably produced a thousand pounds of milk a year compared with sixteen thousand pounds today.⁸ At the same time they were used for a lot more than just food: their hides provided clothes and shoes, their trotters could be turned into glue. "Everything but the squeal" was the rule in these far from sentimental times. Americans as a people were hunters as well as farmers. The great outdoors was full of free food and clothes in the form of elk, deer, and ducks. John Jacob Astor succeeded in amassing America's biggest fortune by trading in the furs of beavers, otters, muskrats, and bears (though he wisely used some of the money he made from hunting in America's great wilderness to buy real estate in Manhattan).

The most important animals by far were horses: indeed, horses were arguably the most important part of the country's capital stock

at this time. In 1800, America probably had a million horses and mules. The human-horse combination was as central to economic life as the human-computer combination is to economic life today. Pedigree horses functioned as stores of wealth as well as sources of entertainment: in Virginia and Kentucky, in particular, discussing bloodlines was a commonplace activity.

Americans were fortunate in having a network of rivers and lakes that functioned like watery highways: the Mississippi River in particular was a four-thousand-mile superhighway that linked the South and the Midwest. Goods easily flowed down these highways and across lakes. The settlers harnessed waterpower by building mills next to fast-moving streams, or even better, harnessed a combination of gravity and waterpower by building mills next to waterfalls, such as the falls on the Charles River in Waltham, Massachusetts. Francis Cabot Lowell and a group of Boston merchants even created a company, the Proprietors of the Locks and Canals on the Merrimack River, to control the flow of the river and sell the resulting waterpower to the local mill and factory owners.⁹ The watery highways had their limitations, however. Moving things upstream, against the current, particularly a mighty current like the Mississippi's, was often impossible.

Americans were also fortunate in having the great Atlantic Ocean to provide them with both a ready supply of fish and a thoroughfare to the European continent. The New England fishing industry was so successful that no less a figure than Adam Smith described it in *The Wealth of Nations* as "one of the most important, perhaps, in the world."¹⁰ Communities sustained themselves on lobster, oysters, herring, sturgeon, haddock, crabs, and scrod; indeed, the codfish was to Massachusetts what tobacco was to Virginia. The "cradle of American liberty," Faneuil Hall, was the gift of Peter Faneuil, a Boston merchant who had made a fortune selling New England codfish around the world.

The most valuable "watery beast" was not a fish but a mammal:

demand for whale oil was so insatiable that returns in the whaling business in America's leading whaling port, New Bedford, Massachusetts, averaged 14 percent a year from 1817 to 1892, and Gideon Allen & Sons, a whaling syndicate based there, made returns of 60 percent a year during much of the nineteenth century by financing whaling voyages—perhaps the best performance of any firm in American history.¹¹

America was as rich in trees as it was in sea life, with some 900 million acres of forest across the continent. English settlers commented on how many more trees there were than in deforested England: pines, oaks, maples, elms, willows, conifers, and many more. A settler in Virginia said that it looked “like a forest standing in water.” A settler in Maryland wrote that “we are pretty closely seated together, yet we cannot see our Neighbours House for trees.” Settlers looked at America's mass of trees and saw the lineaments of civilized life: furniture for their houses, fuel for their hearths and smithies, masts and hulls for their boats, parts for their machines, false teeth for the toothless.¹²

Walt Whitman held up the ax as a symbol of what divided the Old World from the New. In Europe, the ax was used to chop off the heads of autocrats. In America, it was used to turn the forests into useful objects:¹³

The axe leaps!
 The solid forest gives fluid utterances,
 They tumble forth, they rise and form,
 Hut, tent, landing, survey,
 Flail, plough, pick, crowbar, spade,
 Shingle, rail, prop, wainscot, jamb, lath, panel, gable. . . .

Americans weren't content to eke a modest living from these natural resources. They developed new ways of squeezing more wealth

from their environment. Jacob Perkins invented a machine capable of cutting and heading two hundred thousand nails a day in 1795. The nail machine made it possible to build “balloon frame” houses with a minimum of skill and effort. William Wordsworth made it more useful still when he invented a machine in the 1820s that could cut wood to specifications. By 1829, Americans were consuming 850 million board feet a year, three and a half times the amount of wood per head as the British.¹⁴ Yet even as they transformed the natural world with their ingenuity, they continued to be dependent on it: by 1850, even the most sophisticated machines were made out of wood and employed belts made out of leather.

RIP VAN WINKLE

The War of Independence delivered a shock to America that makes the shock delivered to Britain by leaving the European Union look minor. During the eighteenth century, British America had become more closely enmeshed with the British economy. America imported manufactured goods from the workshop of the world and paid for them with its abundant natural resources, such as fish and wood, and its cash crops, such as tobacco and rice. The growing trade across three thousand miles of ocean was justified by the theory of mercantilism and reinforced by a surging economic struggle between the major European powers.

The war devastated America's fragile economy. Rival armies destroyed towns and homesteads. British warships disrupted trade. More than twenty-five thousand Americans died in battle. The Continental Congress's attempt to finance the war by firing up the printing presses, printing more than \$242 million worth of fiat money in the form of continentals, worked well at first, allowing George