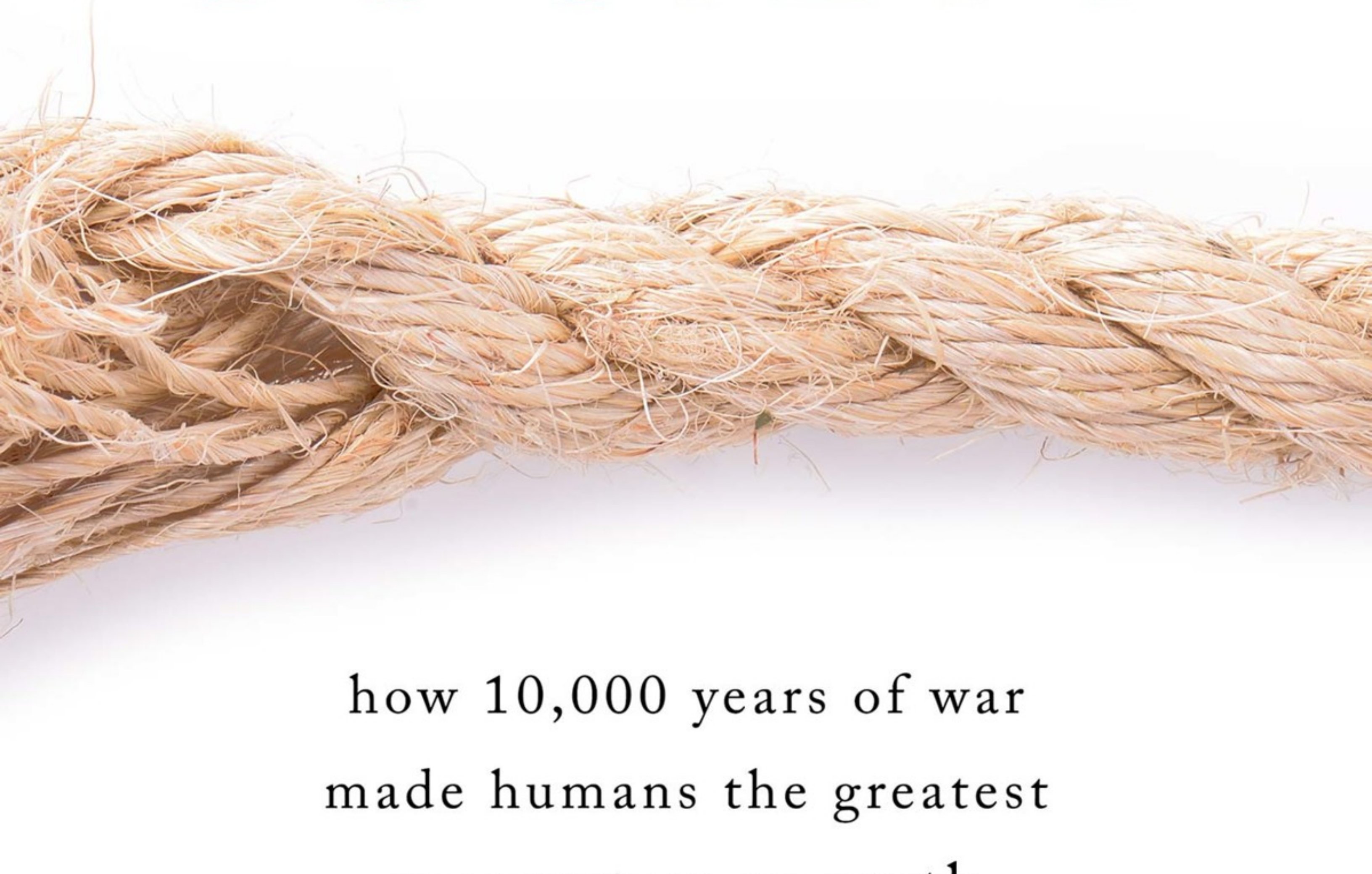
ULTRA SOCIETY



how 10,000 years of war made humans the greatest cooperators on earth

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Ultrasociety

How 10,000 Years of War Made Humans the Greatest Cooperators on Earth

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Chapter 1
The Puzzle of Ultrasociality

From Göbekli Tepe to the International Space Station

There is a large grassy field near my house in Connecticut, and a summer's evening with a clear sky found me hiking over to it. Reaching the middle, I turned to the northwest and waited. Ten minutes later, right on time, a bright dot rose above the horizon and started racing across the sky. With the help of high-powered binoculars I could just about make out the shape of one of humanity's most impressive achievements—the International Space Station. Here was a flying machine that looked nothing like a flying machine; more like a cathedral in outer space. How astonishing that something so unwieldy could get up into the sky. The whole experience was over in two minutes, but the thrill I felt watching this product of a remarkable feat of human cooperation was worth a few mosquito bites on that humid New England night.

The ISS is the wonderful fruit of something that human beings learned to do only very recently. Of course, it involves hundreds of technologies that would have astonished even the greatest scientists of a century earlier. But the really strange thing it proves is that people can now work together on a very large scale indeed.

In the broadest sense, hundreds of millions contributed to it, including you and me. After all, a small fraction of the taxes we pay helps ensure that the ISS continues to grow and function. But how many people actually participated in building it? Though nobody knows for sure, we can do a rough calculation. Consider that the total cost of the station is around $150 billion. Dividing it by $50,000, the median pay of American workers, we can estimate that more than three million people-years were required to build and operate it. (This is actually an underestimate, because the median pay in Russia, for example, is much lower than in America.) A few, those who work for NASA or Roscosmos, devoted years of their lives to the project. Most, like welders in Russia who assembled the Soyuz module and the American engineers who built the solar array wings which power the ISS, contributed only weeks or months of work. The ISS builders must number many more millions than three.

Three million is something like the population of Armenia or Uruguay. But the builders of the station and the astronauts working in it did not come from a single country. The ISS is a joint project supported by 15 nations. It was constructed by people from all over the world, including—indeed, led by—two nations that had recently been Cold War adversaries.

“Since the beginning of human spaceflight 50 years ago, astronauts have reflected on how peaceful, beautiful, and fragile the Earth looks from space,” wrote the ISS astronaut Ron Garan in his blog *Fragile Oasis*. “We can look down and realize that we are all riding through the Universe together on this spaceship we call Earth, that we are all interconnected, that we are all in this together, that we are all family.” Of course, this is an optimistic view; the reality down here on the ground is much grimmer. There are still wars that kill thousands of people, such as the one raging in Syria.

In fact—as Garan discovered while taking some practise shots to test his camera—you *can* see some borders from space.[1] The one between India and Pakistan shows up as an illuminated line snaking across the landscape. It is lit up by the floodlights India uses to prevent infiltration by terrorists and arms smugglers. This is a sobering reminder that the conflict over Kashmir between these two nuclear-armed nations, which has caused four major wars and continues to claim dozens of lives every year, has not been resolved.

How do we stop wars and eliminate suffering and poverty? “The answer is quite simple—just do something,” proposes Garan in his blog. “The challenges of the world are really about how each of us individually responds to them. In other words, to what extent does humanity, on a person-to-person basis, commit to making a positive difference, no matter how small, or how big?”

Garan’s heart is in the right place. Unfortunately, what he proposes will not work. Difficult things like building peaceful, wealthy, just societies cannot be done by individuals, no matter how well intentioned they are. The only way we can eliminate violence and poverty is by working *together*. In a word, the answer is cooperation.

All this might just sound like a feel-good pep talk. In fact, it brings us face to face with something remarkable. We often wish that people could work together better, but actually human beings are astonishingly good at cooperation. We are better at it than any other creature on the planet. The ISS shows how far we’ve come. And herein lies a profound puzzle, because according to the standard evolutionary science, we shouldn’t be able to cooperate very much at all. We shouldn’t have the capacity in the first place, and we shouldn’t have acquired it so fast. But we do and we did.

I am concerned not so much to promote noble intentions as to understand how humanity evolved this strange ability to work together in groups of millions (and more). Once we understand this immensely important side of human nature, perhaps then we will see a way to cooperate even better. But to get there, we will need the kind of lofty overview you just can't get from space.

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This book is about *ultrasociality*—the ability of human beings to cooperate in very large groups of strangers, groups ranging from towns and cities to whole nations, and beyond. The ISS is the brightest, most visually striking example of large-scale international cooperation. But there are other examples. They include CERN, the European Organization for Nuclear Research, which operates the Large Hadron Collider near Geneva. Then there is the United Nations. The greatest achievements of the UN include addressing hunger and increasing food security, aiding refugees, protecting children, promoting women's rights, and fighting epidemics such as HIV and AIDS.[2] Peacekeeping operations by the UN sometimes fail, as happened in Srebrenica, Bosnia, in 1995. But ending a civil war is a tough job, and let's not forget the UN's successes in, for example, El Salvador and Guatemala.

Abolishing war requires cooperation on a very large scale—one that encompasses the whole of humanity. After all, peace is not simply the absence of war; it requires active management. The conflicts that inevitably arise between nations must be resolved in ways that don't cost lives. Rogue international players who choose to pursue their goals by violence need to be restrained, by force when necessary, but the only way actually to eliminate war is by cooperation between people belonging to different countries, creeds, and political persuasions.

However, cooperation is actually astonishingly difficult to achieve and, once achieved, hard to preserve. We tend not to appreciate just how fragile it is. Take the ISS, again. It's a miracle that the station ever got off the ground. In 1993, a bill to kill the ISS program nearly passed in the US Congress. It failed by a single vote. If just one representative had switched positions, the ISS would have never happened.

At the end of the 20th century Russia experienced its own failure of large-scale cooperation. In 1991 the Soviet Union fragmented into 15 newly independent states, one of them the Russian Federation. The social dissolution did not stop there. The economy of Russia shrank by 50 percent. A bloody war of ethnic secession flared up in the Caucasus. Supporters of the parliament battled against supporters of the president in the streets of Moscow, and tanks shelled the White House, which housed the parliament. Had this disintegrative trend continued, Russia would have become a failed state. That would also have spelled the end of the ISS, removing the crucial Russian know-how acquired when it built the ISS's predecessor, the Mir space station. This is the problem when you cooperate on something big. There's always the danger that you'll crash and burn.

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For most of their evolutionary history, human beings lived in small-scale societies of gatherers and hunters. Before the advent of agriculture, they interacted most closely with a few dozen other members of their foraging bands. These bands, in turn, were embedded within "tribes"—people sharing the same language and culture and united by a common identity. Such tribes typically encompassed hundreds of people, a few thousand at most. In small-scale societies, everybody knew everybody else, if not as a result of direct dealing, then by reputation.

Today we live in huge societies of millions of people, most of whom are perfect strangers to us. We don't fear strangers (well, not unless we find ourselves in a high-crime area after dark). More than that, we actually need them. We often forget how much we depend on the kindness of strangers. We count on being able to buy food in the local supermarket, but it only arrives there as a result of a huge number of people we will never know acting in concert to produce, transport, and sell it to us.[3] The clothes that a typical American wears come from faraway places like Vietnam and Bangladesh. And if you fall ill on a trip to an unfamiliar city, you can rely on strangers in the hospital emergency room to do everything humanly possible to save your life. It is strangers who ensure that our lives are free from hunger and fear, so that we can enjoy fulfilling careers and pursue our interests.

This amazing capacity to cooperate in large groups is very recent. Cooperation on a truly global scale dates back only to 1945, when the United Nations was launched to prevent another world war. If we had a time machine and could travel back into the past, we would see the scale of human cooperation gradually dwindle, until all we found were small bands of hunter-gatherers.

Natural scientists have a saying: if you want to understand something, first learn how to measure it. We don't have a time machine, but my colleagues and I are building a kind of historical macroscope that allows us to peer into the past, albeit imperfectly.[4] We call it *Seshat Global History Databank*, and I will tell you more about it in the last chapter of this book.

But for now let's use its prototype version to trace the history of human cooperation with numbers and dates.

Like the Force in *Star Wars*, cooperation has its dark side, but we will have plenty of opportunity to discuss that later. For now, I'd like to focus on its creative power. Let's trace the emergence of ultrasociality by looking at some of the monuments it has bequeathed us. One practical advantage of this approach is that large buildings leave obvious traces even if they are abandoned and destroyed, giving archaeologists a way to measure the social complexity of past societies.

I was 21 when I first stepped into the Notre-Dame de Chartres Cathedral. It was the year after I emigrated from the Soviet Union. I've never forgotten it. The sweeping columns and arches pull your gaze upwards. Colored light streams through the huge stained-glass windows. The stone statues of saints and angels seem to detach from their moorings and levitate in space. Suddenly, the organ starts playing (the organist is practicing for a recital in the evening). The solemn music fills you up until you feel you are about to slip your own moorings and soar with the saints and angels. I am not a religious person, but I came near to being "born again" in that cathedral in France.

After returning to the United States, where I was finishing my BA at New York University, I took a course in Gothic architecture and art. Above all, I wanted to understand what had motivated the medieval cathedral builders. How, and why, had they worked together to carve their faith into stone? Some years later, after a grueling final year in graduate school, I felt I owed myself a vacation, so I toured all the other famous medieval churches of northern France. This is what I learned.

In terms of sheer size, the most impressive Gothic cathedral is Notre-Dame d'Amiens, standing in the capital of the Picardy province north of Paris. Weighing about the same as the Empire State Building, Amiens Cathedral is the tallest complete Gothic church, rivaled only by the incomplete one in Beauvais, which was so tall that it kept collapsing during construction and was never finished.

Why was it built? Not because a king ordered it. It came about as a result of the collective efforts of the people of Amiens and Picardy. Well, the actual construction was done by crews of professionals: engineers, stonemasons, sculptors, and glaziers. The religious authorities oversaw the workmen, but the scale of construction was so huge, the clergy couldn't do it alone. The city fathers—an oligarchy of merchants and manufacturers—provided additional funds. The third source was the nobility of the region, who made cash contributions and wrote the cathedral into their wills. Finally, the common people, or small folk (*les menus gens*), contributed to periodic fundraising drives organized by the clergy. An image of the saint would be taken in procession through the streets of Amiens and into the countryside, and all were encouraged to give as much as they could. As the medieval art historian Stephen Murray notes in *Notre-Dame, Cathedral of Amiens*, the support from townsfolk must have been substantial, because many stained-glass windows were donated by them, though not many have survived.

Where a cathedral has retained most of its original windows, such as the one in Chartres, we can take veritable tour of medieval French society, from the highest to the lowest. One window was donated by St Louis, the king of France (Louis IX). Several were given by knights: Pierre de Courtenay, Raoul de Courtenay, Julian de Castillion, and Amaury de

Monfort. And then there was a multitude of windows that were paid for by the guilds, from those, like the furriers, who catered to the aristocracy, to the most humble—the grocers, the basket-makers, the coopers, the shoemakers, and the porters. These windows were dedicated to the patron saints of the guilds and often showed the donors at work: furriers displaying a fur robe, money-changers testing their coin, butchers killing oxen. Even the common laborers, who somehow managed to pool their meager resources, donated a window, which was dedicated to Adam, "who first dug the earth by the sweat of his brow."[5]

Building a Gothic cathedral is an enormous undertaking. The generations that started these great projects did not live to see them completed. In some cases, construction extended over two or three centuries. Even the cathedrals that were built relatively rapidly, such as those of Amiens and Chartres, required 50 years of almost continuous work from start to finish (and later generations kept adding embellishments). Gothic cathedrals rose as a result of cooperation not only between the different estates of medieval France—clergy, nobility, and common people—but also across generations, between parents, their children, and grandchildren.

If you want to understand something, first learn how to measure it. Can we put figures to the scale of cooperation required to build a Gothic cathedral? The architectural historian John James estimated that the number of builders working on construction at any given time was about 300. Multiplying by 50 years gives us 15,000 people-years. This is a very crude estimate; the true number could easily be half, or twice that. But we don't need that much precision. Compare it with the three million people-years that went into the ISS—200 times as many! A mere twofold error doesn't mean much when we deal with hundredfold differences.

Another way of looking at the social scale of cooperation is to consider how many people contributed funds for the construction of the cathedral. According to Murray, the city of Amiens had 20,000 inhabitants. Picardy was one of the most densely populated provinces of medieval France, home to more than two million people (more than today). On the other hand, the Picards (yes, an ancestor of the *Enterprise*'s captain in *Star Trek: The Next Generation* must have come from northern France) were very fond of building cathedrals. Picardy bristles with some of the world's most spectacular Gothic churches: Senlis, Laon (famous for the cute cow sculptures on its bell tower), and Beauvais (the one that kept collapsing). The circle of cooperation that was responsible for erecting each one must have included some hundreds of thousands of people. By contrast, the combined population of the USA, Russia, the European Union, Japan, and Canada, countries whose taxes supported the ISS, is just over one billion. That's at least three orders of magnitude greater than the population base of a Gothic cathedral. Quite a shift, isn't it?

Let's go back to our macroscope and look deeper into the past. One of the most impressive buildings of imperial Rome was the Colosseum, which cost 30 million sesterces to construct. This huge amount of money (equal to the annual salary of 25,000 legionnaires) was looted by the Emperor Vespasian when his armies sacked Jerusalem in 70 CE while suppressing the Jewish Revolt. Twelve thousand slaves labored for eight years, giving us a cost estimate of 100,000 people-years.

Going further back we hit the looming presence of Egyptian pyramids. The archaeologist Mark Lehner estimated that the Great Pyramid of Giza, which was built in the 26th century BCE, cost 400,000 people-years. Ancient Egyptians beat imperial Romans hands down!

Finally, we come to the oldest known example of monumental architecture. Göbekli Tepe is a hill in southeastern Turkey, not far from the Syrian border. Eleven thousand years ago people living in this area quarried huge, T-shaped pillars, weighing between 20 and 50 tons (similar to the upright monoliths in Britain's much more famous Stonehenge). These monoliths were decorated with pictograms and carved animal reliefs and installed within circular stone enclosures, creating the oldest temples in the world. What is astounding about this ritual complex, which includes about 20 such structures, is that it was built by people who knew only hunting and gathering.

What was the scale of cooperation needed to construct a Göbekli Tepe temple? Before answering this question, let's ask a more fundamental one: *What was Göbekli Tepe for?*

Megalithic sites seem very mysterious. In a recent single by the Norwegian comedy duo Ylvis, Vegard Ylvisåker sings:

What's the meaning of Stonehenge?
It's killing me that no one knows
Why it was built 5,000 years ago. . . .
I would give anything to know
About the Stonehenge
Yeah, I would give all I have to give
Choir: Would you give them your car?
(Mmm) Are you kidding me, of course
I would have given the car
Choir: What car do you drive?

Drive a Civic, drive a Civic. Drive a Civic!

Choir: A car you can trust!

Never mind the car, let's talk about the henge . . .

Actually, let's talk about henges in general. Like the creators of Stonehenge, the people who built Göbekli Tepe left no written explanation of their motives. But, as the Oxford anthropologist Harvey Whitehouse writes in *Aeon Magazine*, "a consensus is emerging among archaeologists that this was a hugely significant ritual center: not a permanent home but a sacred place where people gathered at special times." The "Göbeklians" did not live on, or near, the hill; instead they traveled to it from many semi-permanent settlements within a large area, some coming from 100–200km (roughly 100 miles) away. We know this because archaeologists find the same kinds of symbolic objects from widely dispersed sites, from the T-shaped pillars, so characteristic of Göbekli Tepe temples, to peculiar-looking scepters.[6]

The Göbeklians carved T-shaped pillars from the side of the hill (a few of them are still there, unfinished), then transported them to a circular enclosure and installed them in carefully excavated rectangular pits. A typical temple has a dozen T-shaped pillars, with the two largest placed in the center, surrounded by the rest, almost like a group of people standing around two leaders. In fact, the pillars are clearly meant to represent people (or perhaps gods). The T-part looks like a head. Many pillars have arms carved into their sides and a loincloth in front.

Once the job of the construction was over, the fun part began. Göbeklians feasted on roasted gazelles and aurochs and drank copious amounts of beer. During their excavation of the site, the archaeologists Oliver Dietrich, Jens Notroff and their colleagues found large numbers of burned bones. They also found many large barrel-like and trough-like vessels, carved from limestone, with dark grayish residue coating the sides. Chemical analysis indicated the presence of oxalate, which precipitates during the fermentation of mashed barley (remember, this was not a cultivated cereal). Some of these vessels could hold 160 liters (40 gallons) of beer, or almost three kegs. Quite a party! A carved stone cup, found in the nearby site of Nevali Çori, depicts two people with raised arms, dancing. Between them cavorts a fantastic turtle-like creature, which Dietrich and colleagues think "might well hint at the dancers' altered state of conscious."

The archaeologists aren't sure how long each temple was in use. At some point, however, the Göbeklians destroyed their temples by burying the monoliths in rubble. Clearly, the purpose was not to create a monument that would last forever; everything was in the service of the ritual.

Perhaps all the megalith-building cultures felt the same way. A retired carpenter and construction worker named Gordon Pipes recently recruited a team of volunteers to help him demonstrate how a small group of people could have moved the Stonehenge megaliths.[7] Pipes estimates that 40-ton stones can be erected using Stone Age technology with fewer than 25 people. Placing lintels on top could require no more than a dozen workers. But such calculations and experiments seem to miss the point. At least as far as Göbekli's temples were concerned, the idea wasn't about erecting monuments in the most efficient manner, with the fewest possible workers—that's the rationalistic thinking of a 21st-century engineer. The purpose was to bring people together.

This is an argument put forward by Jens Notroff and colleagues in an article titled "Building Monuments, Creating Communities."[8] These archaeologists look to recent ethnographic accounts of monument-building, such as the construction of megalithic tombs on the Indonesian island of Nias. There, a crowd of 500–600 share the work, hauling the megaliths—which are a bit smaller than the Göbekli pillars—using Stone Age technology (with a wooden sledge, rollers, and ropes made from lianas). It takes three days to move the stones a distance of 3km (two miles) to their destination. Many more people participate than is necessary. But it's not about efficiency. It's about having fun. And then, after the monoliths have been installed, everybody has a party with lots of food and (of course) beer. The tangible result—the monument—is not important. The intangible but lasting feeling of community and cooperation is what the whole thing is about.

There are two ways to build a large, labor-intensive structure: a small team working over a long period of time, or a large group getting everything done quickly. Although recent ethnographic examples suggest that megaliths were built the second way, can we be really sure that was how they worked back in the distant past? In fact, yes, we can be sure in at least one instance: the archaeological site of Poverty Point, in northeastern Louisiana.

The people who built the massive earth mounds at Poverty Point between 1800 and 1350 BCE were emphatically hunter-gatherers. The most impressive one is Mound A, which required 240,000 cubic meters of soil to be carried from various nearby locations and piled up to make a structure that covered 50,000 square meters at the base, rising to a height of 22 meters (equivalent to a seven-story building). In human terms, 240,000 cubic meters equals eight million basketloads of dirt, each weighing 25 kilograms (55 pounds). In a *Science Daily* article, Tristram Kidder, one of the leaders of a recent geomorphological study of the Poverty Point mound, estimates that 270,000 people-days were required to build it. Taking into account that everybody needs a break, that's roughly 1,000 people-years.

When archaeologists first realized that earthworks such as those found at Poverty Point (and a number of other locations in the Mississippian region) were built by foragers, they automatically assumed that it had been done by a small group of people putting in a steady amount of labor over the long term—decades, perhaps even centuries. This amount of work is clearly too much for a typical foraging band of 50 people, so let's assume that Mound A was built by a "tribe," an ethnolinguistic group of 500–2,000 people. Let's further suppose that 300 adults could be spared for mound-building work for 10 days a year. Then it would take 90 years—nearly a century—to pile up enough earth to make Mound A.

But that is not how the Poverty Point mound was erected. When Kidder, together with Anthony Ortmann and other archaeologists, excavated Mound A, they made a surprising discovery. Cutting a vertical slice through the mound, they saw layers of reddish soil alternating with layers of grayish soil. Apparently, basketloads of earth from two different parts of the area had been carefully spread over the top in alternating phases. The cross-section of the mound was striped like a tiger skin.

This observation has remarkable implications. Had it rained at any time during the building process, rainwater would have seeped through the top layers and mixed them up, thus destroying the fine striation pattern seen on the vertical slice. Indeed, the top meter or so of the mound lacks the tiger stripes because of this process of erosion. And yet there are no signs of weathering below the top meter and a half. The startling conclusion we must draw is that Mound A was built not over many years, but in one fell swoop—between two rains.

Kidder estimates that if the mound had been built over 90 days, it would have required 3,000 workers, which implies the overall scale of the society (adding women and children) was at least 10,000 people.

Now, as one who lived in Louisiana for seven years, I must say I can't imagine a dry spell of three months in this region (and there is no evidence of a massive drought during the period in which the mound was built). Even 30 days without rain is pushing it, but let's use that as a more realistic estimate than 90. In this case, mound-building would require 9,000 workers and an overall society numbering in the tens of thousands. No matter how you slice it, it would take the cooperation of many tribes, speaking a variety of languages, to build the Poverty Point mound.

The Göbekli temples were less expensive. Recent experiments by the German archaeologist Claudia Beurger suggest that carving a single pillar required 20 people-years.[9] Multiplying by 12 (the typical number of pillars) gives us 240 people-years, but we also need to account for lifting, moving, and installing the pillars within a circular enclosure (which also needed to be constructed). Let's say 300 people-years in total, but it could easily be as little as 100 or as many as 500.

Again, the uncertainty in the estimate pales into insignificance when we look at the overall trend. Over the 11,000 years separating Göbekli Tepe from the International Space Station, the scale of cooperation, when measured by the labor costs of the most impressive building project, went up by four orders of magnitude—from 300 to 3,000,000. This is a huge—indeed, an astronomic—increase. And, of course, it was paralleled by an equally enormous increase in the scale of human societies.

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It is generally believed that anatomically modern human beings appeared around 200,000 years ago. For a very long time—the first 95 percent of our evolutionary history—we lived as foragers in small-scale societies. It was only during the last 10,000–12,000 years that things started moving. The ritual complex of Göbekli Tepe was built by foragers, but these people were already settling in semi-permanent villages, made possible by the abundance of wild cereals (emmer wheat, einkorn wheat, and barley) that grew in natural stands in the Fertile Crescent in the Middle East.

When we look through our macroscope beyond Göbekli Tepe, we see absolutely no evidence of monumental architecture (or any other kind, for that matter). We see small, impermanent camps of hunter-gatherers of the later Pleistocene, the geological epoch that ended just a few centuries before Göbekli Tepe. These people did not lack creative capacity—some were accomplished sculptors and painters. In my humble opinion, the spectacular cave paintings of Altamira or Lascaux are much better art than most of what hangs in the Museum of Modern Art in New York. But these works of art were created by individuals. In our journey to trace the roots of ultrasociality back in time, it looks like Göbekli Tepe is the end of the road.

The end of the road, that is, for the human species, but not for other organisms. For a 100 million years before the first members of the genus *Homo* appeared on the African savannah, the reigning champions of large-scale cooperation were the social insects—wasps, bees, ants, and termites.

In his book *The Social Conquest of Earth*, the renowned evolutionary biologist and ant expert Edward O. Wilson points out that human beings and social insects took very different paths to conquering Earth. People cooperate in large groups of genetically unrelated individuals and, with minor exceptions, do not lose their reproductive capacity. Social insects, on the other hand, live in societies of close relatives. All honeybee workers in a hive, for example, are sisters. And they are sterile—only one individual in the hive, the queen, lays eggs. Because the two paths are so different, most biologists use the term *eusociality* (true sociality) for social insects and *ultrasociality* (extreme sociality) for humans.[10]

The social life of termites and ants, in which some species live in colonies numbering millions of individuals, is truly remarkable in its complexity. Here's how Edward Wilson describes our closest rival in the sociability stakes:

> From Louisiana to Argentina, immense colonies of leafcutter ants, the most complex social creatures other than humans, build cities and practice agriculture. The workers cut fragments from leaves, flowers and twigs, carry them to their nests and chew the material into a mulch, which they fertilize with their own feces. On this rich material, they grow their principal food, a fungus belonging to a species found nowhere else in nature. Their gardening is organized as an assembly line, with the material passed from one specialized caste to the next all the way from the cutting of raw vegetation to the harvesting and distribution of the fungus.[11]

For millions of years social insects reigned supreme as the leaders of social evolution. During the Pleistocene, the scale of cooperation in humans was much smaller than in the social insects, and not really different from that of other social primates, such as chimpanzees or baboons.

Let's now travel from the Pleistocene to the present to see just when human beings became the champion cooperators of the animal world.

Instead of on monuments, however, I now focus our macroscope on the overall size of cooperating societies. Here's what that trajectory looks like:

Social scale (people)	Polity Types	Time (kya)
10s	Foraging bands	200
100s	Farming villages	10
1,000s	Simple chiefdoms	7.5
10,000s	Complex chiefdoms	7
100,000s	Archaic states	5
1,000,000s	Macrostates	4.5
10,000,000s	Mega-empires	2.5
100,000,000s	Large nation-states	0.2

Table 1 The increase in the scale of human societies, measured by the number of people in a polity (a politically independent unit). Population numbers are approximate and indicate an order of magnitude (for example, '100s' means between 100 and 1,000). *Time (kya)* is time in thousands of years since the first appearance of the polity type. A complex chiefdom differs from a simple chiefdom in having a three-tier administrative hierarchy. It is governed by a paramount chief with several subordinate chiefs under him, and several villages under each subordinate chief.

The first centralized societies appeared in Mesopotamia 7,500 years ago. These societies typically encompassed several thousand people, living in many farming villages. They were ruled by hereditary chiefs, which is why the anthropologists call them "chiefdoms." Populations of complex chiefdoms, which were ruled by a paramount chief at the top and subordinate chiefs at the next level of hierarchy, typically numbered tens of thousands. This is similar to the social scale of honeybee colonies of 20,000 or so workers.

The first cities and states arose 5,000 years ago. One of these archaic states, the Old Kingdom of Egypt (2650–2150 BCE), the one that built the Great Pyramid of Giza, had a population of between one and two million, which is beginning to approach the social scale of the most complex social insects, ants and termites.

The scale of historical societies continued to increase, and during the last millennium BCE we see the first mega-empires: the Persian Empire, the Roman Empire, and China under the Han Dynasty. The mega-empires ruled populations numbering in the tens of millions. For example, the populations of both the Roman Empire and Han China grew to 50–60 million people at the peak. This is the point when we surpassed the social insects. During the past two millennia no other animal anywhere has rivaled human societies in size and complexity.

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In evolutionary terms, 10,000 years is a blink. Yet human societies have been utterly transformed during this period—from small-scale, egalitarian groups integrated by face-to-face interactions to huge, anonymous nation-states with centralized decision-making, extensive division of labor, and, less positively, large differentials in wealth and power. This remarkable development cries out for explanation—and explanation of a kind that has been unusual, even unwelcome, in the study of history. We need to appeal to general principles—scientific laws of social development. And though immensely slow on the political scale (where a week, as we know, counts as a long time), these astonishing transitions in human society were still much too fast to be due entirely to the evolution of the human genome. We need to understand them as cultural achievements, and the whole story as a process of cultural evolution.

This imposes a certain discipline on our analysis, one that, again, is unusual in humanistic history. I started my career as a biologist, and I know very well that it is impossible to make sense of evolution without mathematics. Darwin's great idea has a deceptive simplicity, with an emphasis on the "deceptive": it's all too easy to think you understand the process, but until you can build a working model of it, you're probably fooling yourself. And once you have developed a mathematical model that seems to work, you need to test it with data.

That's exactly what my colleagues and I are doing. A quiet revolution, which has gone below the radar of most social scientists and the general public, is transforming social and historical sciences. A big part of it has been the rise of the discipline of cultural evolution. Theories of cultural evolution are different from traditional explanations in three important and mutually reinforcing ways—they are general, they are based on mathematical models, and they are empirically testable.

Many historical explanations arise as a result of a specialist studying a particular society, noticing something striking about it, and proposing a theory based on the observation. For example, the geochemist Jerome Nriagu noted that the Romans used lead pipes to supply water to their cities and cooked with lead pots. From this observation he concluded that the Roman Empire must have fallen because its elites (the group most likely to use lead vessels) literally poisoned themselves.[12]

It doesn't matter whether this hypothesis is correct or not (most scholars tend to dismiss it). What's important is that it clearly cannot be a general explanation of why empires collapse.

Explaining the decline and fall of the Roman Empire has been a veritable cottage industry since Gibbon's *Decline and Fall of the Roman Empire*. Thirty years ago a German historian compiled a list of such explanations and discovered that the total was 210.[13] I know of at least a dozen other theories proposed since then. There is nothing wrong with such intellectual games, but they are not science. Science is about looking for general explanations. Not why any particular empire fell, but why empires in general decline and fall. More importantly, how did empires become possible? What are the social forces that hold large human societies together, and why do they sometimes falter, leading to social disintegration and collapse? We don't need a theory about Rome. We need a theory about empires.

Science is also about formulating explanations very precisely, so that there is no possibility of making a logical error or missing a step in the argument. When we want to explain the behavior of complex systems such as human societies, we almost always have to resort to mathematics. Building mathematical theories of history (and then testing them with data, on which more below) has been the province of the new science of Cliodynamics.[14] Cliodynamics (from *Clio*, the muse of history, and *dynamics*, the study of change) combines the insights from such diverse fields as historical macrosociology, economic history, and cultural evolution to build and test models for historical dynamics.

Finally, and most importantly, science is not only about building carefully-constructed theories that explain general phenomena. It is also, and primarily, about distinguishing good explanations from bad ones. This is where traditional history has been deficient. Historians have created, and continue to create, new explanations, but they are not in the business of testing them with data.

You might ask, is it even possible to treat history as a science? It turns out, yes, it is. I will give you an example from my own work.

Archaeologists, sociologists, and political scientists have proposed a multitude of theories to explain the evolution of large-scale, complex societies. But most anthropologists and archaeologists think that the chief driving force was the invention of agriculture. For example, in *Guns, Germs and Steel*, Jared Diamond advances a powerful argument that geography determined the first areas of Earth to be farmed and that, in turn, shaped subsequent human history. Agriculture created high population densities, as well as production surpluses that could be appropriated by new ruling elites. On this premise, agriculture set the ball rolling, and the entire history of civilization followed from that.

A different perspective, one rooted in the new discipline of Cultural Evolution, disagrees. Yes, agriculture is a necessary condition for the evolution of complex societies. But it is not enough. The problem is that vital institutions, such as bureaucracies and organized religion, and constraints that compel a ruling elite to promote the common good, are all costly. How could these institutions come about in spite of such costs? The theory of cultural multilevel selection says that this evolution is only possible when societies compete against each other, so that those lacking the right institutions fail. The costly institutions of complex societies manage to spread and propagate because the societies that possess them destroy those that don’t.

This may sound quite abstract, but it is possible to take this general theory and build a specific and detailed model to predict where and when complex, large-scale societies should arise, and how they grew during the ancient and medieval eras of human history. A paper published in 2013 in the journal *Proceedings of the National Academy of Science* describes how my colleagues and I did precisely that.

The trick is to focus on factors that intensify intersocietal competition, which until very recently meant military confrontation: warfare. And between 1500 BCE and 1500 CE, the intensity of military competition in the Old World maps extremely well onto the spread of military technologies based on warhorses. So we built a model around this factor, and it did an incredibly good job of predicting when and where large empires arose in Eurasia and Africa.

Our model simulated conditions within a realistic landscape of the Afro-Eurasian landmass over those three millennia. It took into account where and when agriculture appeared within this huge region. During the time period, horse-related military innovations, such as chariots and cavalry, dominated warfare in the Old World. Geography also mattered, as nomads living in the Eurasian steppe influenced nearby agrarian societies, thereby spreading intense forms of offensive warfare beyond the steppe belt. On the other hand, rugged terrain inhibited offensive warfare.

Our model predicts that the first states and empires should emerge in Mesopotamia, Egypt, and northern China. From there, large states gradually spread into the Mediterranean and the rest of Europe; into India, starting in the north and flowing south; from northern to southern China, and into southeast Asia beyond that. Although the model missed some of the minor details of the actual, historically observed rise and spread of states within the Old World, it was eerily accurate in capturing the overall pattern of history.

Make no mistake, the model did not "know" anything about the actual trajectories of historical states. Its output was a true prediction from first principles—the spread of military technology from the Great Eurasian Steppe superimposed on the geography of the continents, the mountain ranges, rivers and seas, and cultivated areas versus arid deserts. When we experimentally "turned off" warfare in the model, it ceased to generate predictions that bore any resemblance to the historical record. Geography and agriculture are important, of course, but if you want to predict where and when agricultural areas will develop into large states, it is the pattern of warfare that you need to watch.

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When the International Space Station flies over the American East Coast at night, its cameras see the major population centers of Washington, New York, and Boston as massive light clusters connected by bright arterial highways. Even my own corner of Connecticut is part of this web of light, which links my little town to Boston, Washington, and beyond—to Chicago, Atlanta, and the rest of the nation. From space one can literally see this huge society of 300 million people—an *ultrasociety*—integrated, if imperfectly, by our capacity to cooperate on large scales.

This book is about the remarkable story of how the foragers and early farmers of prehistory evolved into the huge ultrasocieties of today, and how over the past 10,000 years the scale of human cooperation raced from the hundreds to the hundreds of millions, leaving our best competitors—ants and termites—in the dust.

However, the road from the ancestral villages and tribes to the modern nation-states has not been a straight one. Early in our evolutionary journey we got rid of the alpha males who ruled our great ape ancestors (and continue to rule chimpanzee and gorilla communities). We evolved remarkably cooperative and egalitarian societies, with leaders who could not order their followers around, leading instead by persuasion and example. For hundreds of thousands of years we lived in societies in which there were few distinctions beyond age, gender, and earned reputation.

Then something happened. Starting about 10,000 years ago, the egalitarian trend reversed. Alpha males came back in the guise of god-kings. They oppressed us, enslaved us, and sacrificed us on the altars of bloodthirsty gods. They filled their palaces with treasures and their harems with the most beautiful women in the land. They claimed to be living gods and forced us to worship them.

Fortunately, god-kings did not last long. Another great turn followed, another trend reversal. Gradually, human societies started extricating themselves from the worst forms of oppression. Human sacrifice and deified rulers went out of fashion. Slavery was outlawed, and privileges were taken away from nobles. Human societies regained much of the lost ground. We are still not as egalitarian as hunter-gatherers—there are the poor and the billionaires—but we are much better off than we were during the days of god-kings.

Human social evolution has followed a remarkable, even bizarre trajectory, with sharp turns one after the other. Why? Philosophers and social scientists have offered many explanations, but there is still no accepted answer. Now, however, thanks to the new science of Cultural Evolution, we are beginning to see the outlines of the explanation.

The answer is surprising. It was competition and conflict between human groups that drove the transformation of small bands of hunter-gatherers into huge nation-states. Not to put too fine a point on it, it was war that first created despotic, archaic states and then destroyed them, replacing them with better, more equal societies. War both destroys and creates. It is a force of creative destruction, to borrow a phrase from the economist Joseph Schumpeter. In fact, that phrase gets the emphasis wrong. War is a force of *destructive creation*, a terrible means to a remarkable end. And there are good reasons to believe that eventually it will destroy itself and create a world without war.

But let's not get ahead of ourselves. Before we can abolish war, we need to understand it.

Chapter 2
Destructive Creation

How cultural evolution creates large, peaceful, and wealthy ultrasocieties

When Tymen Bouwensz woke on the morning of the last day of his life, he had no inkling that that evening his flesh would be roasted over a campfire and eaten by hostile Indians.

Bouwensz was one of the thousands of common Dutchmen who came to the New World in early 17th century looking to make their fortunes (but, mostly, finding early graves). In January 1624 he sailed from Amsterdam on the *Mackerel* together with another, and more notable, personage, the Honorable Daniel van Krieckenbeeck, who served as the supercargo of the ship. Van Krieckenbeeck ("Beeck" to his associates) and Bouwensz landed in New Amsterdam on the island of Manhattan later that spring.

New Amsterdam was the capital of New Netherland, the colony established and run by the Dutch West India Company. Its location at the mouth of the Hudson River allowed the Company to control one of the best transport corridors that reached deep into the North American continent. The Company's main interest was in the fur trade with the Indians, who supplied beaver pelts needed for the manufacture of fashionable and waterproof hats.

In 1624 the Dutch built a trading post up the Hudson, on a site where now stands Albany. They named the settlement Fort Orange in honor of the House of Orange-Nassau, which had (and indeed has) ruled the Netherlands ever since that country successfully rebelled against Spain in the 16th century. Beeck was appointed commander at some point between 1624 and 1626, and Bouwensz followed him to this farthest outpost in the Dutch fur-trade network.

At that time Fort Orange was surrounded by the territory of the Mahican Indians (also spelled Mohicans, and not to be confused with the Mohegans, who now operate the Mohegan Sun Casino in Connecticut). It was the Mahicans who were the subject of the novel *The Last of the Mohicans*, by the American writer James Fenimore Cooper, and of the popular 1992 movie of the same name. To the north of the Mahican lands was the territory of the fierce Mohawks, the easternmost tribe of the powerful and expansionary Iroquois Confederacy. The Mohawks also wanted access to the Dutch (they were especially keen to buy firearms, which the French, unlike the Dutch, refused to sell). Two years after the establishment of Forth Orange, tensions between the two Native American tribes escalated to the point of warfare. The Dutch mostly stayed out of the hostilities, but they supplied the Mahicans and encouraged them to continue fighting.[15]

In 1626, Beeck, Bouwensz, and five other traders set off for a meeting with a Mahican war party. A mile from the fort the party was ambushed. Beeck, Bouwensz, and two others were killed by Mohawk arrows, while the rest escaped (one of the survivors was “wounded by an arrow in the back whilst swimming”). Then, as one report has it, the Mohawks “devoured” Tymen Bouwensz, “after having well cooked him. The rest they burnt. The

Indians carried a leg and an arm home to be divided amongst their families."[16]

In the aftermath of this debacle, the Dutch abandoned any attempts to aid the Mahicans, who lost the war and were driven by the Mohawks from the Hudson Valley. The victorious Mohawks gained total control over the lucrative trade with the Dutch. The Mahicans survived for a while in western Massachusetts, but eventually went extinct, not an uncommon fate for a Native American tribe.[17]

Life on the North American frontier was perilous and brutal. Our historical sources are primarily concerned with massacres and atrocities involving Europeans, sometimes as victims, more often as perpetrators. But cruel and merciless ways of war were just as common in conflicts between Native Americans. Men were ambushed and killed when away on hunting trips. Women put themselves at risk when they went into the forest to gather berries and nuts. Occasionally, large war parties overran entire villages, even those that were well protected by defensive stockades (as many were). The victors pillaged food stores, destroyed crops, burned houses, dispatched the wounded, and carried off the survivors. Although women and children were often adopted into the winning tribe, the defeated warriors were usually tortured to death.

In *The Barbarous Years*, the historian Bernard Bailyn writes, "the prisoners were often maimed—fingers chopped or bitten off to incapacitate them for further warfare, backs and shoulders slashed—then systematically tortured, by women gashing their bodies and tearing off strips of flesh, by children scorching the most sensitive parts of their immobilized bodies with red-hot coals." In the end, "they would most likely be burned to death after disembowelment, some parts of their bodies having being eaten, and their blood drunk in celebration by their captors."

The drawings and watercolors by the French artist and cartographer Jacques Le Moyne de Morgues, a member of Jean Ribault's expedition to North Florida and South Carolina in 1564–65, depict a landscape dotted with stockaded villages. The fortifications are not there for show. In one painting a group of hostile Indians is shooting flaming arrows from a hill into a village. Several of the thatched huts are already burning.

Perhaps the most horrific of Le Moyne's watercolors is the one titled *How the Indians Treated the Corpses of their Enemy*. In the foreground we see a young man's scalped and naked corpse being butchered by three of his foes. In fact, it's not even clear that the victim is already dead—one of the warriors is preparing to stick an arrow into him to finish the job. To the right, another group has gathered around a fire over which one man is drying a fresh scalp while a second is getting ready to cook a leg. Severed limbs and quartered bodies are lying around, and in the background a third group is making off with legs and arms—perhaps home, to be divided among their families.

The Europeans were of course shocked by what they encountered in the New World. But they shouldn't have been. Insecurity and war, with a constant threat of sudden (or, worse, excruciating and degrading) death, was the typical condition of human societies before "civilization"—before large-scale states with their governments and bureaucrats, police forces, judges and courts, complex economies, and intricate division of labor.

Some anthropologists object to the use of American Indians as a mirror of life in all small-scale, tribal societies before the rise of states and empires.[18] The Rutgers University anthropologist Brian Ferguson, for example, argues that the arrival of Europeans in the Americas with their germs, metal tools, weapons, and an insatiable appetite for trading goods destabilized native societies and raised the intensity and lethality of intertribal warfare. There is something to be said for this argument. As we saw, the establishment of Fort Orange triggered a major war between the Mohawks and the Mahicans. More generally, war intensity has varied greatly between different regions, and within regions, over time. I will return to this important issue in a later chapter. Nevertheless, life in small-scale tribal societies was much more precarious and violent than most people realize—not only on the American frontier, but even before the European settlers arrived.

We know this because modern archaeology tells us a lot about societies that never encountered Europeans. Consider, for example, a village of Oneota Indians, who lived along the Illinois River 200 years before Columbus. Archaeologists excavated the village cemetery (the site is known as "the Norris Farms #36") and studied the remains of 264 people buried there. At least 43 of them—16 percent—had died violent deaths.

> Many of them were struck on their fronts, sides, and backs with heavy weapons, such as celts [stone axes], or they were shot with arrows. Some people apparently were facing their attackers, whereas others were not. Presumably the latter were wounded when trying to flee. Victims were occasionally hit many more times than necessary to cause their deaths; perhaps several warriors struck blows to share in the kill. Bodies often were mutilated by the removal of scalps, heads, and limbs. Scavenging animals then fed on many corpses, which were left exposed where

> they fell until the remaining parts were found and buried in the village cemetery.[19]

The pattern of deaths suggests a state of constant warfare, with men and women being ambushed singly or in small groups as they went about hunting, gathering, or tending fields. In other words, this Oneota village was quite similar to many later Indian villages described by Europeans.

The estimated proportion of violent deaths, 16 percent, is huge. It's the same as playing Russian roulette with a six-gun. Nevertheless, it's not as high as in some other small-scale societies. In fact, it lies in the middle range of such estimates for prehistoric populations. Some were better. Some were worse.

Life in pre-history was not uniformly grim. People living in small-scale societies did enjoy periods of peace and prosperity. But at other times, warfare was even more deadly than that endured by the Oneota villagers. Another village in what is now Crow Creek, South Dakota, several hundred miles northwest of the Oneota settlement, was home to a Caddoan-speaking tribe. Crow Creek is one of the famous prehistoric massacre sites. It was a large village protected by a defensive moat, but it was nevertheless overrun and completely destroyed by enemies. Skeletons from 500 bodies, piled in a common grave, show evidence of violent death and extensive mutilation. Nearly all the bodies had been scalped, and many were beheaded or dismembered. In some cases, the tongues had been cut out.[20]

OK, you might say, but Columbus and his crew were not the first Europeans to arrive in America. Perhaps the peaceful Indian societies were corrupted by the rapacious Vikings, who got to "Vinland" in about 1000 CE. This seems rather far-fetched, because the Norse colonies on the American eastern seabord were short-lived and likely had no impact on

Native American societies. On the other hand, there is now a lot of evidence for such a "corrupting" influence that spread into the North American continent centuries before the Vikings. The remarkable thing is, it came from the opposite direction, across the Bering Strait.

In about 700 CE a technological package, which archaeologists call the Asian War Complex, appeared in Alaska. It spread rapidly through the continent—east to Greenland and south to California and the American southwest. The central innovation of the package was the recurved bow, backed with sinew. This was a much more powerful weapon than the wooden self bow already known to the Native Americans, and came with body armor often made from slats of wood or bone. Clearly, it wasn't just a hunting tool: it was used for war. Indeed, the appearance of the Asian War Complex in an area is usually followed by signs of intense warfare, such as a profusion of barbed bone arrowheads found embedded in human vertebrae.[21] So yes, the intrusion of people with superior military technology can lead to more intense warfare.

But you can see now why the anthropological debate about the origins of warfare has proved so difficult to resolve. The followers of Jean-Jacques Rousseau, the 18th century's Swiss *philosophe* who was a proponent of the "peaceful savage" myth, are hard to pin down. These "Rousseauans" can always point to some period and place in which war spiked, and then argue that the spike signals the arrival of war in a previously warless society. So, was it Europeans who brought war to America? No. Mass burials in such sites as the Oneota cemetery and Crow Creek, as well as lots of skeletons with arrowheads embedded in them, say otherwise.

Then was it the spread of the compound bow into North America in 700 CE? I'm afraid not. The forensic anthropologist James Chatters recently surveyed all complete skeletons identified as belonging to people who had lived in North America earlier than 9,000 years ago. He found that seven of twelve male skeletons (or 60 percent) and three of sixteen female (20 percent) had either skull fractures, or penetrating wounds, or both.[22] The famous Kennewick Man, who lived 9,000 years ago near the Columbia River, Washington, has a leaf-shaped projectile point (probably an atlatl dart) in his pelvis. A young male from Grimes Point, Nevada, died after being stabbed twice in the chest with an obsidian dagger.

Was it the domestication of plants that turned peaceful hunter-gatherers into warlike agriculturalists? Again, no. The North American evidence reviewed by Chatters comes from foraging populations. More evidence comes from the Nile and one of the oldest graveyards known to archaeologists, the Jebel Sahaba Cemetery, just south of the Egypt-Sudan border. People buried there lived more than 13,000 years ago, well before the rise of agriculture. More than 40 percent of them, men, women, and children, were killed by archers. Just as in the Oneota case, the Jebel Sahaba people died not in one massive massacre, but as a result of constant warfare extending over years.[23]

As the methods of forensic anthropology improve, evidence for prehistoric warfare becomes ever more compelling, forcing the Rousseauans to retreat further into the distant past. Raymond Kelly, the author of *Warless Society and the Origin of War*, thinks that combat originated independently in several different parts of the world between thirteen and four thousand years ago. Human societies in the Pleistocene were warless due to “low population density, an appreciation of the benefits of positive relationships with neighbors, and a healthy respect of their defensive capabilities.”[24] But if that was true, the first hunter-gatherers who got to the huge North American continent would seem to have enjoyed all the necessary conditions of prelapsarian innocence. Yet as we saw a few paragraphs ago, they had one of the highest rates of war-inflicted injuries ever.

In a review of the available data, Philip Walker, a leading scholar in the field of bio-archaeology, writes: "Bones bearing cutmarks inflicted by other humans are surprisingly common considering the paucity of early hominid remains." His conclusion is that "throughout the history of our species, interpersonal violence, especially among men, has been prevalent. Cannibalism seems to have been widespread, and mass killings, homicides, and assault injuries are also well documented in both the Old and New Worlds."[25]

Is that all that can be said for the noble savage? Not quite. The last line of defence for the Rousseauans is to cast doubt on whether pervasive evidence of violence is really evidence of warfare—violent conflict between groups, rather than interpersonal homicide. Azar Gat, the author of one of the best scholarly books on war, *War in Human Civilization*, notes in a 2015 article that this position represents a significant retreat from the classical Rousseauan view that celebrated hunter-gatherers as "the peaceful children of the earth."[26] In the 1960s, anthropologists who studied foraging societies used to write books with titles like *The Harmless People* (about the Kalahari Bushmen), and *Never in Anger* (about the Canadian Inuit).[27] What happened? Well, subsequent studies showed that the homicide rate among the Bushmen was four times higher than for the United States, and for the Inuit it was 10 times higher.[28]

The evidence is overwhelming that daily life in the shadow of imminent violence was the rule rather than the exception for people in tribal societies. Of course they had to deal with the usual sources of internal friction—conflicts over resources, jealousy and infidelity—and fights would sometimes end with a corpse lying on the ground. But the main and most terrifying threat came from outside their society. It came from strangers.

And so life in small-scale societies was very different from our experience today. It's not just that our ancestors had less technology and fewer things. I can travel to Albany to give a lecture to a roomful of strangers not far from the place where Tymen Bouwensz met a violent end 400 years ago. Yet I am on the whole not worried that these strangers will shoot me with arrows (or modern automatic weapons), cook my flesh over the fire, and eat it. A visiting seminar speaker at Rensselaer Polytechnic would have to give a very boring lecture indeed before anyone ended up carrying home his roasted arm.

Here's the basic and remarkable fact. The fraction of modern Americans killed by other people, whether in overseas wars or by homicide, is *much* lower than for pre-contact Native Americans. An even greater contrast is with the country of Denmark, where I recently spent a semester as a visiting professor. The chances that a Dane will meet a violent death are less than one in a thousand. The difference between a typical small-scale society and Denmark in the probability of homicide is huge—200 to 1.

Where did all the bad guys go?

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It seems obvious that this astonishing outbreak of peace on Earth must be connected with the general increase in social complexity. In Chapter 1 I asked how it was that human beings had gone from living in villages, surrounded by relatives and friends, to huge societies of strangers, with thousands of professions and elaborate governance structures. If you pose this question to anthropologists (which I have done on many occasions), you will find it hard to get a clear answer. Typically they hedge by saying something like, “Well, there are many factors, and some are more important in explaining the rise of complex societies in Mesopotamia, while others played a critical role in Mesoamerica.” This is a fudge. Keep pressing. Eventually, the majority of anthropologists will point to agriculture as the decisive factor—a venerable view, which can be traced back to such eminent scholars as Gordon Childe,[29] Leslie White,[30] and Elman Service.[31] Today one of the most eloquent proponents of the theory is Jared Diamond, the author of *Guns, Germs, and Steel*.

Beyond this basic point of agreement, however, scholarly opinion divides broadly into two basic camps. One side tends to accentuate the positive aspect of large-scale societies. Such groupings, it suggests, fulfill a clear need, coordinating production and distribution, managing flows of goods and information, and, more generally, producing public goods that benefit all (such as freeways). To give you an example of this style of thought, in 1957 the historian Karl August Wittfogel tried to explain the rise of states and empires by the need to control water, either for irrigation or to prevent floods.[32] Call this the Hydraulic Theory of civilization.

Other commentators take a more sinister view. When you cut to the core, the argument goes, complex societies are built on force and self-interest. Anthropologists influenced by the ideas of Karl Marx argue that the adoption of agriculture created a surplus that could be appropriated by the elites. In a more extreme view, the state arose simply as the vehicle for the elites to oppress the rest of the population. Another rather bleak theory, from the German sociologist Franz Oppenheimer, points to *conquest* as the engine of social evolution.[33] Complex societies result when one group conquers others and sets itself up as a ruling class, lording it over the subjugated population.

While there are elements of truth in many of these theories, any specific one fails as a general explanation of how large-scale complex societies evolved from small-scale tribal ones. Both the Hydraulic and Conquest theories have been rejected as we learned more about how real historical societies acquired states. This is why there is currently no single theory that would be accepted by a majority of anthropologists and archaeologists. The situation is made worse by the division of social science into "tribes" of anthropologists, sociologists, political scientists, and economists. Each discipline tends to emphasize its own set of theories while disagreeing with others (and even among its own adherents). Social scientists are the blind men touching different parts of an elephant and drawing different conclusions about it.

Obviously enough, a human society is a complex and integrated system. Social structure and dynamics affect the economy, which in turn influences politics, and both feed back into social structure. What's more, societies today are the products of long and often tortuous histories. In other words, if we want to answer a Big Question such as the one about how complex societies evolved, we need all the social sciences—sociology, anthropology, and economics—as well as the historical sciences, to work together. We need to break out from the narrow disciplinary silos. But we need to do it in a rigorous and organized way. How can we achieve that? The answer comes from a surprising direction.

Most people think that evolution is something that only biologists need to study. But evolutionary science is much more general. It isn't just about how organisms adapt and gene frequencies change; it can also tell us how societies evolve and frequencies of cultural traits change.

As a matter of fact, Charles Darwin himself was the first to attempt to apply his theory to human beings. He did so in *The Descent of Man*, which came out in 1871, 12 years after *On the Origin of Species*. In *The Descent* Darwin clearly formulated an argument for what we now know as group selection: "Although a high standard of morality gives but a slight or no advantage to each individual man and his children over the other men of the same tribe . . . an advancement in the standard of morality will certainly give an immense advantage to one tribe over another."

However, for a number of reasons, Darwin's ideas on human evolution fell on deaf ears within the scholarly community.[34] One obstacle was the unfortunate rise in the late 19th century of a pseudo-scientific ideology called Social Darwinism. Despite its name, Social Darwinism was actually based more on the ideas of the British sociologist Herbert Spencer than those of Darwin himself. Among its crimes, it was used to justify racism, fascism, eugenics, and the crudest forms of *laissez-faire* capitalism. In America, its influence crested in the Gilded Age (c.1870–1900) and ebbed during the Progressive Era (the first decades of the 20th century). Social scientists such as the anthropologist Franz Boas were among its leading critics. But the damage was done, and the spectre of Social Darwinism continued to inhibit the development of cultural and social evolution for most of the 20th century.

The second reason why Darwin's cultural project languished for so long may sound more surprising to modern ears. Strange to say, at the beginning of the 20th century, just as the social sciences were coming into their own, Darwin's theory of evolution itself had lost some of its appeal among biologists.[35] The problem was the rise of the new science of genetics, which seemed to contradict the basic tenets of Darwinism (Darwin assumed that genetic variation was continuous, but the geneticists showed that it was a result of action by discrete genes).

But all that changed during the 1930s, a time of tremendous intellectual ferment in the field of biological evolution. This was the decade that gave birth to the Modern Evolutionary Synthesis, the ultimate synthesis of Darwinian evolution with Mendelian genetics. The next three decades saw an extraordinary leap in our understanding of evolution, melding insights from mathematical models, from experimental evolution in the lab and field, and from analyses of paleontological data over geological timescales.

During the 1970s, some evolutionists started to ask themselves whether this success story could be replicated by studying societies rather than organisms. These pioneers were largely working independently of one another. The most famous among them was E. O. Wilson, whom we encountered in Chapter 1. The publication of his *Sociobiology: The New Synthesis* in 1975 triggered one of the greatest scientific controversies of the 20th century, even earning Wilson a drenching when protesters dumped a pitcher of water over his head during a meeting of the American Association for the Advancement of Science in 1978. Critics from both biological and social science backgrounds vehemently disagreed with Wilson's view that behavior, most controversially human behavior, is ultimately regulated by genes. *Sociobiology*, whose focus was on animal societies, was followed by *On Human Nature* (1979), in which Wilson applied his theories to people. Wilson then teamed up with Charles Lumsden to publish *Genes, Mind and Culture: The Coevolutionary Process* (1981). That book was destined to be one of the three foundational texts of a new discipline: Cultural Evolution.

The second foundational work, written by the geneticist Luca Cavalli-Sforza and the theoretical biologist Marcus Feldman, was *Cultural Transmission and Evolution: A Quantitative Approach*, also published in 1981. In their book Cavalli-Sforza and Feldman took such key concepts from biological evolution as mutation, random drift, and selection, and used them as building blocks in a theory of cultural evolution.

Finally, the third, and ultimately the most influential book, was published by the anthropologist Robert Boyd and the ecologist Peter Richerson. It was called *Culture and the Evolutionary Process* (1985).[36]

Richerson and Boyd started their long-term collaboration during the 1970s, when both were at the University of California at Davis. Their first papers developed a mathematical theory of what they called "dual inheritance," a coevolutionary process between genes and culture.[37] This work laid the mathematical foundations for the subsequent edifice.

For the next two decades, Cultural Evolution grew very slowly, unremarked by the majority of evolutionary and social scientists. This was partly due to the heavily mathematical nature of the foundational books and articles. Yet, in retrospect, it was the right decision to put the developing theory on a firm mathematical footing. Models yielded clearcut, quantitative predictions, and gradually cultural evolutionists began to accumulate the empirical corpus by designing experiments and analyzing historical data.

In the meantime, Boyd moved into a faculty position at the University of California, Los Angeles. By the early 2000s he and Richerson had trained a brilliant cohort of graduate students, who themselves began moving into academic positions at prestigious universities and research institutes. Cultural Evolution started to attract scholars working in both the social sciences and the humanities—even literary critics (an example is *The Storytelling Animal* by Jonathan Gottschall).

A turning point in the maturation of the field was a meeting in Frankfurt in 2012, organized by the Strüngmann Forum Foundation, which brought together 45 key players.[38] Five days of intense discussion forged a strong sense of community. In the summer of 2015 we made the collective decision to start the Society for the Study of Cultural Evolution. Within three weeks of issuing the call, more than 1,000 people had signed up. Clearly, the time had come at last for an evolutionary study of human societies.

In the social sciences, human existence is carved up into artificial little niches, each studied by its own discipline. Biology also started like that, but during the 20th century, its pursuit was unified by the theory of evolution. As the Russian-born American geneticist Theodosius Dobzhansky famously said, “Nothing in biology makes sense except in the light of evolution.” I fully expect that quite soon we will be able to say, “Nothing in social life makes sense except in the light of cultural evolution.”

Cultural Evolution gives us the tools to analyze societies as coherent, integrated wholes, rather than a collection of separate economic, political, and social subsystems. It also offers a new way to answer the question I posed earlier, about how we made the transition from small-scale, intimate social life (menaced by sinister tribes of outsiders) to huge but largely peaceful societies of strangers. Interestingly, this answer integrates the two anthropological perspectives mentioned above, reflecting both the optimistic and pessimistic views of human social evolution.

On my cultural-evolutionary analysis, cooperation and warfare were *both* critical in the transition from small-scale to large-scale societies. This is not the same as saying that "everything is important." They had to combine in a very special way. They are the yin and yang of social evolution—two seemingly contradictory, yet mutually interdependent forces. Hold onto your hat for a quick sketch of how this works—just the bare bones of the answer. Connecting the logical dots and marshaling empirical evidence will be the job of the rest of the book.

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What distinguishes a true society from a mere collection of individuals? The answer is *cooperation*—people working together to produce public goods that benefit all members of the society. An important characteristic of cooperation is that while the benefits are typically shared among all, such public goods are costly. For example, maintaining internal peace and order, something that any decent society must do, requires a lot of work. There are always some who want to solve their problems with intimidation and violence, and such "antisocial elements" must be restrained and, if they do not desist, punished. As any law-enforcement officer can tell you, maintaining order is a dangerous job: every year many cops lose their lives in the line of duty. In other cooperative enterprises, costs are usually less extreme. People can contribute money, their labor, or even time—doing something for others instead of taking it easy. But an essential characteristic of cooperation is that it requires some kind of sacrifice.

The typical tribal society is highly cooperative. People share food and help those who have temporarily fallen on bad times. They maintain internal peace, organize collective hunts, and build community buildings or houses for newlyweds. Such communal barn-raising was common in 19th-century rural America, for example. Amish communities still do it today. Most importantly, tribespeople organize collective defense against other tribes and, sometimes, collective predation on weaker neighbors.

It is fairly easy to organize collective action in small societies. When everybody knows everybody else, it is not too hard to decide who will do what, who is trustworthy, who is likely to slack off and may need additional prodding. The forms of cooperation specific to your community will tend to be familiar to everybody, greatly simplifying the coordination of purpose and effort. As Alexis de Tocqueville wrote in *Democracy in America*, "The village or township is the only association which is so perfectly natural that, wherever a number of men are collected, it seems to constitute itself."[39]

It is much more difficult to get common projects off the ground in societies consisting of thousands of villages and cities, spread out over a large territory, with millions of people who are largely strangers to each other. In such societies cooperation is highly fragile and can easily unravel. Take somewhere like Afghanistan.

Back in the 1960s Afghanistan was one of the safest countries to travel in. The anthropologist Thomas Barfield, who spent several years doing ethnographic research among the nomads of northern Afghanistan, writes, "It was a time of peace and security, when foreigners could travel the breadth of the country alone, armed only with a bit of common sense to ensure their safety."[40] Because the Afghan state, presided over by King Zahir Shah, was quite rudimentary, internal peace and order were largely maintained cooperatively by the Afghan people themselves. Then came a coup-d'état, a Marxist revolution, an invasion by one of the world superpowers, an Islamist counter-revolution, and, finally, an invasion by the other (at that point, the sole) superpower. The fragile and invisible web of mutual trust and cooperation was completely destroyed. Today Afghanistan is one of the most dangerous countries, both to foreigners and to the Afghans themselves.[41]

Still, although large-scale societies are fragile, somehow human social evolution managed to overcome the difficulties associated with getting millions of strangers to cooperate. Ever since the first centralized states appeared 5,000 years ago, cultural evolution has been hard at work making them more stable. With time the states became larger and better organized. They also grew numerous. Today, the entire habitable surface of the Earth is divided between them. Large-scale societies organized as states have completely replaced or, in some cases, encapsulated, the small-scale societies in which human beings lived for most of their evolutionary history. For some reason, big, fragile structures have squeezed out the smaller, more durable, more easily maintained ones. And so intuitively, it seems as though some powerful external force must be tilting the playing field in favor of scale.

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"God is on the side of big battalions," goes the French military saying. The more warriors you bring to battle, the better are your chances of winning it. Could the main engine that drove the transition to large societies be warfare? This is a paradoxical idea, because war is not a nice thing. People are killed or crippled, villages and fields are burned and cities pillaged. But war brings not only destruction and misery in its wake. It can also be creative.

When people first started cultivating plants and settled in permanent villages, war between tribes became more intense. Defeat now could easily result in the loss of land for growing crops, which meant starvation. In extreme cases, like that of Crow Creek, a catastrophic defeat could wipe out the whole community. Because the consequences of losing were so grave, societies came under great evolutionary pressure to get better at surviving war. This meant inventing better weapons and armor, building up social cohesion, and adopting better battlefield tactics. But the best thing you could do was simply become a larger group, so that you could bring big battalions to the fight.

This inexorable evolutionary logic forced villages to combine into larger-scale societies. These combinations could take the form of loose alliances, more cohesive confederations, or centralized, hierarchical chiefdoms. Chiefdoms were the most common form of social organization in eastern North America when the Europeans arrived in the 16th century. Chiefdoms enjoy an overwhelming advantage over single villages, simply because they have more warriors. Additionally, a centralized organization—a clear chain of command—results in more effective battlefield tactics and overall strategy against alliances and confederations. Gradually, single villages and less cohesive combinations were either conquered and annexed by a growing chiefdom, or simply wiped off the map. The same evolutionary logic induced chiefdoms to combine in yet larger-scale societies—complex "chiefdoms of chiefdoms." Those, in turn, scaled up into early states and empires, and eventually into modern nation-states. At every step, greater size was an advantage in the military competition against other societies.

And yet increased size brings with it a whole host of coordination and cooperation dilemmas. Evolution had to find cultural mechanisms that would allow large-scale societies to function reasonably well without splitting at the seams. Being a large-scale society is not easy. A society cannot be bound by force alone. The essential glue that holds it together is cooperation (although force, or threat of force, is an important ingredient in sustaining cooperation, as we will discuss later). The larger the society—the further it is from a naturally cooperative village or township—the harder it is for people to cooperate in resolving conflicts and achieving collective goals. Even today there are many countries that lost their ability to cooperate at the level of the whole society—the failed states, such as Afghanistan and Haiti. The first centralized large-scale societies were even more fragile, because they had not yet accumulated a stock of the cultural mechanisms that help to sustain cooperation and build cohesion.

The past is littered with corpses of failed states and empires. Historians and readers of history books alike are fascinated with why this or that empire collapsed. But a much harder question to answer is, how were huge empires possible in the first place?

The answer is that people had to invent arrangements that would allow them to cooperate with strangers. The better they got at cooperation, the better their chances of staying in the game. Even as small-scale societies were being weeded out by competition with larger-scale societies, less cooperative large-scale societies were succumbing to more cooperative ones. There was a lot of trial and error in this process, and there were many dead ends. But that is typical of evolution.

And the process is not finished. The large-scale societies we live in remain quite fragile. We typically take the functioning of the more successful ones for granted. But even in North America or Western Europe, cooperation can unravel quite suddenly. Think of Northern Ireland in the 1970s. This is why we need to understand social evolution much better—not only so we can learn how to fix failed states, but also how to nurture cooperation and prevent state failure in the first place.

Still, while it is best not to overestimate the resilience of our societies, there is no need to deny that we've come a long way in 10,000 years. We (or, at least, a substantial majority of the world population) don't live under the constant threat of violence, as our ancestors did. Our societies are the most affluent in the history of humanity. The average life expectancy in the world today is the highest it's ever been. True, there are still many places on this planet where the majority of people are desperately poor and where civil wars continue to rage. But even such utopias of gentleness as Denmark are not exactly freakish aberrations.

Here's how I think these peaceful, stable societies came about. As war created large states, empires, and nation-states, societies evolved measures to suppress internal conflict and violence. Reduced internal violence is the obverse of increased cooperation. Surprising as it may seem, the trend towards greater peace was already noticeable during the Ancient and Medieval historical eras, long before the Enlightenment of the 18th century. Of course, wars between empires dwarfed intertribal conflicts in scale. Huge armies fought increasingly bloody battles, and the numbers of casualties mounted. But the key point is that these wars moved away from imperial centers, towards the frontiers. More and more people—those living far from frontiers where battles were fought—never experienced conflict, and could enjoy relative prosperity.

There is no contradiction between larger armies and larger butcher's bills from warfare, on the one hand, and on the other, a greater part of the population enjoying peace. What is important from the point of view of quality of life is not how many people, in total, are killed, but what the chances are that I (or you, or someone you care about) will be killed. In other words, the important statistic is the risk of violent death for each person. To illustrate this point, there were 49 homicides in Denmark in 2012 (population: 5.6 million), so the chance of any particular Dane being murdered that year was less than one in 100,000. But in a typical small-scale society, with a population of, say, 1,000, 49 homicides would translate into one chance in 20 of being murdered.

As a concrete historical example, consider how the chances of a common Roman citizen being killed in war changed during the course of the Roman Empire. During the Republic all male citizens over 18 years of age had to serve in the army. Rome fought wars almost continuously, and a high percentage of citizens, perhaps 5–10 percent, did not return home. In one particularly bad conflict, the Second Punic War, a series of devastating defeats wiped out close to a third of Roman men.

Three hundred years later, by contrast, the Roman Empire had pushed its borders far away from Italy. Under the reigns of the "Five Good Emperors" there were no civil wars, and the barbarians were kept on their side of the frontier. Only one percent of the population served in the legions, which were stationed on the frontiers. Very few legionnaires came from Italy. In fact, until modern times, Italians were never so free from the threat of violence as during this period. *Pax Romana*, internal peace and order imposed by Rome, really worked—while it lasted.

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Societies can compete in many ways, but until quite recently the main—and the most demanding—way has been war. Just as economic competition eliminates the less efficient businesses, military competition in history eliminated less cooperative societies.

The process is brutal. When a corporation goes belly up, thousands of people may be thrown out of work. An occasional CEO may jump to his death from the 30th floor of the corporate headquarters. Destructive creation in the economic sphere has significant costs. But warfare generates incomparably more human misery. Once the bodies are buried and the wounded taken care of, the defeated society must face consequences ranging from paying reparation or tribute to losing political independence and cultural identity. At the worst end of the spectrum, it might succumb to wholesale genocide.

Nevertheless, this brutal, murderous force can also be creative. By eliminating poorly coordinated, uncooperative, and dysfunctional states it creates more cooperative, more peaceful, and more affluent ones. Indeed, as I shall argue below, it even creates *more just* societies.

Here's how war serves to weed out societies that "go bad." When discipline, imposed by the need to survive conflict, gets relaxed, societies lose their ability to cooperate. A reactionary catchphrase of the 1970s used to go, "what this generation needs is a war," a deplorable sentiment but one that in terms of cultural evolution might sometimes have a germ of cold logic. At any rate, there is a pattern that we see recurring throughout history, when a successful empire expands its borders so far that it becomes the biggest kid on the block. When survival is no longer at stake, selfish elites and other special interest groups capture the political agenda. The spirit that "we are all in the same boat" disappears and is replaced by a "winner take all" mentality. As the elites enrich themselves, the rest of the population is increasingly impoverished. Rampant inequality of wealth further corrodes cooperation. Beyond a certain point a formerly great empire becomes so dysfunctional that smaller, more cohesive neighbors begin tearing it apart. Eventually the capacity for cooperation declines to such a low level that barbarians can strike at the very heart of the empire without encountering significant resistance. But barbarians at the gate are not the real cause of imperial collapse. They are a consequence of the failure to sustain social cooperation. As the British historian Arnold Toynbee said, great civilizations are not murdered—they die by suicide.

The idea that moral decay might be the chief cause of imperial collapse is an old one. It is prominent in the writings of the Greek historian Polybius (died c. 118 BCE), the great Arabic philosopher Ibn Khaldun (14th century CE), and, more recently, Edward Gibbon and Oswald Spengler. The problem with most such explanations is that they don't really explain why "moral decay" sets in, nor how it is reversed. Why did China rejuvenate itself on multiple occasions following dynastic collapse? Unlike biological organisms, societies do not grow up and do not grow senile. There is no natural life-cycle for an empire.

In my book, *War and Peace and War,* I build a detailed sociological explanation of "imperiopathosis," one which does not invoke mystical forces or misleading biological analogies.[42] The most important point for my argument here is that cooperation at the level of the whole society, especially a large one, is inherently fragile. It can unravel rather easily, unless this tendency is counteracted by forces of destructive creation.

The idea of war as a force of destructive creation is also not new. In its most refined form it is present in Hinduism as one of the central strands in the myth of Shiva. In some traditions, this Hindu deity is purely a god of war and destruction—Shiva the Destroyer as opposed to Brahma the Creator and Vishnu the Preserver. In others, he is both the destroyer and the creator. The creative aspect of Shiva was explained by the Swiss historian Jacob Burhardt:

> Not without cause do the Indians worship Shiva, the God of destruction. Filled with the joy of destruction, wars clear the air like thunderstorms, they steel the nerves and restore the heroic virtues, upon which states were originally founded, in place of indolence, double-dealing and cowardice.[43]

Or, more poetically, by Rabindranath Tagore:

> From the heart of all matter
> Comes the anguished cry –
> "Wake, wake, great Siva,
> Our body grows weary
> Of its law-fixed path,
> Give us new form.
> Sing our destruction,
> That we gain new life . . ."[44]

In fact, the intellectual roots of "creative destruction," as it is used in evolutionary economics today, can be traced to ancient Indian philosophy by way of Friedrich Nietzsche's *Thus Spoke Zarathustra*.[45]

The central idea of this book is that it was competition between groups, usually taking the form of warfare, that transformed humanity from small-scale foraging bands and farming villages into huge societies with elaborate governance institutions and complex and highly productive economic life. The road from villages to nation-states was by no means straight. Along the way there were twists and turns, and the changing nature of competition and conflict helps us understand why. These are, of course, the bare bones of the argument. Putting flesh on those bones is the task for the rest of the book.

But let's start with something basic. Why *is* ultrasociality so rare? What is it that makes cooperation difficult in the first place?

Chapter 3
The Cooperator’s Dilemma

Selfish genes, ‘greed is good,’ and the Enron fiasco

By all accounts (including his own) Jeff Skilling is a very clever guy, even brilliant. “I am fucking smart,” he told an admissions officer at Harvard Business School.[46] An executive at Enron, who worked closely with Skilling for five years, called him “the smartest son of a bitch I’ve ever met.”[47]

The son of a sales manager for an Illinois valve company, Skilling studied at Southern Methodist University in Dallas on a full scholarship. In 1979 he earned an MBA from Harvard Business School, graduating in the top five percent of his class. He went to work for the management consultants McKinsey & Company, where he became one of the youngest partners in the firm’s history. He joined the Enron Corporation in 1990 and was promoted to president and chief financial officer in 1997, becoming CEO in 2001.

The rest of the story is well known. When Enron went under in December 2001, its shareholders lost tens of billions of dollars and many of its 20,000 employees lost their life savings. Its top executives ended up in prison. Currently (as of 2015) Skilling is serving his sentence in the Federal Prison Camp in Montgomery, Alabama.

Although it was Kenneth Lay who formed Enron in 1985 and led the company as CEO for most of its history, Skilling was "Enron's chief visionary, head cheerleader, and internal compass," a former Enron trader told *Businessweek*. Other Enron executives, including Lay and the chief financial officer Andrew Fastow, bear much of the responsibility for Enron's failure (and paid for it with hefty prison terms). But it was Skilling's vision and management philosophy that turned what could have been a simple bankruptcy into an epic of corporate greed, fraud, and corruption. According to the *Businessweek* interview, "there was never any question who was in charge. It was Jeff."[48]

Every year Skilling recruited hundreds of new MBAs from the best business schools, and then fired those whose performance ranked in the lowest 10 percent. Top performers, on the other hand, were lavishly rewarded. Naturally, the biggest rewards went to Skilling and others in the top management layers—in the year before Enron's collapse, Skilling earned $132 million.

Officially, the system that Skilling imposed on Enron was known as the PRC, or Performance Review Committee. But the employees called it "Rank and Yank." "Despite the widespread hatred of the system inside Enron's headquarters," writes Robert Bryce in *Pipe Dreams*:

> Skilling thought it was great. He told one reporter, "The performance evaluation was the most important thing for forging a new strategy and culture at Enron—it is the glue that holds the company together."
>
> Skilling couldn't have been more wrong. The PRC wasn't glue. It was poison.[49]

Enron "was as competitive internally as it was externally." Traders who needed to go to the bathroom shut down and locked their computers because they were afraid that a colleague (in other words, a competitor) sitting at the next desk, would steal their ideas. "If I'm going to my boss's office to talk about compensation, and if I step on some guy's throat and that doubles it, then I'll stomp on that guy's throat," said one former employee.[50] Why should it be surprising that such an atmosphere of cut-throat competition bred unethical behavior and financial impropriety—or, in plain English, cheating and fraud?

Eventually the rot spread beyond Enron. One casualty was the accounting firm of Arthur Andersen, whose reputation never recovered after it was convicted of colluding in Enron's dishonest accounting practises, even though that verdict was later overturned by the US Supreme Court. When Enron got in trouble, its reputation for ruthlessness and dishonesty came back to haunt it. One investment banker, interviewed by *Businessweek*, called it "the sort of organization about which people said, 'Screw them. We don't really owe them anything'."[51]

Obviously, Skilling never intended to achieve the Fall of Enron. Certainly, he did not plan on serving a 24-year sentence (subsequently reduced to 14 years) in a federal prison. Yet that was precisely what happened, and in large degree as a result of the managerial system that he instituted at Enron.

It is cooperation that underlies the ability of human groups and whole societies to achieve their shared goals. This is true for all kinds of groups, for economic organizations, firms and corporations, as well as for political organizations, such as states. But what Skilling did at Enron was to foster within-group competition, which bred mutual distrust and back-stabbing (if not throat-stomping). In other words, Skilling completely destroyed any willingness among his employees to cooperate—not with each other, not with their bosses, not with the company itself. And after that, collapse was inevitable.

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I don't want to beat up on Jeff Skilling too much. He is not a particularly pleasant character, but he is at least paying his dues in prison. What's more important is that he is not unique. The failure of Enron is not an isolated case. In many ways Skilling's philosophy reflects the changing cultural mood in America, with the roots of the change going back to the 1970s.

Although the system that Skilling set up at Enron was an extreme example, it's worth remembering that this Rank-and-Yank scheme has become general practice at American companies, including such behemoths as Microsoft and General Electric (where it was pioneered by Jack Welch). According to a 2012 estimate, 60 percent of Fortune 500 firms use what is essentially the Rank-and-Yank system (although giving it more politically correct names).[52] The Fall of Enron was not a fluke. It was just one (and not even the most costly) in a series of corporate scandals that proliferated in the opening decade of the 21st century. One wonders, in how many other companies has internal cooperation been undermined to the point where they are about to become new Enrons?

In the late 1970s and early 1980s the social mood in the United States underwent a dramatic change. Here's how the United Auto Workers president Douglas Fraser described this cultural shift in his famous resignation letter to the Labor-Management Group:

> I believe leaders of the business community, with few exceptions, have chosen to wage a one-sided class war today in this country—a war against working people, the unemployed, the poor, the minorities, the very young and the very old, and even many in the middle class of our society. The leaders of industry, commerce and finance in the United States have broken and discarded the fragile, unwritten compact previously existing during a past period of growth and progress.[53]

What's remarkable about this letter is that it was written in 1978, within a year or two of the point to which we can trace a number of new long-term trends in United States, including rising political polarization and income inequality.[54]

The political scientist Robert Putnam thinks this shift was due to the passing of the "long civic generation"—Americans who came of age during the Depression and World War II. During the three decades that followed the New Deal, Americans were much more deeply engaged in civic life than today. The long civic generation also possessed an abundance of what Putnam calls social capital, "features of social life—networks, norms, and trust—that enable participants to act together more effectively to pursue shared objectives."[55] In other words, they were uniquely cooperative.

The same spirit of cooperation pervaded not only the lives of common Americans; it was shared by the political and business elites. As the journalist Bill Bishop wrote recently, during the 1950s and 1960s "the American ideal was to get along. The national goal was moderation and consensus. . . . In Congress, members visited, talked across party boundaries. They hung out at the gym, socialized at receptions, and formed friendships that had nothing to do with party and ideology."[56] In the economic sphere, relations between employers and employees were harmonious (by today's standards, anyway). Most businessmen did not object to strong unions and collective bargaining. Post-war America was by no means a socialist country—a typical CEO earned 40 times as much as an average worker in his company. But today CEOs earn 500 times as much.

Then, in the years around 1980, something happened. Ideologies of extreme individualism, such as the Objectivism of Ayn Rand, emerged from obscurity and began gaining adherents among businessmen and politicians. But as the historian Kim Phillips-Fein records in *Invisible Hands: The Businessmen's Crusade against the New Deal* (2009), this ideological shift was not entirely spontaneous. It was helped along by a well-funded campaign to promote the economic ideas of Friedrich von Hayek and Ludwig von Mises, fierce proponents of unfettered free markets who feared the corrupting influence of the "nanny state."

In the political arena the new social mood manifested itself in the presidency of Ronald Reagan in 1980. Margaret Thatcher, who became prime minister of the United Kingdom in 1979, reflected a similar cultural shift there. Thatcher neatly encapsulated the emerging consensus in her famous remark: "There is no such thing as society—there are individual men and women, and there are families."

The resurrected prophet of individualism Ayn Rand, on the other hand, did not deny the existence of society, but she was impatient to do away with it: "Civilization is the progress toward a society of privacy. The savage's whole existence is public, ruled by the laws of his tribe. Civilization is the process of setting man free from men."[57]

As often happens, the new spirit of the times was best captured in the words of fictitious Gordon Gekko (played by Michael Douglas in the 1987

Oliver Stone movie *Wall Street*). In a speech to Teldar Paper stockholders, Gekko says:

> America has become a second-rate power. Its trade deficit and its fiscal deficit are at nightmare proportions. Now, in the days of the free market, when our country was a top industrial power, there was accountability to the stockholder. . . .
>
> The new law of evolution in corporate America seems to be survival of the unfittest. Well, in my book you either do it right or you get eliminated. . . .
>
> The point is, ladies and gentlemen, that greed—for lack of a better word—is good.
>
> Greed is right.
>
> Greed works.
>
> Greed clarifies, cuts through, and captures the essence of the evolutionary spirit.
>
> Greed, in all of its forms—greed for life, for money, for love, knowledge—has marked the upward surge of mankind.
>
> And greed—you mark my words—will not only save Teldar Paper but that other malfunctioning corporation called the USA.[58]

In the popular press, which loves soundbites, this speech is often shortened to just “Greed is good.” But Gekko says much more than he is usually given credit for. He lays out his business philosophy and explains why greed is good. And he is very persuasive!

He is also very wrong. In 1987, when the movie was made, the cultural shift from cooperation to extreme individualism and competition was too new for its consequences to be seen clearly. Jeff Skilling had not even started working for Enron. Gordon Gekko's character was based on such insider trading figures as Michael Milken and Ivan Boesky. But the scale of fraud and losses due to the scandals of the 1980s pales into insignificance when compared with the massive corruption of the early 2000s.

Lay and Skilling of Enron were followed in rapid succession by Bernard Ebbers of WorldCom and Dennis Kozlowski of Tyco. Then came Bernie Madoff and the Lehmann Brothers. And immediately on *their* heels came probably the greatest case of corporate hubris and fraud—the Global Financial Crisis of 2007–8.

So Gekko was wrong. Not only did greed not save the fictitious Teldar Paper, it also destroyed the all-too-real Enron, WorldCom, Tyco, and Lehmann Brothers. And these companies were neither small nor insignificant. On the contrary, before they went down, they were in the ranks of the most influential American corporations. *Fortune* magazine named Enron "America's Most Innovative Company" for six years in a row. In 2007, just a year before its bankruptcy, Lehman Brothers was ranked #1 "Most Admired Securities Firm," by the same magazine. It looks like *Fortune* doesn't learn from its mistakes.

In *Wealth and Democracy,* the political commentator Kevin Phillips uses examples and statistics to show that the last time we had similarly large numbers of corporate scandals was in the Gilded Age (the last three decades of the 19th century)—precisely when the flawed doctrine of Social

Darwinism was most popular among the American elites. By contrast, during the period from the New Deal to the Great Society (that is, the 1930s–1960s), when a more cooperative social mood reigned, corporate scandals were rare to nonexistent.[59]

We can trace the rise and fall of cooperation using "culture-metric" methods pioneered by Google, which has digitized huge numbers of books published in English (and several other languages, but my primary interest is in the books published in the USA). These data show that the frequency of the word "cooperation" in American books grew rapidly after 1900, during the Progressive Era and the New Deal. By 1940 books talked about cooperation five times more often than books published in 1900. Cooperation continued to be an important topic until 1975, but went into a decline during the 1980s. A randomly chosen book published in 2015 is half as likely to use the word as one published in the 1970s.

This is not simply a vogue for one word. For example, "labor-business cooperation" goes on exactly the same trajectory. On the other hand, the dynamics of "corporate greed" are precisely inverse: rising when "labor-business cooperation" declines, declining when "labor-business cooperation" rises. Books published in 2015 are five times as likely to talk about "corporate greed" as books published in the 1970s![60]

The decline of interest in cooperation also coincides with the spread of the new gospel of greed, so articulately preached by Gordon Gekko. It coincides with a surge in the sales of Ayn Rand's books, such as *The Fountainhead* and *Atlas Shrugged*, which promoted her gospel of individualism and selfishness. When so many indicators trend the same way, they suggest something important about the underlying reality.

Note also that Gekko ends his speech by comparing America to a malfunctioning corporation, and by suggesting that greed ("for lack of a better word") is going to fix it. In fact, the opposite happened. Even supposing the United States was a malfunctioning corporation in the 1980s (and I would take issue with that), by 2015 it had become a dysfunctional one.

Several kinds of statistics support this gloomy assessment. One is the extreme degree of political polarization that has divided Congress and public opinion. Using a quantitative procedure, the political scientists Nolan McCarty, Keith Poole, and Howard Rosenthal show that polarization in Congress started growing during the 1970s, and by 2015 had exceeded the previous peak during the Gilded Age. Other measures, such as the proportion of bills in the Senate that are threatened with filibuster, or the confirmation rates for judicial nominations, were trending in ways that similarly suggested an increasing inability to compromise, resulting in government dysfunction.

The fiscal impasse and government shutdown we went through in October 2013 revealed that our political elites were fragmented, and losing their ability to work together for a common solution. In other words, their ability to cooperate had been unraveling. While the default on sovereign obligations was averted at the 11th hour, the structural problems that brought about the budget crisis remain in place.

The 30 years in America since about 1985 were a giant social experiment. What would happen if ideologies extolling extreme individualism and elevating self-interest as the sole basis on which to organize society were to gain the upper hand? The results are in: a decline of social cooperation at all levels of American society, resulting in a decreased ability to get the job done.

Not every ill affecting a society can be traced to its members losing their ability to cooperate. Still, cooperation is very important. Complex human societies, including our own, are fragile. They are held together by an invisible web of mutual trust and social cooperation. This web can fray easily, resulting in growing social dysfunction. When cooperation is lost, a typical result is a wave of political instability and internal conflict and, in extreme cases, outright social collapse. In *Secular Cycles* (2009), the Russian historian Sergey Nefedov and I have examined in detail eight such waves of instability, brought on by the loss of cooperation: the civil wars of the late Roman Republic and the collapse of Roman Empire, the Hundred Years War and the War of the Roses in medieval England and France, the French War of Religion, the English Civil War, the Time of Troubles in Russia, and the Russian Revolution and Civil War that ended the Romanov dynasty. In each case, we found that unraveling cooperation was a lead indicator of social collapse.

Thankfully, America is not at that point yet. But it is very important to understand what makes societies competent and effective, and how they become dysfunctional. Evolutionary theory does in fact provide the answers, but answers very different from those put forward by the Jeff Skillings and Gordon Gekkos of the world.

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As far as I know, Skilling never gave a speech that laid out his thinking as clearly and eloquently as Gordon Gekko does. Let’s turn, then, to the play ENRON, in which the playwright Lucy Prebble uses artistic license to imagine how Skilling might explain his management philosophy. Here's a dialogue between Skilling and Andrew Fastow (Enron's CFO):

> **Skilling** You ever read those business books, *How to Win Friends and . . . The Seven Secrets of Highly Effective People* and stuff like that –
> **Fastow** Yeah, I –
> **Skilling** Don't. It's bullshit. Read Dawkins, *The Selfish Gene*?
> **Fastow** I don't know it –
> **Skilling** Guy named Richard Dawkins. Read Darwin.
> **Fastow** Am I getting fired, Jeff?
> **Skilling** By rights you should be out. I got this company running on Darwinian principles.
> **Fastow** Please don't fire me!
> **Skilling** Charles Darwin showed how an idea can change the world. Now we understand our own nature. And we can use that.
> **Fastow** Use for what?
> **Skilling** For business. Business *is* nature.
> **Fastow** Like self-interest and competition?
> **Skilling** Exactly. Money and sex motivate people, Andy. And money's the one that gets their hands off their dick and into work.

What I am interested in is that the fictitious Skilling bases his philosophy on "Darwinian principles" and *The Selfish Gene*, the favorite book of the real Skilling.[61] *The Selfish Gene* is an important and influential book, but it is also deeply flawed. And it's this flaw that explains why it could become the basis of pathological social philosophies for people like Jeff Skilling (and Gordon Gecko, although Oliver Stone doesn't tell us whether Gecko read Dawkins). As it happens, the book came out in 1976, just in time to contribute to the rising tide of extreme individualism.

Now, I am not saying that Richard Dawkins should be held responsible for the Enron Scandal. In *The God Delusion*, Dawkins wrote: "I was mortified to read in the *Guardian* ('Animal Instincts,' 27 May 2006) that *The Selfish Gene* is the favourite book of Jeff Skilling, CEO of the infamous Enron Corporation, and that he derived inspiration of a Social Darwinist character from it." Dawkins claims that his book was misunderstood. But was it?

Let's start with what Dawkins gets right. When *The Selfish Gene* was published in 1976, our theoretical understanding of the evolution of cooperation was in a very confused state. It was clear to all that a number of species, most notably ants, bees, termites, and human beings, were capable of cooperating in very large groups. The benefits of cooperation are obvious. Social insects such as ants and termites have been spectacularly successful. Ed Wilson, the evolutionary biologist and ant lover whom we met in Chapter 1, points out that ants, just one group of social insects, account for one-quarter of all terrestrial animal matter. Humans, similarly, are the most successful species among mammals, having spread to all the continents, including outposts on Antarctica, and now reaching into space. We may become the first species to spread beyond the limits of the Earth and colonize other planets.

By the mid-20th century, the benefits of cooperation were so obvious to biologists that its evolution hardly needed explaining. As Charles Darwin, the father of evolutionary biology, wrote in 1871, more cooperative groups of organisms outcompete less cooperative ones. As a result, cooperative genes should spread through the population. The English zoologist V. C. Wynne-Edwards and the Austrian ethologist Konrad Lorenz (ethology is the study of animal behavior) expanded this logic even further. They argued that animals acquired altruistic traits because such traits favored the survival of their species. Let's call this idea *naïve group selectionism*.

What's wrong with it?

The problem is that cooperation doesn't only bring benefits. It also has significant costs. Although the benefits of cooperation are shared equally among all members of the group, the costs are borne privately by each cooperator. The tension between "public goods—private costs" results in what is sometimes known as the Cooperator's Dilemma.

Suppose you belong to a tribe that is peacefully minding its own affairs, cultivating crops, herding animals, raising children, and generally enjoying life. Everything would be good, but you have scary neighbors. Across the river there is a tribe of warlike people who enjoy nothing more than attacking others, killing, looting, and destroying. They think it's much more fun than tending the crops. There is no higher authority to stop them from preying on you—no state, no police, no courts.

One day the warriors from the warlike tribe cross the river and advance on your village. What you need to do is gather the tribe and repel the invaders. Everybody should participate, because the larger the troop that you assemble, the better your chances of defeating the aggressors. The benefits of putting together a successful defense are obvious and huge. It is literally the difference between life and death. Think of the fate of the Crow Creek villagers and innumerable other wholesale massacres in prehistory.

The problem is, even if your side wins and the enemies are killed or chased away, some of your people will be killed or maimed. That is the nature of war. Worse still: you may become a casualty yourself.

However, if nobody shrinks from fighting, the chances that you personally will survive are improved. Your tribe knows the territory better than the invaders, and defense is always easier than offense. And the alternative to fighting is the slaughter of the whole village. So if you are one of those smart people whose behavior, as Jeff Skilling supposed, is motivated solely by fear and greed, you will weigh the risks you face in combat against the certainty of death in a general massacre, and you will decide to fight in the front rank. Right?

Wrong. Social theorists have a name for smart people motivated solely by greed and fear—"rational agents." It turns out that a group consisting entirely of rational agents is incapable of cooperation. In particular, such people will never manage to put together a fighting troop. This result has been proved mathematically, using an impressive array of abstract models, but it's easy enough to explain in plain English.

Let's suppose that your tribe can field 1,000 fighters, enough to repel the invasion, but at the cost of 50 fighters killed or seriously wounded. Whether you join this war band or not is not going to have any significant impact on the course of the battle. One thousand warriors or 999, it doesn't matter: the outcome will be the same. Other factors—terrain, weather, the element of surprise, and simple luck—will have a much greater effect than a single absent fighter. In fact, a few are going to be too sick to fight, anyway. So you can pretend to be sick and stay home.

This is what you will do if you are a rational agent. The final outcome for all is going to be the same, whether you join them or not, but you calculate your chances of serious injury or death at one in twenty (dividing 50 casualties by 1,000 fighters). In other words, the personal consequences for you can be very significant. So a rational agent will make this calculation and "defect," both literally (from the war band) and figuratively (in the jargon of collective action theorists, "defect" means failing to contribute to a cooperative enterprise). Or you might pretend to join, but then hang back when the action heats up and retreat at the first sign of danger.

The logic governing the actions of a rational agent was captured perfectly by Joseph Heller in his 1961 novel *Catch-22*. The main character in the novel, Yossarian, tells his commanding officer, Major Major, that he refuses to participate in the war:

> "I don't want to be in the war any more."
>
> "Would you like to see our country lose?" Major Major asked.
>
> "We won't lose. We've got more men, more money and more material. There are ten million men in uniform who could replace me. Some people are getting killed and a lot more are making money and having fun. Let somebody else get killed."
>
> "But suppose everybody on our side felt that way."
>
> "Then I'd certainly be a damned fool to feel any other way. Wouldn't I?"

Yosarrian's logic is unassailable. When there are ten million men in uniform, it doesn't matter whether Yossarian is among them or not. His participation will not change the outcome of the war one whit. But he, Yossarian, runs a very significant chance of getting killed, and that matters to him a lot.

Also note the last point Yossarian makes. If all others defected, Yossarian would "certainly be a damned fool" to continue fighting. Just imagine that everybody else in your tribe is running for cover—what will happen if you, by your lone self, bravely go out to meet the invading army? You will get killed, and for no good reason.

In fact, *no matter what others do, a rational agent's best course of action is always to defect*. In a tribe of rational agents, all will feel this way, and therefore none will go out to meet the enemy. They'll all pretend to be sick—until they are dragged out of bed and killed by their enemies.

That is what the Cooperator's Dilemma is all about. It would be better for all if everybody contributed to the common good, but it is to each individual's advantage to shift the burden to others. If all follow this logic, no collective goods are produced and everybody is worse off. The dilemma strikes not just in matters of war and peace, but in many other spheres of public life: providing good governance, creating public infrastructure (such as roads), funding research in science and technology, keeping air and water clean, and so on.

In fact, cooperation is not just one of many things that societies do, it's the main thing they do. Production of public goods is what distinguishes a true society from a mere collection of individuals.

Note that sometimes producing a general benefit can be costless. To give an example, consider the rule of driving on the right side of the road. When automobiles were first introduced, there were a lot of collisions because drivers had to decide quickly on which side they would pass the oncoming car. When both went left, or right, everything was fine. But if one driver decided to go left and the other right, a collision would result. So the society set the rule: you shall drive on the right side of the road. This had the immediate result of reducing collision (a general benefit). And it's costless—unless you happen to want to commit suicide, there is no temptation to break the rule.

Collective action theorists sometimes call such cases of costless cooperation a "coordination problem." It doesn't matter whether the choice is right or left (the British drive on the left, with generally adequate results). We should all coordinate on one or the other, and everybody is better off.

Most cooperation problems, however, are not costless. Let's call them "cooperation in the strong sense" to distinguish them from the costless minority. Public goods usually cost something to somebody. Cooperation requires some sacrifice, ranging from the violent deaths faced by soldiers and peace-keepers, to less extreme deprivations of money, work, and time.

A clear understanding of the Cooperator's Dilemma emerged only during the 1960s. Interestingly, it happened simultaneously in several fields of science at once: in economics, in political science, and in evolutionary biology. One important contribution was the 1965 book by the economist Mancur Olson, *The Logic of Collective Action: Public Goods and the Theory of Groups*. Economists now have a very precise definition of a "public good." The most important characteristic is that nobody can be excluded from enjoying it. Think about my war example: if your tribe's warriors succeed in repelling the enemy, everybody in the village benefits—both those who fought, and those who didn't. It's the tension between the public nature of the benefits and the private nature of the costs that defines cooperation in the strong sense.

Another example of a "non-excludable" public good is broadcast radio and television. Public radio has a further interesting property: it's in essentially infinite supply. Anybody with a radio can tune in, and no matter how many other people catch the signal, the individual's ability to listen is in no way compromised. In this respect, radio is an unusual good.

Many natural resources, such as fisheries, forests, clean water, and clean air, are exploited in common, but they are terribly finite. In a seminal contribution published in 1968, the human ecologist Garriet Hardin explained why the exploitation of such resources is vulnerable to "the Tragedy of the Commons." Consider clean air, a common resource that people used to take for granted. An entrepreneur builds a factory, an iron smelter that spews carbon dioxide along with sulfur dioxide and other toxic pollutants into the atmosphere. The decline in air quality is so slight that it is essentially unnoticeable, and it is shared among all. It is certainly rational (in the narrow sense of economic rationality) for the entrepreneur to build the factory—her payoff is the fortune she makes, at the cost of the tiny decrease in the quality of the air she breathes.

But then another factory is built . . . and another. Eventually, the capacity of the biosphere to assimilate pollution and decontaminate itself is overwhelmed. People sicken, plants wilt under acid rain. Temperature rises, ice shields on Greenland and Antarctica melt, and rising oceans drown the coastal cities. The result of a rational pursuit of profit is that everybody is worse off. The Tragedy of the Commons is thus another kind of cooperation failure, resulting from the tension between its public benefits and private costs.

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These two examples—defending your village against the enemy and keeping the air clean—show that if you want to understand cooperation, you cannot simply point to its undoubted benefits. You also need to explain how people can solve the Cooperator's Dilemma. This is the mistake made by the adherents of naïve group selection in biology.

Their key error was pointed out by the evolutionary biologist George C. Williams. In his 1966 book, *Adaptation and Natural Selection: A Critique of Some Current Evolutionary Thought*, Williams demolished the logical foundations of naïve group selectionism. Williams' book was highly influential in swinging the academic field of evolutionary biology against group selection, but it didn't make much of an impact in the wider community. That is, not until 1976, when Dawkins translated Williams' ideas into engaging and vivid prose. And thus *The Selfish Gene* was born.

What Williams and Dawkins pointed out was that genes are, in a sense, rational agents. Genes, of course, don't calculate costs and benefits of the traits they code for. This is done instead by the evolutionary process itself—natural selection. Individuals with altruistic genes sacrifice "fitness" (remember that cooperation in the strong sense requires some kind of sacrifice). Such altruistic genes are less likely to survive and reproduce themselves than genes that cause individuals to behave selfishly.

As an example, imagine a "nun gene," one that makes its carrier devote her life to helping others at the expense of having her own babies. Any such gene that arises through mutation will be eliminated by evolution in one generation—because its carrier passes it to no offspring.

More sophisticated versions of a nun gene, however, are possible. In some animal species, certain individuals devote themselves to helping raise the offspring of their parents or sisters, and do not have babies themselves (or wait until later to reproduce). However, such helping behaviors are invariably directed at close genetic relatives.

The most extreme version of helping is found in social insects. In beehives, for example, only one female, the queen, produces offspring. The other females are all her daughters and—apart from the few bred to start their own colonies come swarming time—sexless workers, devoted to selflessly caring for the queen, raising her children, gathering food, and defending the colony from predators. How do such altruistic behaviors square with the selfish gene theory?

The key insight, developed by the theoretical biologist William D. Hamilton, was that these helping behaviors are directed at close genetic relatives, which are themselves likely to carry a copy of the "altruistic gene." The altruistic gene doesn't help just any randomly chosen individual. In a sense, it helps copies of itself in a different individual. Generally speaking, full siblings share 50 percent of their genes, so if I can help more than two of my sisters, even at the expense of sacrificing myself, then, on average, such behavior will be favored by natural selection. Hence the famous quip by the evolutionary biologist J. B. S. Haldane. When asked whether he would give his life to save a drowning brother, he replied: "No, but I would to save two brothers or eight cousins." Unlike brothers, who share one-half of their genes with each other, cousins share only one-eighth, so it would take at least eight of them to break even. Seeing only seven cousins drowning, you should do nothing.

Perhaps this all sounds a bit silly. Nevertheless, the basic insight of the kin selection theory is quite valid. Explaining extensive cooperation in social insect colonies, such as ants, bees, and termites, was one of the triumphs of the "gene-centric view" of evolution advocated by Williams and Dawkins. (It's called "gene-centric" because we track not individuals, but copies of a gene scattered among many related individuals.)

However, kin-selection theory does not explain cooperation in groups of *genetically unrelated* people. The gene-centric view does not help us understand why a soldier would fall on a grenade to save his buddies at the expense of his own life. And it doesn't help us to understand how huge, cooperative human societies evolved. *The Selfish Gene* is, in many ways, a brilliant book. Yet it fails utterly to explain one thing: the evolution of cooperation in human beings.

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Having successfully demolished the naïve group selectionists, gene-centric theorists found themselves at a loss to explain such obvious features of human social life as morality, sympathy, and generosity. Richard Dawkins wrote:

> Be warned that if you wish, as I do, to build a society in which individuals cooperate generously and unselfishly towards a common good, you can expect little help from biological nature. Let us try to teach generosity and altruism, because we are born selfish.[62]

To George C. Williams, morality is "an accidental capability produced, in its boundless stupidity, by a biological process that is normally opposed to the expression of such a capability."[63] At the turn of the previous century, Herbert Spencer advanced much the same view, thus contributing to the rise of Social Darwinism—which, as we have noted, coincided with the previous era of massive corporate malfeasance.

Thirty-two years after *The Selfish Gene*, Dawkins returned to the question of evolution and morality in *The God Delusion*.[64] He remains a fervent foe of group selection and continues to think that the two main engines of social evolution are kin selection and reciprocal altruism. To these "good Darwinian reasons for individuals to be altruistic, generous or 'moral' towards each other" (the quotes around "moral" are his) he adds two secondary ones. The first is "the Darwinian benefit of acquiring a reputation for generosity and kindness." The other is the "additional benefit of conspicuous generosity as a way of buying unfakeably authentic advertising."[65] And he continues to insist on what he now calls the "mistake" or "by-product" theory of morality. Here's how it is supposed to work:

> In ancestral times, we had the opportunity to be altruistic only towards close kin and potential reciprocators. Nowadays that restriction is no longer there, but the rule of thumb persists. Why would it not? It is just like sexual desire. We can no more help ourselves feeling pity when we see a weeping unfortunate (who is unrelated and unable to reciprocate) than we can help ourselves feeling lust for a member of the opposite sex (who may be infertile or otherwise unable to reproduce). Both are misfirings, Darwinian mistakes: blessed, precious mistakes.[66]

In other words, all the complex, intricate arrangements our ultrasocieties employ to sustain cooperation, maintain internal peace and suppress crime, organize efficient production and delivery of all kinds of goods, and achieve spectacular feats, such as lifting the International Space Station into the Earth's orbit—all of that is simply a "by-product" of natural selection in ancestral times, when we lived in small groups of relatives and friends.

The idea that modern, complex societies are a by-product of evolution during the Pleistocene is as far-fetched as the proposition that our remarkably efficient, intricately constructed bodies are by-products of natural selection acting on our distant ancestors, single-cell organisms, three billion years ago. (For all its own efficiency and integration, the "body politic" has a lot to learn about complex systems from the human body—itself far from perfect: I do wish evolution had taken a moment to design a better knee!)

Just think how intricately different institutions of the modern nation-state interlock. In the United States there are elaborate arrangements to ensure that the executive, legislative, and judicial branches of the government work well together (yes, there is friction and conflict between the branches; still, this Republic has so far managed to muddle along). The press is also embedded in the governance networks to the point that it is sometimes called the fourth branch of government. A system of formal laws and informal social norms ensures that the military doesn't seize power and establish a dictatorship. All these institutions are evolutionary innovations of the past two or three centuries. Small-scale societies have nothing like this. In fact, a person magically transported from any Pleistocene society would find the idea of chains of command and executive orders unnatural and repugnant.

As the evolutionary biologist David Sloan Wilson explains in *Does Altruism Exist?*, "group-level functional organization evolves primarily by natural selection between groups." Modern nation-states are a product of the thousands of years of cultural evolution resulting from intense competition between the states. This is why they are reasonably functional. On the other hand, when kin selection and reciprocal altruism enter into the equation, they tend to undermine ultrasociality. We know them as “nepotism” and “cronyism.”

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I am reasonably certain that Richard Dawkins is, and George Williams and Herbert Spencer were, decent human beings, at least to a fair approximation. It is, at any rate, hard to imagine them perpetrating corporate fraud on the massive scale of Jeff Skilling. Nevertheless, their flawed understanding of human nature not only gave them pessimistic views of our capacity for morality, altruism, and cooperation. Worse still, policy prescriptions on how to increase cooperation, trust, and social justice will not achieve the desired results so long as they rest on these views.

The “by-product” theorists ended up saying, yes, the human is a selfish beast, so we have to *will* him to become moral. We should use our superior reasoning powers to foresee the consequences of our actions and choices, and then we should choose the more cooperative and socially desirable outcomes that would increase the wellbeing of all, including ourselves.

But Skilling and Gekko chose a different route. They said in effect, yes, the human is a selfish beast, that’s the way things are. And I, being the smartest guy around, will use this secret knowledge to get very rich! In short, the main idea of *The Selfish Gene* readily lends itself to abuse by the Jeff Skillings of the world. Selfish people are naturally attracted to theories that postulate the essential selfishness of human beings. They find such theories liberating, giving them carte blanche to be selfish and greedy and feel good about it.

But my critique of *The Selfish Gene* and by-product theorists goes beyond the spurious moral justification they inadvertently provide for people who want to revel in greed. “Selfish Genery” is really not a scientific theory, because it makes human morality an accident of evolution. Unlike multilevel selection, it doesn't generate theoretical predictions that we can test empirically.

The by-product theory also offers no practical route to making our societies more altruistic, and increasing social trust and cooperation. The alternative understanding, which I explain in this book, is not only a better theory, both logically consistent and supported by a growing body of data. It is also useful. As we shall see, it tells us how to design policies that increase cooperation among human beings in small groups, whole societies, and at the global level. In fact, it even tells you how to make your sport team win.

Chapter 4
Cooperate to Compete

What team sports teach us about cooperation

The University of Connecticut, where I teach, is famous for its women's basketball team, the Connecticut Huskies. Naturally, my Connecticut friends think the UConn Huskies the best team in the country, and in this case the empirical evidence tends to support their claim. Whenever our team wins the National Championships (five times in the past ten years!) the campus celebrates for days on end.

I have an additional reason to celebrate, because to me, basketball is more than just an exciting spectator sport: it can also teach us a lot about how and why people cooperate.

Human beings are capable of behaving both selfishly and cooperatively. There is a lot of variation between people, with some tending to be more selfish and others more cooperative. The very same person can behave quite differently in different circumstances, going all out for the sake of the common goal in one situation while choosing to free-ride in another. A team sport like basketball or baseball is a particularly good setting in which to compare the different influences pushing people to become more or less cooperative. Teams are ranked by how many goals they score, how many games they win, and how close they get to becoming national champions. There are elaborate statistics on individual performance—batting averages, points, rebounds, assists, and so on. Additionally, in spectator sports, players are "working" before a critical audience who can observe whether they are going all-out or shirking. Sporting stats give us a window onto some deep truths of human nature.

This was the angle used by James McGill Buchanan (a Nobel laureate in economics) in his article *Group Selection and Team Sports*.[67] Consider a basketball player in a situation where she must either shoot for the goal or pass to a team-mate who has a better chance of scoring. Passing the ball increases the chances of the team's winning—the collective good. But it has a personal cost—it reduces her own prospects of a high relative score within the team.

This is a typical example of the dilemmas that people deal with all the time. We all belong to a multitude of different groups—sports teams, voluntary associations, perhaps a church; and, most importantly, our workplaces. We want our group to succeed, but we also care about our own standing within the group and within the society as a whole. It's important to recognize that "competition" can come in several guises. For example, if you work for a firm, your firm competes with other businesses in the marketplace, but at the same time you personally compete with other employees within your firm for salary increases, year-end bonuses, and promotion. In other words, competition can take place on many levels. And so the evolutionary theory that helps us make sense of the whole thing is called "multilevel selection."

Our basketball player is in just such a multilevel situation. Whether she shoots or passes depends on her personal dispositions: is she a team player? Or a "hot dog"? Even more interestingly, her choice may also be affected by her social environment, which is why the same person may choose to be a cooperator in one situation and a free-rider in another.

To show how a player's choices can be shifted in one direction or another, let's look at the situation from the point of view of the team owner, someone who sets rewards for players.[68] If we want the team to win as many games against other teams as possible, then we should tie the rewards to team success. For example, we can pay all players the same amount, without taking into account how many goals individuals score. But everybody's pay goes up when the team wins.

Now our hypothetical player has no incentive to hog the ball, because passing it to a better-situated player increases both the team's chance of winning and her own potential rewards. In other words, when group-level and individual rewards are perfectly aligned, people are much more likely to cooperate.

In the real world, no sports-team owner pays all players the same amount. There are various reasons for this. For one thing, most people do not consider it fair to pay everybody exactly the same. Some team members are more skillful, or work harder, than others, and all agree that it is fair that they should get a larger share. How much larger depends where you are, and there's a surprising amount of variation. In Nordic countries, such as Norway or Denmark, people have a strong preference for egalitarianism, and so high performance gets a lower reward than in the United States. Even such closely-related societies as America and Australia, both of which were founded by settlers from the British Isles, have different cultural norms on this issue. Australians systematically favor more equal outcomes than Americans.

Although societies differ in their tolerance of inequality (especially if it's justified by high performance), there is always a point beyond which unequal division of rewards ceases to seem legitimate. When people feel that they are not getting their fair share, they begin to withdraw their cooperation. In a baseball team in which one player—the superstar—earns 10 times as much as his mates, the other players begin to slack off. As a result, baseball teams with highly unequal payrolls win fewer games than teams in which rewards are distributed more equitably. This is despite the fact that the more unequal teams have extremely strong players.

The effect can be quite pronounced. Frederick Wiseman and Sangit Chatterjee sorted the Major League Baseball teams into four payroll classes, ranging from those with the biggest disparities to those with the smallest. Between 1992 and 2001, teams in the most equal class won an average of eight more games per season than those in the most unequal class.[69] The corrosive effect of inequality on cooperation is not limited to baseball. The same effect was observed when researchers analyzed the performance records of soccer teams in Italy and Japan.[70]

Why do team owners choose such a suboptimal way to motivate their athletes? Well, for one thing, winning games is not the only thing they care about. They also like to make money, and hiring a high-profile player can sell more tickets and team paraphernalia. Nevertheless, pay disparity has such a strong effect on performance that it can negate the drawing power of "stars." In 1996, the Detroit Tigers invested heavily in two superstars, Cecil Fielder and Travis Fryman, who took over 60 percent of the total payroll. Yet the team did very poorly on the field, losing more than two-thirds of its games. Fans stayed away in droves and the Tigers had the second-worst box office of all Major League teams that year.[71]

I think the real explanation is that Americans in general, and wealthy Americans in particular, tend to overestimate the effect of a brilliant individual on team success, and to underestimate the importance of the collective effort. As a result, the performance of most MLB teams could be improved by making the pay within them more equal.

We know this because the quarter of MLB teams that have the most equal distribution of salaries win more games than the next quarter, which is still more level than average, but not as egalitarian as the first quarter. The second quarter wins more games than the third quarter, which in turn does better than the fourth, least equal quarter.[72] In other words, performance of at least three-quarters of Major League Baseball teams could be improved by a more equitable distribution of player rewards!

If the corrosive effect of inequality on cooperation is not understood in team sports, where the importance of seamless coordination and team spirit is crystal clear, it is hardly surprising that we tend to make suboptimal choices in other areas of human enterprise, such as business. For example, there is no evidence that bringing in a hot-shot CEO and paying him a huge salary improves the long-term prospects of a corporation. If anything, the evidence points in the opposite direction. Big companies in Europe and Japan pay their corporate leaders much less and maintain less disparity between the salaries of executives and workers. Such an approach doesn't damage their ability to grow and develop. Yet American corporations continue to overpay their CEOs.

This belief in the brilliant individual, and the corresponding disparagement of team effort, also underpins the Rank-and-Yank system. Imagine a basketball team managed in the same way that Jeff Skilling managed Enron. Skilling would rank all players by the number of goals they scored, pay the best-scoring player most of the money in the salary pool, and fire the one who scored the fewest. It wouldn't matter to him that the "worst" player might actually play a key role in defense, or be the one who makes the most passes for scoring throws. Out she goes.

Skilling, then, would succeed in creating a highly competitive atmosphere within the team. Each player would want to score as many goals as possible. But that would not make a winning team. Suppose you are a player who is currently ranked Number 2. You are in a position to pass to the Number 1 player, who has a much better shot at the goal. However, if you are not stupid, you will try to score yourself, because you need those goals to get to Number 1 yourself. And you certainly don't want the current Number 1 to score yet another goal.

Let's take this further. If you want to become Number 1 (and who doesn't?), why stop at withdrawing cooperation? If the current Number 1 is setting up for a shot and you can jostle her to spoil her chances, you should do it. After all, getting to Number 1 can be accomplished not only by you scoring more goals, but also by your rival scoring fewer. The same logic will percolate down the rankings. The lowest-ranked player will want to trip the next player up so that she can move up and avoid the sack. Higher-ranked players need to keep lower-ranked ones down. Very soon everybody realizes that their worst enemies are not the players on the other team. The real enemy is your neighbour in the huddle.

The importance of cooperation is less obvious in the world of business than it is in team sports. Yet, as we saw in the previous chapter, the internal dynamic at Enron was very much like the one that would develop in a basketball team if Skilling were allowed to manage it. Remember the words of that Enron employee? "If I'm going to my boss's office to talk about compensation, and if I step on some guy's throat and that doubles it, then I'll stomp on that guy's throat." He meant it metaphorically, but on the basketball court, if your team-mate trips and falls to the ground, you might be well served by literally stepping on her throat—accidental-like.

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Dissecting how a sports team works is a great way to study cooperation, because we humans evolved as a team animal. A basic form of teamwork is already found in our closest relative, the chimpanzee, which hunts cooperatively to corner and kill its prey, such as the colobus monkey. But that's nothing compared with early human beings, who perfected coordinated hunting to the point where they could reliably take down dangerous giants such as the aurochs or the mammoth.

Teamwork pays. A single hunter can spend a lot of effort chasing down a rabbit, and get only a pound or two of meat to show for it at the end of the day. When a team of hunters brings down a buffalo, they will divide among themselves close to a thousand pounds of meat—perhaps a hundred pounds each. Economists call this kind of arithmetic "increasing returns to scale"—when a group working together can significantly increase each individual's payoff, compared with what they would get working on their own.

In modern economies, businesses need to solve increasingly complicated problems requiring detailed and varied knowledge that no single person can learn on his own. For this reason, teams that combine people with different and complementary skills easily outperform the same individuals working alone. As the personnel economists Edward Lazear and Kathryn Shaw write, "teamwork has increasingly become a way of life in many firms." By the late 1990s, three-quarters of corporations had self-managed work teams. Firms that produce complex products, meaning they have complicated problems to solve, are more likely to use the team system.[73] For example, US mills that make intricate and precisely engineered steel components are much more likely to rely on teams to solve production problems than mills that simply cut steel billets into smaller pieces.[74]

But there's more to it than just putting people in a team and telling them to solve a problem. A team needs to be carefully constructed, with the right mix of skills. In other words, it needs diversity. At the same time, team members need to share a common language and culture, allowing for efficient communication and coordination, and helping to build mutual trust. Most importantly, a team needs to be organized in a way that gets around the Cooperator's Dilemma—how to motivate the members to work towards a collective goal rather than free-ride on the efforts of others.

This is where studying team sports helps. A sports team needs to find solutions for all the same problems (shoot or pass?), but measuring performance in sports is much easier. As we saw earlier, the data is available in marvellous abundance. Even in games such as soccer, where objective statistics are arguably of limited value, there's plenty to work with. Sports journalists rank players by performance during each game. One study of Italian soccer teams used the average of rankings in three major sports newspapers in Italy to investigate how inequality of pay affected the athlete's effort. They found that in more equal teams, players worked harder.[75] As a result of such studies, we know a lot about how people cooperate (or not) in teams. And we are learning more, because the study of team sports by organizational economists is becoming a new cottage industry.

Here's one of its first lessons: different forms of competition can have very different consequences for cooperation. It all depends on the level—whether it is competition between individuals within a team, or competition between teams. This is one of the most important insights from the theory of multilevel selection: competition *within* groups destroys cooperation, but competition *between* groups creates cooperation.

Let's go back to team sports and take a look at soccer, in which teamwork and cooperation between players are particularly important. In soccer, each player has a specialized role (forwards, defenders, the goalkeeper, etc). Studies show that soccer teams that pass the ball more frequently win more games. If we applied the Rank-and-Yank scheme based on how many goals were scored by individuals, we would destroy the team, since we would be firing the goalkeeper and defenders just for starters.

On the other hand, applying Rank-and-Yank to entire teams would be an excellent way to increase within-team cooperation and create formidable soccer machines. In fact, this is precisely how the soccer (association football) league system operates in many countries. In Italy, for example, the men's game is organized in a hierarchy of league divisions, known as Serie A, Serie B and so on. Every season, out of the 20 teams that participate in Serie A, the three ranked lowest are relegated to Serie B while the three best-scoring Serie B teams are promoted. And how's that system working out for the Italians? Pretty well, as a matter of fact. Two of their top clubs, AC Milan and FC Internazionale Milano, have between them won the FIFA Club World Cup and its predecessor, the Intercontinental Cup, seven times, as well as numerous European club competitions. Contrast that with USA, where there is no promotion-relegation system (and even allowing for the relatively lowly status of the game in the USA):

no American club has even qualified for the FIFA Club World Cup and the record at regional level is undistinguished.[76]

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The lesson that team sports offer is that we don't just compete against each other as individuals. We also compete as team members against other teams. Team sports are a great metaphor—working together in teams is also pervasive in our normal lives. Take me—most of my work takes place within one team or another. As a single individual, I cannot be an expert anthropologist, economist, sociologist, and climatologist all at once. Yet understanding history requires all these disciplines, and many more. The only way we can achieve progress in making history a science is by bringing together teams of specialists drawn from very diverse fields.

So here's what I do. I put together a team of specialists who work together on a particular question (I will say more about this in Chapter 10). Then our team competes against other scientific teams—vying for grant money and to get our publications into prestigious journals. And it's not only me. The majority of scientists today work in teams, because most scientific advances take place at the interfaces between many disciplines (this is reflected in the ever-increasing number of authors on scientific papers). Gone are the days of a lone sage contemplating the world from an ivory tower.

People working for businesses also tend to do so in teams. An entire firm is a kind of team, competing against other firms in the marketplace. In fact, most people belong to a hierarchy of nested groups, all competing against each other at different levels. Special-purpose teams compete against other such teams within a firm, firms compete against other firms in national markets, and, at the highest level, national economies compete against other national economies.

This is particularly well-defined in the military, where to hone in-group cooperation, competition with and disparagement of sibling units (ie, other platoons within a company, companies within a battalion, and so on right up the scale to the international level) is actively (though maybe not officially) fostered. Indeed, any weary soldier will tell you that there is only one army in the world, and that's "the bloody army": the experience is much the same everywhere.

Such a *multilevel* nature of organization of economic and social life has profound consequences for the evolution of human societies—just how profound we are only now beginning to understand, thanks to Cultural Evolution. The central theoretical breakthrough in this new field is the theory of Cultural Multilevel Selection—quite a mouthful and I wish I could shorten it, but I can't. All the parts are important. Let's start by discussing the significance of "Cultural."

What is "cultural evolution"? There is a lot of misunderstanding of this discipline, even among the scientists. Evolutionary studies of society have been called a variety of names: Sociocultural Evolution, Social Evolution, Sociobiology, Evolutionary Psychology, and even Social Darwinism, as we saw in Chapter 2.

To many social scientists (including, most notably, social anthropologists), sociocultural evolution implies that human societies must pass through a set of well-defined stages. Call this a "stadial" theory of social progress. For example, one of the earliest proponents of sociocultural evolution, the American anthropologist Lewis H. Morgan (1818–1881), proposed that societies develop through three stages: from "savagery" to “barbarism” and finally to “civilization.” Others proposed more sophisticated schemes, but the majority of anthropologists today are united in their rejection of such stadial theories.

And for good reason. Human societies vary along many dimensions—scale of cooperation, degree of economic specialization and division of labor, forms of governance, levels of literacy and urbanization, and so on. One cannot fit them neatly into a set of discrete stages. Moreover, while we have seen that over the past 10,000 years the scale of cooperation, and social complexity in general, had a tendency to increase, different world regions took quite different paths. There is no single trajectory of sociocultural evolution that all societies have to follow.[77] Finally, the stadial theories simply assume that social complexity grows with time—what’s missing in them is the causal motor for this trend.

The habit of equating evolutionism with predetermined stages is puzzling to a scientist like myself, whose training was in biological evolution. Biologists long ago converged on a standard definition of that: the study of how and why frequencies of genes change with time. This definition doesn’t imply that there has to be any kind of progress. “Progress” (mapped along whatever dimension you prefer) may result from changes in genetic frequencies, but it is equally possible to have regress, or long periods of stasis. Paleontological data show that different lineages in the animal and plant kingdoms can follow all kinds of evolutionary trajectories.

Similarly, nothing prevents us from defining Cultural Evolution as the study of how and why the frequencies of cultural traits change with time. Whether or not there is progress (or stages, however defined) becomes an empirical question for Cultural Evolution to answer.

What are "cultural traits"? *Culture* is understood very broadly as any kind of socially transmitted information. Thus, information about edible berries and mushrooms that parents and other experienced elders transmit to youngsters is part of culture. Culture also includes knowledge of how to make tools; stories and songs; dance and rituals; and "norms"—socially transmitted rules of behavior. Basically, any kind of information that is passed between members of a society qualifies under this definition. A cultural trait is similar to a *meme*, a word coined by Richard Dawkins, which is typically explained as "an idea, behavior, or style that spreads from person to person within a culture." Dawkins proposed that memes are the cultural equivalents of genes—self-replicating units of cultural transmission.[78] Cultural traits, however, are a more general category than memes, because they also include quantitative (smoothly-varying) characteristics that cannot be easily represented as discrete alternatives: for example, the inclination to trust strangers. (More on that below.) Additionally, memeticists have a tendency to think of memes as parasitic elements ("selfish memes") that leap from brain to brain and can make people believe in all kinds of weird things (Dawkins' example is the "idea of God").[79] The problem here is with pushing the analogy between genes and cultural elements too far.

The process of transmitting cultural traits is quite different from that of gene replication. It can occur simply by observation and imitation, or it may involve active teaching and perhaps even a drill, to make sure that the material is being passed on faithfully. Homer's *Iliad* was transmitted orally through many generations of itinerant performers before it was ever written down. And on that note, it's also remarkable that culture can be stored outside the human brain. It is transmitted on such media as paper (e.g., instruction manuals and, more generally, books) and via computers. Such variable mechanisms of transmission, each with a different range of fidelities, is another reason why theorists working within the field of Cultural Evolution prefer to talk about cultural traits rather than memes. Is a book a "meme"? Or is the meme the set of ideas within the book?

To be fair to the concept of memes, genes do make a stimulating metaphor for processes of cultural transmission. But that's all. Cultural knowledge is analogous to genetically transmitted information in some ways, but in other ways it is quite different.[80] A precise comparison is difficult because, while we understand very well how genetic information is encoded and transmitted, with cultural information we are on much shakier ground. We know that knowledge is somehow encoded in the brain, but precisely how is still poorly understood. Researchers in the fields of cognitive linguistics and neuropsychology are working hard to connect "molecules to metaphors" (to borrow the title of Jerome Feldman's 2006 book, *From Molecule to Metaphor: A Neural Theory of Language*). But they've a long way to go yet.[81]

Not having an equivalent of Mendelian genetics in Cultural Evolution is an annoying problem for cultural evolutionists, but we don't need to wait while the brain scientists work out the answer. We wish to better understand our societies so that we can make them more cooperative, more peaceful, and more wealthy. This means that we need to proceed now with the investigation of how societies and cultures evolve, while incorporating any new insights from neurocognitive sciences as they emerge. Remember how much progress Darwin and the first evolutionists were able to make before they had any understanding of how genetic information is actually encoded.

Cultural Evolution today may be at a similar stage of development to that of genetic evolution before the Mendelian revolution.

To make our discussion more concrete, let's discuss a particular cultural trait: social trust (or to use the social science jargon, "generalized trust"). Trust is important for explaining the ability of people, teams, and whole societies to cooperate. Social trust creates mutual bonds between citizens that make them willing to enter potentially profitable, but risky, transactions and to participate in collective enterprises that create public goods.[82] Social scientists beginning with Alexis de Tocqueville have known that generalized trust is a critical ingredient for collective action, economic growth, and effective governance.[83] Thanks to such organizations as the General Social Survey in the USA and the European Social Survey, we have a lot of quantitative data on how social trust varies within societies, between societies, and how it changes over time.

The standard question that sociologists ask when they survey social trust is, "Generally speaking, do you believe that most people can be trusted or can't you be too careful in dealing with people?" Respondents are then offered four versions of the answer:

- always trusted
- usually trusted
- usually not trusted
- always not trusted

The spectrum of potential responses is, rather arbitrarily, split into four discrete answers, although it is clear that the degree of belief that most people can be trusted grades smoothly from a complete agreement to a complete rejection of this statement. In other words, generalized trust is not really a meme, at least as usually understood by the proponents of memetics. It's not something you simply have or don't have.

Is it a cultural trait? The key question is whether this attitude is socially transmitted or individually learned. Clearly, our assessment of whether any specific individual, known to us, should be trusted will be affected by our previous interactions with him. This would seem to make trust a purely individual phenomenon. But what about trusting a stranger, someone with whom we have no history of interactions? It turns out that people, even within the same population group, vary quite significantly in their attitudes on this. What's more, specific encounters (with either a trustworthy or a duplicitous person) have only a small effect on our level of credulity. Such attitudes appear to be remarkably stable. In fact, the most important influence predicting a person's level of generalized trust is the attitude of his parents.[84] And that would make generalized trust a culturally transmitted trait.

Lorenzo Carcaterra's novel *Gangster* (2001) narrates the life of a successful Mafia boss, Angelo Vestieri. One of Vestieri's favorite stories, which he never tires of repeating, is about a father and his six-year-old son. The father puts the boy on a high ledge and tells him, "jump and don't worry, Daddy will catch you." When the kid jumps, the father allows him to fall to the ground. "Remember one thing," he tells his injured son, "in this life, never trust *anybody*."

Southern Italy, where Vestieri grew up, is a well-studied area with abysmally low generalized trust. During the 1950s the American anthropologist Edward Banfield carried out a famous study of "Montegrano," a fictitious name for a real village in southern Italy. In the study—rather bluntly titled *The Moral Basis of a Backward Society*—

Banfield described how pervasive distrust, envy, mutual suspicion, and inability to cooperate except within the family, had created a society in which the villagers were unable to act for their common good. As a result, most of them (except for a small elite of landowning gentry) were trapped in extreme poverty from which they were unable to escape.

To show how social attitudes are transmitted across generations, Banfield related a story about a peasant father who throws his hat on the ground.

> "What did I do?" he asks one of his sons. "You threw your hat on the ground," the son answers, whereupon the father strikes him. He picks up his hat and asks another son, "What did I do?" "You picked up your hat," the son replies and gets a blow in his turn. "What did I do?" the father asks the third son. "I don't know," the smart one replies. "Remember, sons," the father concludes, "if someone asks you how many goats your father has, the answer is, you don't know."

As these two anecdotes help to illustrate, we typically learn generalized trust (or distrust) from the previous generation. So it's a cultural trait.

Periodic social surveys indicate that generalized trust behaves just as we would expect a cultural trait to behave. National-level studies show that each surveyed population is characterized by a mixture of people holding different beliefs about whether others can be trusted. The relative proportions of different beliefs are quite stable—but they do change, given enough time. In other words, this cultural trait *evolves*. And that, remember, is all evolution is. There doesn't have to be "progress."

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Having dealt with culture, let's now talk about *multilevel selection*. We have already seen an example of how it can make sense to view a cultural trait as being "expressed" at different levels of social organization. Individuals vary in how trusting they are, and their attitudes have consequences for them. For example, a person who trusts strangers too much is more likely to be swindled by a con-man.

Different societies, on the other hand, can have very different distributions of attitudes towards social trust. There are high-trust and low-trust societies, and this aspect of national culture also has consequences.[85] In particular, high-trust societies tend to be more successful—better governed, more economically productive, simply nicer places to live and to visit. Is it surprising that the Danes are not lining up in queues to emigrate to Somalia?

Because cultural traits have consequences, they are subject to selection. One of the most important insights from the theory of Cultural Multilevel Selection is that selective pressures affecting frequencies of cultural traits can work in opposite directions, depending on whether we consider selection on individuals or on social groups.

To illustrate this idea, let us consider a personal trait like courage. Warriors who place themselves in the front lines during a battle and confront the enemy bravely are in much greater danger of being wounded or killed than cowards who hang back and run away at the first sign of danger. A naïve evolutionary argument would suggest that, in each generation, more brave youths would be killed than cowardly ones, meaning that they fail to marry and leave children. As a result, each successive generation will have fewer courageous men, and eventually this trait will be eliminated by natural selection.[86]

But we can think about this question in a different way. As Charles Darwin himself noted, tribes with many courageous warriors will be much more likely to win battles and wars against tribes with many cowards. Because defeat can have dire consequences for the tribe, up to and including genocide, we would expect that courageous behavior, on the contrary, would increase.

Which of these arguments is the correct one? According to the theory of Multilevel Selection, neither. Or, a better way to put it, both provide incomplete answers. Natural selection can simultaneously act on individuals within groups, and on whole groups. Within each tribe, cowards do better than brave men, on average increasing every generation. But at the same time, cowardly tribes are eliminated by courageous ones. Which of these processes will be stronger depends on many details: just how great is the cost of bravery? How frequent is warfare and what are the consequences of defeat? How frequently are defeated tribes eliminated? The frequency of brave types will decrease or increase depending on which selective force is greater, the one acting on individuals or the one acting on groups.

This argument seems to make sense. But how do we compare these forces with each other to calculate which way the balance will go? Fortunately for us, Multilevel Selection has powerful and sophisticated theoretical tools for understanding how such traits as courage, generalized trust, and cooperation can evolve in human beings. It is a genuine theory in the strict scientific sense, because it has been built on a solid mathematical foundation, the heart of which is a formidable little formula called the Price equation.[87]

Writers of popular books are told to avoid mathematical equations like the plague. I am going to break this rule—just once—and show you a way to present the main insight from the Price equation.

A cooperative trait will evolve (increase in frequency) if:

$$\frac{\text{Between-group variance}}{\text{Within-group variance}} > \frac{\text{Selection strength on individuals}}{\text{Selection strength on groups}}$$

Before I explain what the various parts of this formula mean, let's ask a more general question: why do we need math? We need it to make sense of the complex interplay of forces affecting the evolution of cooperation. If we don't hold ourselves up to the tests of mathematical rigor, it's simply too easy to make logical mistakes and to be led astray by faulty arguments.[88] Mathematical models can also yield unexpected insights. In my research I combine models with data because that's the most powerful way of making progress in science. In this popular volume, I skip the equations (except once!) and instead try to give an intuitive sense of the way the dynamic works. Nevertheless, this is easily the most technical part of the book, and you might want to drink a coffee or something before tackling it.

OK. Are you ready?

Let's suppose that there are two types of people, cooperators and free riders. They live in tribes (or groups). Tribes typically have a mixture of both categories of individual, although some tribes have more cooperators and others have fewer. Individuals compete within tribes, with cooperators generally losing ground to free riders. As a result, the average cooperator leaves fewer offspring than the average free rider. The children of cooperators tend to be cooperators while children of free riders are also free riders. At this point it doesn't matter why this happens: children can either inherit "cooperative" genes from their parents or they may be taught cooperation by the parents, or both genetics and teaching could be important. The Price equation applies regardless.

Tribes also compete against each other. Such competition may be quite direct, as happens when tribes go to war. The more cooperators a tribe has, the more likely it is to win battles, impose casualties on its enemies, and take their territory. Alternatively, tribes may compete indirectly. For example, the environment could be so harsh that any group might be hit by a total catastrophe (famine, drought, or flood) and wiped out. However, tribes with more cooperators are more resilient and have a better chance of surviving such a calamity. Survivors then repopulate the landscape, replacing the extinct tribe, until the next disaster hits. In either case (direct or indirect competition), a higher proportion of cooperators enables a tribe to survive and flourish at the expense of its neighbors.

What will happen to the overall frequency of cooperators in this model? Will the cooperative types increase or go extinct? The simple answer is, there is no simple answer. No one factor determines the outcome. Instead, we must compare the strength of competition at the different levels (these are the quantities on the right-hand side of the Price formula). At the individual level, we want to know how much of a disadvantage it is to be a cooperator. "Selection strength on individuals" in the Price equation measures this disadvantage.

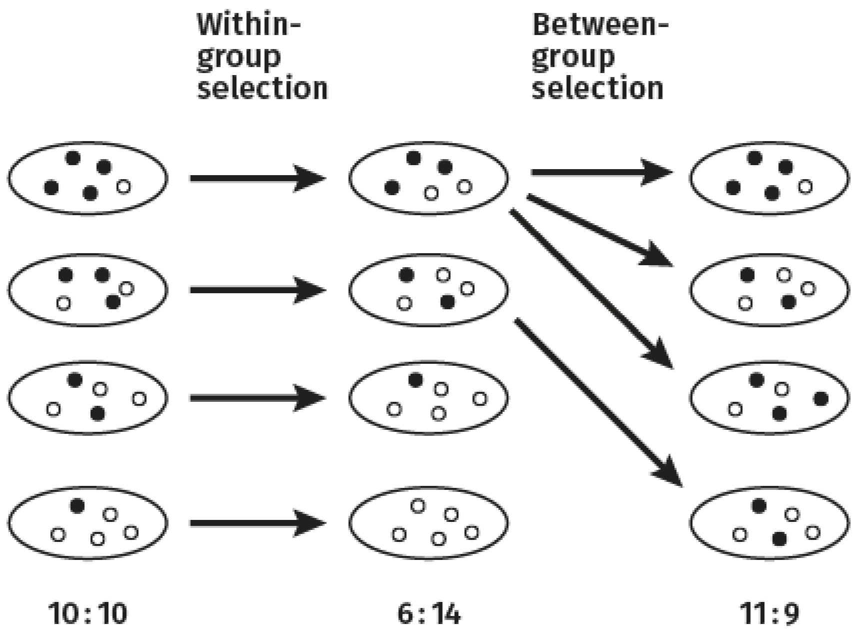
For example, cooperators may be brave warriors—with chances of surviving and raising children five percent lower than for free riders. All else being equal, this means that the cooperator's fitness is reduced by five percent compared with a free rider's. It doesn't sound like much, but in the absence of a countervailing force, cooperators will be gradually eliminated from the overall population.

Cooperators, however, increase the chances of the whole tribe surviving. Let's suppose that replacing a free rider with a cooperator in a tribe increases its probability of survival by a small but non-zero amount—say 0.0001. This means that a tribe with 600 cooperators and 400 free riders will have a two percent better chance of surviving a calamity than a tribe in which the proportions are flipped (400 cooperators and 600 free riders). Again, it may not sound like a huge advantage, but these percentages accumulate across many generations.

Furthermore, what's important is not the absolute size of these values—selection forces acting on individuals or on groups—but their strength relative to each other. This is why the formula only includes the ratio of selection forces. Clearly, the lower the cooperator disadvantage with respect to free riders, and the greater the effect of cooperators on the tribe's probability of survival, the more likely it is that cooperation will spread.

Here's an illustration of how this logic works. We start with four groups, each with five individuals. Solid circles indicate cooperators and hollow circles stand for free riders. Some groups have more cooperators, others fewer, but overall we start with same number (10) of each of the two types.

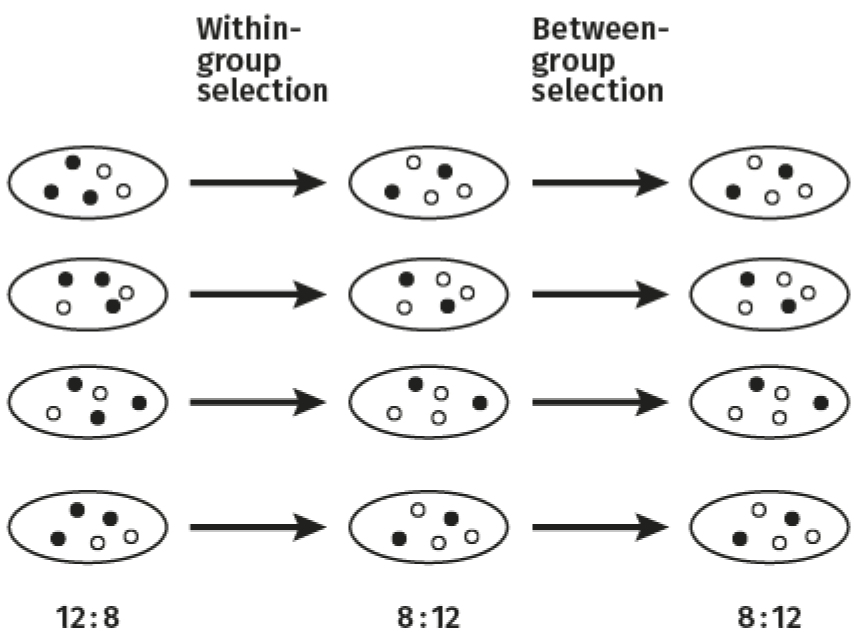
First, individuals compete within groups, resulting in the loss of a cooperator in each group, who is replaced by a free rider. Within-group competition results in a drop in the number of cooperators (from ten to six). However, next comes the phase of between-group competition. Groups having no cooperators, or those with only one, are completely wiped out. The group with two cooperators, on the other hand, manages to hold its ground and reproduce itself. But it is the group with the largest number of cooperators that does the best. It doesn't just manage to reproduce itself. It also creates two additional copies, which occupy the empty territories vacated by the groups going extinct. Note that both cooperators and free riders in the most cooperative group profit from this expansion. The numbers of both types are tripled (from three to nine cooperators and from two to six free riders). Overall, the number of cooperators is now 11, which is a 10 percent increase over the starting point (10 cooperators). In this example, between-group competition turns out to be stronger than within-group competition.



But the balance of the competition coefficients is only one part of the story—the right-hand side of the formula. What is there on the left?

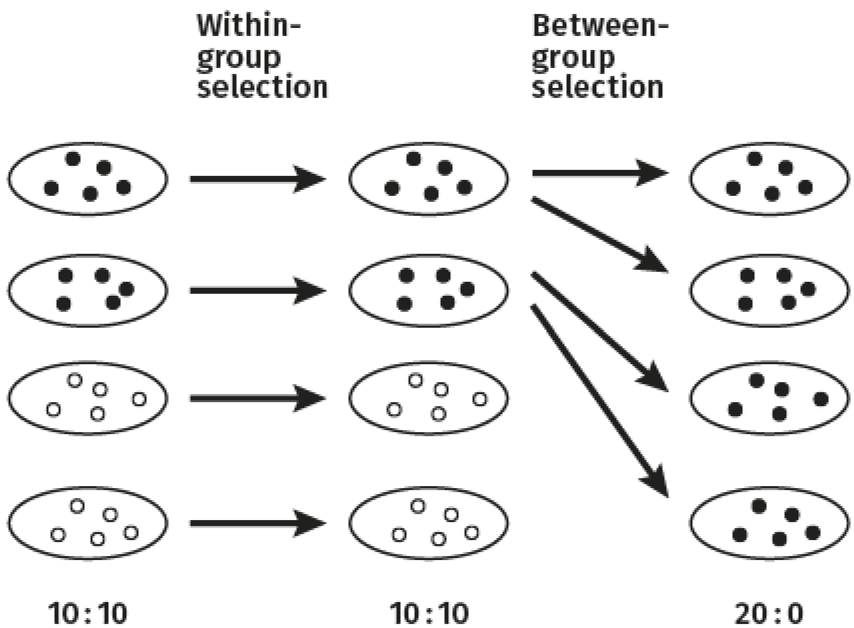
As evolutionary scientists know very well, the grist for the evolutionary mill is *variation*. Selection, whether natural or artificial, needs different types to select among. Suppose you want to breed a very fast pigeon. You test pigeons for their flying ability, eliminate the slowest, and raise the next generation from the eggs laid by fast flyers. After a few generations, you will have a flock of very fast pigeons. On the other hand, suppose you want to breed flying dogs. Well, you are out of luck because you have no variation in flying ability to work with: no dog can fly at all. No matter how harsh a selection regime you are willing to impose, you'll never get a flying one.

The same logic applies in the more complex case of multilevel selection, except we now need to track how much variance there is at each level quantitatively. We can imagine two extreme scenarios. In the first, all the variation is within groups. Note how all the groups have the same number of solid and hollow circles:



As before, the first step (within-group competition) reduces the proportion of cooperators in each group. At the second step, however, nothing happens. All groups have the same number of cooperators, so they have exactly the same probability of being wiped out, or of surviving and reproducing themselves. During the between-group selection phase, the frequencies of cooperators and free riders don't change. Combining both steps, we see that the overall proportion of cooperators has decreased. They will all go extinct in a few more steps.

In the second extreme scenario, by contrast, we make groups as different as possible. All cooperators are together, and all free riders are together:



Now nothing happens during the first step of within-group competition, because there is no variation within the groups for selection to work on. Each group is internally homogeneous. But then, when we move to between-group competition, the uncooperative groups are wiped out. The two cooperative groups are the same in their composition, so they do equally well and divide the vacant sites among themselves. In this example, in which all variation has been concentrated at the group level, we go to cooperators completely replacing free riders in one generation!

In the real world, most situations will be intermediate, so what matters is the balance between how variable the groups are internally and how different they are from each other. This is why the left-hand side of the formula contains the ratio of between-group variance to within-group variance.

The Price equation tells us precisely how this structure of variation is combined with relative strengths of selection coefficients to determine whether the cooperative trait spreads or not. Here it is, again, so you don't have to leaf (or scroll) back:

$$\frac{\text{Between-group variance}}{\text{Within-group variance}} > \frac{\text{Selection strength on individuals}}{\text{Selection strength on groups}}$$

The larger the ratio of variances on the left, and the smaller the ratio of selection strengths on the right, the easier it is for the inequality to hold, and for cooperation to spread.

Although I used a very simple example to illustrate the Price equation, it actually works the same way in much more realistic situations. For example, although I assumed that the cooperator trait is all or nothing (so that we have only two types), the same logic would apply to a mixture of many types, whose preferences for cooperation vary smoothly from "always cooperate" to "sometimes cooperate" to "always free ride."

The most important insight from the Price equation, which holds under all kinds of conditions, is that the key to the evolution of cooperation is how cooperators and non-cooperators are sorted among the groups. Even quite weak group-level benefits can outweigh the costs of cooperation, so long as the cooperators somehow manage to bunch together. In fact, they don't even need to be in well-defined groups. If some areas have high densities of cooperators and others are where the free riders hang out, then it's the same as having groups, even though there are no clear boundaries.

The general intuition is that when cooperators interact mainly with other cooperators, while free riders mainly deal with other free riders, then it is easier for cooperating traits to spread. In the technical jargon, this is known as “positive assortment,” and the math says it is at least as important as the balance of selective forces. If your populations segregate themselves into cooperators and free-riders, obviously that will tend to make the group-level competition much more stark. Birds of a feather flock together—and then some flocks go extinct. Sorry, but that’s just how it is.

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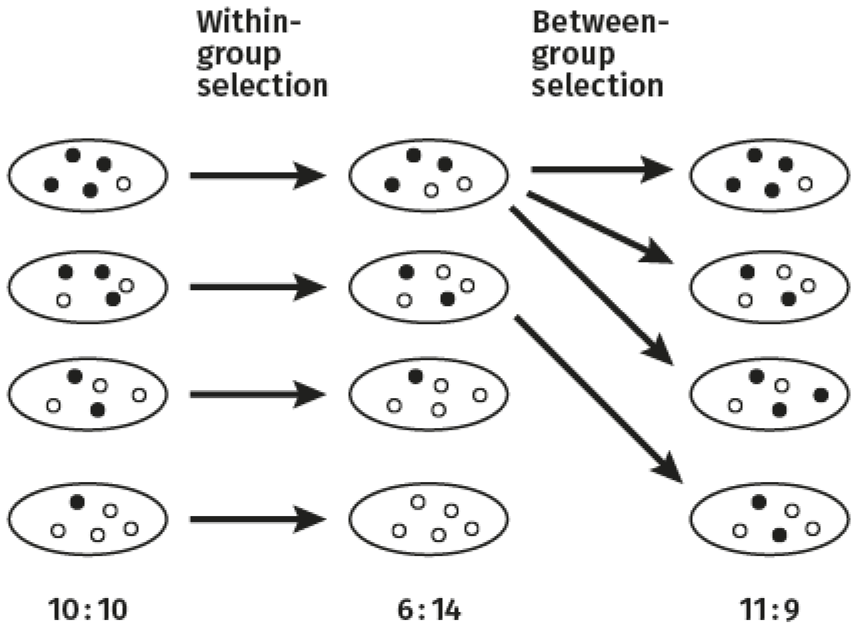
So far in our discussion of cooperation, courage, and trust I’ve set aside the question of how these traits are transmitted—genetically, culturally, or both. The Price equation doesn’t care: it works the same for any mechanism of inheritance. However, now that we understand its key insights, we need to go beyond the equation. This means that we need to start looking at genetic evolution and cultural evolution separately. As we saw earlier, there are significant differences in how genetic and cultural information are encoded and transmitted, and that turns out to be very important for the question of variances—and thus the evolution of cooperation. As we shall see shortly, switching from genetic to cultural evolution is quite a game-changer—and explains why human beings are the world’s champion cooperators.

Let’s talk about genetic traits first. Remember that in order for cooperation to evolve, we want groups to be as different as possible. One evolutionary force that creates such variation is simply random chance. Let’s go back to the diagram that illustrates the balance of within-group versus between-group selection:



Note that when the most successful group (the top one in the middle column) reproduces itself, it doesn't create three identical copies. There were a total of nine cooperators (and six free riders), but they have sorted themselves randomly, so that one group got four cooperators, while another had only two. This was due to chance, but it resulted in groups that differed in their composition. In other words, random chance creates variation.

The problem is that chance is a rather weak force, especially when groups are large. Let's suppose you toss five coins on the table. It is not too difficult to get all of them to come up the same (five heads or five tails). If you keep tossing them repeatedly, you should expect this to happen once in 16 tosses. But if you toss 100 coins, the probability of getting all heads or all tails is so low that for all intents and purposes it will never happen. You can keep tossing until the end of the Universe and never see it happen even once. Even an outcome of 70:30 is highly unlikely. So random assortment is not a great way to generate significant differences between large groups.

The opposing force, which destroys variation by making groups more similar, is migration. Suppose you have a glass divided into two compartments by a removable thin wall. Pour coffee into one half and milk into the other. Then carefully withdraw the divider without disturbing the two liquids. Initially, you will be able to see a clear difference between the white and black regions. As time goes along, however, molecules will diffuse in both directions, and rather soon you will end up with the café-au-lait color distributed uniformly within the glass.

Population migration works in the same way as physical diffusion—it gradually makes different groups more similar, and eventually identical. Even small amounts of migration can destroy variation rapidly, and in most animal species migration can be quite substantial. For example, all female chimps leave their native groups when they mature and disperse to other troops. As a result, half of the troop's genes are mixed up in each generation. Similarly in human societies: ethnographic studies show, for example, that there is a lot of movement of people between hunter-gatherer groups.

Early proponents of group selection did not understand the importance of variation between groups, nor how difficult it is to maintain in the face of constant migration. They weren't stupid; it's just that the mathematical theory had not yet been developed to make this point clear. Nevertheless, critics such as G. C. Williams and Richard Dawkins were quite correct to point out the errors of the naïve group selectionists, such as V. C. Wynn-Edwards and Konrad Lorenz. Numerous approaches to modeling genetic group selection have shown it to require rather special circumstances that rarely arise in the natural world.

However, the critics also erred when they included human beings in their sweeping rejection of group selection. Humans are very unusual animals. We have huge brains and are capable of remarkable mental feats. We also have culture. And that makes a huge difference.

Incidentally, why do we have culture? That's a good question. No one knows for sure, but it'll be worth our while to take a quick detour through the most likely explanations. A clue to the origin of our remarkable capacities may be provided by long-term climate data. Humans evolved during the geological epoch known as the Pleistocene, which started 2.6 million years ago and ended just 12,000 years ago. The Pleistocene had extremely variable climate, the most chaotic such period during the past 250 million years. The climate went through violent oscillations between very cold periods ("ice ages") and much warmer interglacial interludes. Roughly every 100,000 years, glaciers advanced from the poles, covering up to 30 percent of the Earth's surface. Sea levels dropped 100 meters (330ft) or more. Water was locked away in huge ice sheets many kilometers thick. When the glaciers receded, huge areas were inundated by the rising seas and by lakes of ice melt. Shorter temperature cycles, with a period of 23,000 years, were superimposed on the 100,000-year cycles.

Such rapid (on a geological timescale) environmental changes created a lot of difficulties for life on Earth, to say the least. Some organisms, the ones with short generation times, like rodents, were able to evolve rapidly enough to adapt genetically to the environmental chaos. Longer-lived animals like our ancestors, on the other hand, could not track the environmental change by adapting fast enough—genetic evolution is a slow process. Instead, our ancestors, such as *Homo habilis* and later *Homo erectus*, adapted to the conditions of violent change by growing big brains.

In other words, they started using behavioral, rather than genetic, adaptation. They acquired a talent for learning.[89]

Behavioral flexibility by itself didn't make early *Homo* very different from other great apes, like chimps, who are also remarkably good at various cognitive tasks. Individual learning, however, is not the most efficient way of learning about the environment. For example, if you want to learn on your own which berries and mushrooms are edible and which are poisonous, you will have to taste them all, risking serious consequences. Some mushrooms are so poisonous that eating even a small piece is lethal. It is much better to ask a wise elder to tell you what's safe to eat. Or you can observe what experienced members of your tribe do and imitate them. And learning useful things from others is culture.

Generally speaking, the capacity for culture should evolve (assuming that such pre-adaptations as sophisticated cognitive abilities are in place) when the environment changes too fast for genetic adaptation to work, but slowly enough for information accumulated by previous generations to be useful. If environmental change is faster than that, you are better off learning everything yourself, even though it's risky and inefficient. During the Pleistocene, apparently, environmental change was just right—not too rapid, not too slow, and very violent—to drive the evolution of culture. It's not a coincidence that many other mammals evolved large brains in parallel with humans.[90]

Once the capacity for culture evolved in our ancestors, it opened a completely new world of cultural evolution. It also made possible the evolution of culturally-transmitted traits by Cultural Multilevel Selection.

It is much easier for Multilevel Selection to operate on cultural variants than to do so on genes. Human beings are great imitators. We change our behaviors by observing others ("when in Rome, do as the Romans do"). We are also easily swayed by success and prestige (which is why advertising agencies pay lots of money to successful athletes and glamorous movie stars). As I said earlier, imitation is adaptive. If you adopt the behavioral traits of a successful individual, you may be able to pick up on what makes him or her successful. You may also imitate a behavior that is irrelevant to success (getting a haircut and dressing up as Elvis is unlikely to propel you to stardom; on the other hand, as long as you don't show up to your investment banker job dressed like that, no harm is done). Some behaviors may even have a delayed cost (e.g., smoking). Still, on balance you are better off by modeling your behavior on what the majority of your tribe do, while also paying attention to the most successful members.

What imitation does, then, is make members of the same group more similar to each other. In other words, it destroys within-group variation. At the same time, different groups are likely to converge on very different sets of behaviors, so that variation *between* groups increases. Movement of people between groups has a much smaller effect on between-group cultural variation, because newcomers, or their children, become culturally assimilated—adopting the behaviors common in their new group. This peculiarity of cultural transmission makes cultural group selection a much more potent force than genetic group selection.

There are several additional reasons why it was much easier for cooperative traits to evolve in humans than in other animals. I'll come to those in the next chapter. For now, the most important point is that the evolution of cooperation is driven by *competition between groups*. These groups can be teams, coalitions, even aggregations without any clear boundaries, or whole societies. No matter what form groups take, it is competition on the collective scale that is necessary for cooperation to evolve.[91] We cooperate to compete.

As a corollary, while competition between teams creates cooperation, competition among players within a team destroys it. In other words, to succeed, cooperative groups must *suppress internal competition*. Equality of group members is, therefore, a very important factor in promoting group cohesion and cooperation, which translates into the capacity of the group to win against other groups. This insight follows directly from the Price equation, and should be intuitively obvious. Yet it is not. At least, it is not obvious to the majority of corporate managers, nor to the owners of professional sports teams.

Another interesting corollary of the Price equation is the importance of cultural diversity at the group level. Remember, the raw stuff of evolution is variation. When different teams, firms, ethnic groups, or whole societies are allowed (even encouraged) to experiment with different ways of doing things, it becomes possible to see what works best. Then best practices can be selected, either by the process of blind evolution, or by conscious choice. However, after that it would be a mistake to force everybody to do things the same way, because that would stop evolution in its tracks. You never know if there's an even better solution just around the corner—or a danger that your training never prepared you for.

After all, as the old boxing adage has it, it's the one you don't see coming that knocks you out.

Chapter 5
‘God Made Men, but Sam Colt Made Them Equal’

How early humans suppressed alpha males

The record for the fastest pitch in Major League Baseball history is currently held by Albertín Aroldis Chapman de la Cruz.[92] The Cuban-born Chapman, who plays for the Cincinnati Reds, is justly nicknamed the Cuban Missile. The fastballs he throws travel at speeds of over 100 miles (160 km) per hour. That’s nearly as fast as a stone shot from a catapult.

Throwing an object like a baseball or a stone powerfully and accurately requires a whole-body motion, starting with the legs and the torso and ending with the arm whipping the projectile forward. But there is one part of the body that is especially important: the shoulder. Recent research shows that the human shoulder acts like a catapult: first storing and then releasing elastic energy.[93] Just this anatomic adaptation alone doubles the speed with which the projectile is released. Equally important is the neural circuitry that is required for close coordination of muscle movements during precision stone throwing.

Humans are uniquely good throwers. No other species even comes close. Monkeys and apes can throw branches, rotten fruit, and excrement (I still remember an encounter with an irate troop of howler monkeys in Costa

Rica . . .), but they do not use projectiles as lethal weapons in hunting or combat. Our closest relatives, chimpanzees, are quite pathetic at throwing.[94]

Imagine yourself being attacked by a large and aggressive drunk in a bar. If running away is not an immediate option, what should you do? I would start throwing whatever came to hand—bottles, chairs—anything to slow him down and make a strategic retreat possible.

Chimps, on the other hand, never use projectiles in fights. They battle at close quarters by pummeling and biting each other. They are extremely tough and strong—three or four times as strong as a man (never fight a chimp hand-to-hand, he will literally tear you apart). But they are also very vulnerable to projectiles. This is how human beings drove them to the point of extinction. We killed them from a distance using spears and arrows.

Stone-throwing ability is likely as old as humanity, broadly understood as members of the genus *Homo*. *Homo habilis*, which appeared 2.3 million years ago, was probably not much better at throwing than a chimpanzee. But the first *Homo erectus*, who lived nearly two million years ago, had shoulders optimized for high-speed throwing.[95] By one million years ago, the human brain probably had the capacity to orchestrate precision targeting.[96] Thrown stones (and fire, of which more below) gave us protection from large predators, which enabled the move from trees to living (and sleeping) on the ground. Reduced demand for climbing ability freed us to evolve the upright posture needed for long-distance running, freed our hands for carrying and wielding objects, and optimized our shoulders for throwing, rather than hanging from branches.

Somewhere along the line, it's true, throwing seems to have fallen out of favour. Most hunter-gatherers known to anthropologists tend to use bows and arrows for hunting (or slings, or spearthrowers). Nevertheless, it would be a mistake to underestimate the effectiveness of a lobbed rock. Even today, stones are sometimes used as weapons of choice, often during urban riots. Admittedly, the rubber bullets (and sometimes live ammunition) used by police are clearly a much more effective tool. Projectiles have evolved quite a lot since the Pleistocene. But two million years ago on the African savanna, stones became the first distinctively human weapon.

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Today we're living in a boom time for the study of human evolution. Our knowledge of how our ancestors hunted, what they ate, and even what they thought,[97] is increasing apace. We know that hominins (the evolutionary branch that includes *Australopithecus* and *Homo*) began eating flesh and marrow regularly 2.5 million years ago.[98] At first, archaeologists thought that they hunted their meat. However, these ancestors of ours were too small, slow, and weak to be able to bring down a large antelope reliably. So it is much more likely that they were scavengers (and hunters of small game). Indeed, some of the most nutritious parts of large mammals—bone marrow—are locked within their thick bones, such as the femur. Our career as carnivores probably began as scavengers who specialized in eating bone marrow.

Although early humans couldn't bring down an antelope or chase away sabertooth lions from their kill (most likely, *Homo habilis* was regularly eaten by sabertooth cats), they could wait until the large predators were done with their meal. After that, it would be simple enough to sneak in, snatch some big bones, and bring them to the camp. *Homo habilis* means "handy man," and these human ancestors used stones as handy tools to cut off whatever meat was left, and then pound the bones to extract marrow.

One of my favorite authors when I grew up in Russia was the 19th century Irish-American writer Mayne Reid. People are sometimes surprised to find that this rather obscure US adventure writer was such a hit in the Soviet Union, and in a way, the story of his posthumous career east of the Iron Curtain serves as a nice illustration of the way in which culture can sometimes magnify chance occurrences into group-level differences. Before the revolution, Reid's books happened to be translated into Russian. After it, because he had espoused a number of progressive causes in his life, including fierce opposition to slavery, the Soviet state felt he was somehow ideologically compatible. And so his books stayed in print when many others didn't, and Russian kids in the 1960s and '70s grew up on a diet of Mayne Reid. These tales, full of adventures in exotic places—America, Tibet, South Africa—were particularly popular among boys, though not especially for their ideological orthodoxy.

Here's one of my favorite scenes. It comes midway through *The Boy Hunters, or Adventures in Search of the White Buffalo*, published in 1868, and it dramatizes just how important—indeed, life-saving— bone marrow can be. The young heroes find themselves traveling through the American prairies. Their food stocks are exhausted, and their attempts at hunting have been unsuccessful. After several days of starving, they start debating whether it is time to kill and eat their trusty mule, Jeanette. As they are setting up their hungry camp for the night, suddenly

> a loud exclamation from Basil drew the attention of his brothers. It was a shout of joy, followed by a wild laugh, like the laugh of a maniac!

François and Lucien looked up in affright—thinking that something disagreeable had happened—for they could not understand why Basil should be laughing so loudly at such a time, and under such gloomy circumstances.

As they looked at him he still continued to laugh, waving the hatchet around his head as if in triumph.

“Come here, brothers!” shouted he; “come here! Ha! ha! ha! Here’s a supper for three hungry individuals! Ha! ha! ha! What shallow fellows we are, to be sure! Why, we are as stupid as the donkey that preferred eating the hay with the bread and butter beside him. Look here! and here! and there! There’s a supper for you. Ha! ha! ha!”

Lucien and François had now arrived upon the ground; and seeing Basil point to the great joints of the buffalo, and turn them over and over, at once understood the cause of his mirth. These joints were full of marrow!

“Pounds of it,” continued Basil; “the very tit-bits of the buffalo—enough to make suppers for a dozen of us; and yet we were going to sleep supperless, or the next thing to it—going to starve in the midst of plenty! And we have been travelling among such treasures for three days past! Why, we deserve to starve for being so simple. But come, brothers! help me to carry these great joints to the fire—I’ll show you how to cook a supper.”

> There are eight marrow-bones in the buffalo, containing several pounds of this substance. As Basil had heard from the old hunters, it is esteemed the most delicious part of the animal; and is rarely left behind when a buffalo has been killed. The best method of preparing it is by simply roasting it in the bone; although the Indians and trappers often eat it raw. The stomachs of our young hunters were not strong enough for this; and a couple of the shank-bones were thrown into the fire, and covered over with red cinders.
>
> In due time the marrow was supposed to be sufficiently baked; and the bones having been cracked by Lucien's hatchet, yielded up their savoury store—which all three ate with a great relish. A cup of cool water washed it down; and around the camp-fire of the boy hunters thirst and hunger were now contemplated only as things of the past. Jeanette was respited, without one dissentient voice.

Getting the marrow from a big, thick, tough ungulate bone is not easy at all. Few scavengers are capable of the feat. African vultures are known to drop big bones from a great height in the hope of smashing them on the rocks below. But the main competitors that early humans had to deal with were the hyenas, whose powerful jaws can crack even the biggest bones. The most effective way of chasing away these scavengers was to pelt them with stones. Hyenas are a fairly dangerous carnivore, especially for small *Homo habilis*, so there was strong selection to become better at throwing projectiles and at coordinating collective attack against hyenas.

By the time *Homo erectus* appeared on the scene, they were clearly quite good at throwing—they had the shoulders for it. They were also much bigger than *Homo habilis*; in fact, they were as tall as modern humans. And they were capable of chasing away sabertooth lions from their kills. Humans had graduated from "passive" scavenging, when they had to be content with whatever scraps larger predators left them, to "confrontational" or "competitive" scavenging, in which they actively sought out recent kills and expropriated them from the predators.

Sites with evidence of human consumption (bones of large animals bearing butchery marks, resulting from cutting meat off and pounding the bones to extract marrow) often contain stones that originated several kilometers away. These stones were probably carried there by early humans to use as projectiles against predators. The whole operation bears the hallmarks of well-organized collective action. Fresh kills were probably located by scouts, who then recruited the rest of the band. Somebody had to bring stones from distant locations (they could also be stored in strategically placed piles). Most likely it was males who attacked the predators at the kill and drove them away by pelting them with rocks. While some stood guard and kept predators and scavengers away, others removed meat from the carcass to be carried back to the camp.

A hail of heavy rocks thrown by a coordinated group of a dozen or more works very well as a defensive tactic against even the most fearsome predator. But a thrown stone cannot reliably kill a fleeing antelope. Before humans could become effective hunters of large game animals, they needed better weapons.

Such weapons evolved over hundreds of thousands of years during the Pleistocene. They included, first of all, spears whose points were hardened over fire and then tipped with stone (a thrown spear has a much greater penetrating power than a blunt stone). With the arrival of modern *Homo sapiens*, projectile weapons became even better. The sling allowed humans to throw stones faster and farther, while the spearthrower or atlatl did the same for darts. The bow, which appeared roughly 70,000 years ago in South Africa, was a particularly effective weapon.[99] It reigned supreme over tens of thousands of years, becoming more sophisticated and lethal as it was elaborated. It was finally made obsolete only by the spread of firearms after 1500 CE—very recently in human evolutionary history (and by that point the bow had already played a key role in the rise of complex societies, as we shall see in the next chapter).

Projectile weapons are one of the most important technologies that shaped human evolution, but they rarely get the credit they deserve. People tend to be much more preoccupied with fire. Well, fire did indeed provide protection against predators, especially at night. It made cooking possible. In *Catching Fire: How Cooking Made Us Human* (2009)*,* the Harvard anthropologist Richard Wrangham argues that the shift from raw to cooked foods was the key turning point in human evolution. Cooking food allowed the human digestive tract to shrink and made possible the evolution of our large, energetically expensive brains. Additionally, fire had subtle effects on human sociality. A human family—pair-bonded man and woman, together with their children—would not evolve without fire. A cooking fire, where the family reunited in the evening to eat the roasted tubers, collected by the woman, and the meat that the man brought, was a focus around which the human household crystallized.

Bonfires, similarly, brought together larger groups for communal feasting, singing, and dancing. And fire was a key enabling factor for later technological developments such as ore smelting and steam power. So there is no question that the control of fire shaped human evolution. Nevertheless, there are some—including the evolutionary economist Herbert Gintis and primatologist Carel van Schaik—who think that projectile weapons had an equally important effect.[100] Personally, I would go further. Projectiles were *more* important than fire. Why? Because without them, the human rights revolution of prehistory could never have taken place.

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There is one very striking difference between human beings, on the one hand, and chimps and gorillas on the other. Unlike our closest biological relatives, people are *egalitarian*. Each gorilla troop, for example has a dominant male—the “silverback” who rules the troop with an iron fist. He decides when and where the troop moves, he keeps order, and he is the only one who mates with the females of the troop. Females have their own pecking order, with a dominant alpha female on top. Since the sex ratio at birth is 1:1 and each silverback has several mates, the majority of males must do without.

Chimpanzees also have a despotic social structure, although it is organized quite differently from that of gorillas. Chimps live in large groups with roughly equal numbers of males and females. There are two linear hierarchies, one for males and another for females. Males are much larger and stronger, so all females are subordinate to any adult male. The alpha male runs around beating up on everybody else, the beta male beats up on all except the alpha, and so on. Males high up in the hierarchy get many more mating opportunities, and father most of the offspring in the troop.

The basis for hierarchy in chimps is mainly physical power and personal fighting ability. However, chimp males can also build coalitions, which may allow two weaker males to dominate a stronger one. On rare occasions, a coalition of several low-ranking "rebels" forms against a particularly obnoxious alpha male.[101]

The social structure of human beings living in small-scale societies (which was was how we lived for most of our evolutionary history up until about 10,000 years ago) is very different. Unlike chimps, a human male and female form a lasting bond that often endures throughout their lifetimes—marriage. This doesn't mean that humans were strictly monogamous. Some men could have more than one wife (which is known as *polygyny*), and *polyandrous* marriages (one wife, many husbands) are also possible. However, reconstructions of the evolutionary history of hunter-gatherer marriage practices indicate that the incidence of polygamy was quite low in ancestral foraging societies.[102]

Like chimps, young human males compete for status. As with chimps, their contests often take the form of physical intimidation and fighting. But human males do not form a dominance hierarchy based on fighting ability alone. Strange as it seems, physically powerful and aggressive men, unlike gorilla or chimp males, are not allowed to bully the weaker members of their bands.

As the anthropologist Christopher Boehm explains in *Hierarchy in the Forest* (1999), forager societies are fiercely egalitarian. Unlike the great apes, they practice *reverse* dominance hierarchy. Boehm labels as "upstarts" powerful and aggressive men (and they are almost always men) who attempt to set themselves up as bosses. Such upstarts, unless restrained, will acquire too much power and control over resources, to the detriment of everybody else in the band. So forager societies have a broad variety of social mechanisms to control them. When the first bullying tendency is detected, the group begins by imposing fairly mild sanctions, such as gossip, criticism, and ridicule. When a wannabe leader issues orders, he may simply be ignored. Eventually, if the upstart doesn't desist, sanctions become more serious, including ostracism and eventually homicide (perhaps it would be better to call it capital punishment).[103]

It is hard to see how this egalitarianism could have evolved without projectile weapons. It is very difficult for a chimpanzee troop to restrain or eliminate a powerful and aggressive alpha. A group of several males can beat and bite him for 10 or 20 minutes, and he still might manage to escape. Even a sleeping alpha male cannot be easily assassinated—as soon as he is attacked, he wakes up and starts fighting back. The attackers themselves are in danger of being seriously injured. For this reason, while executions of chimpanzee leaders have been observed, they are very rare.[104]

Compare our human experience. There is a saying in America that "God made men, but Sam Colt made them equal"—referring, as you doubtless remember, to Samuel Colt's invention of the revolver in the 1830s. In actuality, projectile weapons had made men (and women) equal a million years before Colt's Equalizer. A coalition of punishers armed with stones (remember that stoning is one of the most ancient forms of capital punishment) or, better, with spears and bows and arrows, can easily dispatch an upstart with little risk to themselves.

Weapons also enable killing from ambush, or by surprise, so that even a single "avenger" can assassinate a much stronger individual. In *The Dobe !Kung* (1984) the anthropologist Richard Lee, who worked among the !Kung people of southern Africa, describes just such an assassination:

> One evening Debe walked right into Gau's camp and without saying a word shot three arrows into Gau, one in the left shoulder,

> one in the forehead, and a third one in the chest. Gau's people made no move to protect him. After three arrows were shot, Gau still sat facing the attacker. Then Debe raised his spear as if to stab him. But Gau said, "You have hit me three times. Isn't it enough to kill me, that you want to stab me too?"
>
> When Gau tried to dodge away from the spear, Gau's people came forward to disarm Debe of his spear. Having been so badly wounded, Gau died quickly.[105]

Gau had a history of violence that made his group unwilling to defend him. Previously, he had killed several people and started a feud that led to additional deaths. The precipitating event for Gau's own assassination was his killing of Hxome, the father of Debe's friend (also named Debe). Quoting that passage, Boehm comments in *Hierarchy in the Forest*: "Gau may well fit the tribal profile we saw earlier, of an incorrigible aggressor who dominates the group sufficiently that they cannot easily take care of the problem, and who essentially is given over to his enemies because his own group wants to get rid of him."

It's worth stressing that projectiles make much more powerful equalizers than hand-held weapons. As the story of Debe and Gau shows, it is easy to surprise a victim with a projectile weapon. Additionally, projectile weapons lend themselves much more readily to collective punishment. Fighters wielding clubs, spears, or swords can gang up on an individual, but once you get beyond two or three attackers, they start interfering with each other. A skilled opponent can take advantage of their lack of coordination and kill them all. (My empirical research, based on watching innumerable samurai movies, provides abundant evidence of this fact.) On the other hand, even the most skilled fighter cannot dodge all arrows shot at him by 10 or 12 people from different directions.

Lee's ethnography of the !Kung also provides an example of a group execution. The story concerns the notorious /Twi, who had previously killed a man in a spear fight. When /Twi killed a second man, the group decided that they needed to get rid of him. The first attempt was made by /Xashe, who ambushed /Twi near the camp and shot him with a poisoned arrow.

> They grappled hand to hand, and /Twi had him down and was reaching for his knife when /Xashe's wife's mother grabbed /Twi from behind and yelled to /Xashe, "Run away! This man will kill everyone!" And /Xashe ran away.

/Twi became enraged and started attacking people in the camp indiscriminately. He stabbed a woman in the face and then killed her husband.

> Now everyone took cover, and others shot at /Twi, and no one came to his aid because all those people had decided he had to die. But he still chased after some, firing arrows, but he didn't hit any more . . . Then they all fired on him with poisoned arrows till he looked like a porcupine. Then he lay flat. All approached him, men and women, and stabbed his body with spears even after he was dead.

As this story illustrates, /Twi was a fearsome fighter who terrified the people in his group. One faction first tried to delegate someone to assassinate him from ambush, but that did not work very well and eventually the whole camp had to collaborate in putting him down.

It is quite likely that the story of /Twi played itself out on innumerable occasions in prehistory. We have startling confirmation in a cave painting from Spain, dating from 12,000 years ago.[106] It apparently depicts a man pierced by a number of arrows. Above and to the right of him is a group of 10 people shaking their bows triumphantly (probably relieved that the assassination went well and nobody, except for the upstart, was killed).

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The killing power of projectile weapons is what made men equal. It also made men and women equal. Well, more nearly equal than males and females among gorillas, chimpanzees, and even bonobos. It's true that ancestral human societies, just like modern societies, divided work according to sex. While men had all the fun hunting big game, women were generally left to do the more labor-demanding and tedious tasks—gathering, processing, and cooking plant-based foods. But in subtler ways, the sexes were converging.

The invention of lethal weapons reduced the intensity of selection on physical strength, simply because a man armed with a bow and arrow (or a Colt six-gun) is equal to any other similarly armed man. Skill matters more than physical brawn. A puny David felled the giant Goliath with a well-aimed sling stone. As a result of this relaxed selection pressure, differences of size and strength between the sexes in humans are the narrowest among the great apes.

With physical strength largely neutralized by lethal weapons, the emphasis shifted to selection for social intelligence. The best way to control an aggressive and violent upstart is with a coalition; ideally, the whole group should come to a consensus that the bully must die. It takes social skill to build consensuses and persuade the upstart's relatives that they need to abandon him.

Lethal weapons also make any single man or woman highly vulnerable to a surprise attack. You can be killed when you sleep, or as you are relaxing by the fire enjoying a dinner and not expecting any trouble. You don't want to end up like Gau, none of whose people made a move to protect him until he was effectively dead. You want the people around you to be your allies, who will warn you, defend you when you are attacked, and exact revenge if you are killed.

Building and nurturing coalitions is therefore the other side of the egalitarianism that is enforced by lethal weapons. The capacity to form coalitions is not unique to human beings. Chimpanzees play politics a lot.[107] But humans are particularly adept at building *large* coalitions of dozens or more. According to the "social brain" hypothesis, the evolution of the oversized human brain during the Pleistocene was largely driven by intense competition between individuals for increased social and reproductive success.[108] Some anthropologists view language as primarily a tool of coalition building, which also improved the efficiency with which such coalitions and alliances operated.[109]

Although forager societies are egalitarian, they are not leaderless. But leaders lead not by intimidating and coercing their followers; instead, they persuade and build consensus. At the same time, they must strive to avoid any sign of despotism. They need to be modest, not overbearing. They have to be scrupulously honest and fair in their apportioning of labor, danger, and the rewards of collective action. Being a skilled warrior or hunter is helpful, but even more important is to be seen to employ those skills to the benefit of the group, rather than selfishly for themselves. And having social and political skills is even more important. For this reason, women play an important role in many forager societies, and can acquire high social status and political influence.[110]

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Let us now draw the diverse threads of this chapter together. Our focus has been on what made our ancestors different from our great ape relatives. It is now time to see how these changes made us uniquely predisposed to evolve cooperation.

Take one of the great technological advances of prehistory: the evolution of projectile weapons. Command of this technology (together with that other key one, fire) is what transformed ancestral groups like the australopithecines into a recognizable human being, *Homo erectus*, who wouldn't look out of place in New York City when dressed in modern clothes.

The invention of weapons that injure or kill from a distance put our ancestors on an evolutionary pathway—first, to passive scavenging, then to competitive scavenging, and then finally, to hunting.

Lipid-rich foods like bone marrow provided the building materials for huge brains. Cooking food, both underground storage plants (roots, tubers, and bulbs) that yield carbohydrates, and meat and marrow which supply protein and lipids, led to smaller guts and freed calories to maintain our energetically expensive brains.

Lethal weapons drove the evolution of egalitarianism, thanks to our collective ability to control and subdue aggressive, physically powerful males. Not needing huge musculature for male-to-male competition freed additional resources that could be channeled to the brain. Projectile weapons also increased the selection pressure for larger brains. First, better neuronal circuitry was needed for skillful and accurate aiming. Second, and even more important, large brains were needed to deal with the complex problems of social computation required for building and maintaining coalitions and for sophisticated collective action. It goes without saying that our large brains and astonishing cognitive abilities had manifold consequences for the evolution of cooperation.

During the Pleistocene period, people lived in small bands of hunter-gatherers. Social life was based on face-to-face interactions—everybody knew everybody else. Our remarkable brains made us very adept at remembering the history of all interactions with other members of the group. All grown-ups had reputations for being reliable or not, good cooperators or free riders. This meant that if you wanted to put together a team for some purpose (for example, to kill that mammoth or, perhaps, get rid of this murderer), you would know whom to include and whom to avoid.

Because humans are very good at detecting and excluding free riders from cooperative groups, cooperators and free riders can end up sorted into separate groups. As we saw in the previous chapter, such "assortative association" can drive very rapid evolution of cooperation.

Returning to one of the themes of the previous chapter, our large brains also made culture possible, which reduces variation *within* groups. This shaped within-group and between-group variances in a way that made it easier for cooperative traits to evolve. But that's not all. There were several other features of human social life that tilted the playing field in ways that favored the evolution of cooperative traits.

For example, one way to suppress within-group variation in cooperativeness is "moralistic punishment."[111] Cooperators are of course vulnerable to exploitation by selfish free riders. But what if they become angry and impose sanctions on those who refuse to contribute to the common good? This is where moralistic punishment comes in. If punishment is severe enough (and in the presence of lethal weapons it can grade all the way up to execution), even rational free riders calculate that contributing pays better, because the alternative is worse.

Groups still need enough moralistic cooperators who will force non-cooperators to pull their weight. If there are not enough moralists, cooperation unravels (and the moralists themselves stop contributing, because they don't want to be taken advantage of). But in groups that have achieved cooperation, moralistic punishment enforces the social norm that everybody contributes equally (some voluntarily, others because the alternative is worse). In other words, cooperators are no longer at a disadvantage compared with free riders. Moralistic punishment is basically a "leveling mechanism" that makes everybody equal within the group and, thus, shuts down within-group competition.

Finally, remember that the evolution of cooperative traits is favored when between-group competition is very intense. The most extreme form of between-group competition is, of course, war. When we survey the biological worlds, we find only two groups of organisms that practice large-scale warfare: human beings and ants.[112] It should not be surprising that both groups also construct huge and highly cooperative societies, albeit organized on very different principles.

Ant combat can be spectacular. But nothing in nature fights on anything like the scale of modern *Homo sapiens*. In the next chapter, we'll find out just how it was that humans became so astonishingly warlike.

Chapter 6
The Human Ways of War

War as a force of Destructive Creation

The large island of New Guinea is one of the most rugged places on Earth. It's so hard to get around that, for centuries, people who lived on the shores thought there was nothing in the interior but mountains piled on top of other mountains. It was only in the 1930s, when airplanes began overflying the island and prospectors started looking for gold in the forbidding mountain ranges, that Westerners learned the startling truth. Those first explorers found fertile valleys, separated by saw-tooth mountains. And the valleys were inhabited by a total of more than a million people, still living in the Stone Age.

One of the better-studied societies on the island is the Enga of central New Guinea. The Enga women cultivate sweet potatoes and raise pigs, while the men—well, it would not be much of an exaggeration to say that their chief business is war.

Warfare among the Enga was studied by the Australian anthropologist Mervyn Meggit, and more recently by the American anthropologist Polly Wiessner.[113] Meggit began his field research in central New Guinea in 1955 on one ethnic group among the Enga, Mae Enga, at the time when the Australian colonial authorities had largely succeeded in imposing peace on the central highlands (peace that, unfortunately, did not last). However, his primary interest was in the warfare during the period before the arrival of the Australians. The Mae Enga at that time numbered around 30,000. They were divided into "phratries" or tribes. A typical tribe, in turn, was subdivided into seven or eight clans, independent political units of roughly 300–400 people occupying between two and five square kilometers of land. These were very small-scale societies indeed.

Most warfare was between pairs of clans, although any particular conflict might also involve other clans coming in on one side or the other. Sometimes lethal conflict would break out between two groups in the same clan, and occasionally the Mae Enga organized Great Ceremonial Wars. These were a kind of tournament battle, which was fought between entire tribes or pairs of allied tribes. Great Ceremonial Wars were heavily ritualistic, and ended with exchanges of valuable gifts between the former combatants, followed by an enormous feast.[114] But the predominant form of warfare was that between clans, not those at the lower (subclan) and higher (intertribal) levels.

The intensity of warfare was very high. Meggit estimated that 35 percent of the men were killed in war or died of battle-related wounds. War was their main killer. An additional quarter died prematurely from illness or accident, and only 15 percent survived into what passed for old age (these percentages do not add up to 100 because in 26 percent of cases Meggitt was unable to determine the cause of death).

Constant warfare created a climate of fear and mutual suspicion. Most people stayed within their clan territories, spending most of their lives within those few square kilometers. Meggitt writes:

> In the past all movement outside one's own clan territory was hazardous, and in general men made such excursions only in

> armed groups and for compelling reasons, in particular to attend distributions of wealth, to negotiate exchange transactions, to trade, and to assist friends and relatives in battle. Casual social visiting by men was not common, not only because it exposed the wayfarer to the dangers of ambush and murder en route, but also because it violated Mae notions of personal privacy and group security. A man who unexpectedly appeared at the house of even a close kinsman in another clan was viewed with some suspicion by the latter's clansmen as a potential spy, who might carry home information—about the clan's defenses (palisades, ditches, secret escape passages, and the like) or about the disposition of its pigs—that could be used in planning a night raid or theft.

Warfare between clans, especially those belonging to different tribes, was very different from the ritualized tournaments of Ceremonial Wars. According to Meggitt, its distinguishing features were

> (a) the execution of surprise attacks or invasions with the aim of achieving a total rout that opens the enemy's territory to occupation; (b) the deliberate maximizing of property destruction (cult structures, houses, ceremonial grounds, trees, crops, and pigs), in the hopes of demoralizing the enemy; (c) the readiness to ignore the restraints of kinship and affinity, both as they moderate the intensity of violence and as they encourage acceptance of mediation or conciliation; (d) the occasional refusal to recognize non-combatant status; (e) the mutilation of fallen enemies; (f) and, perhaps, the longer duration of these confrontations.[115]

In short, interclan warfare has all the hallmarks of total war. The consequences could be dire for the losers. Of the 34 wars in Meggitt's database for which he could determine the final outcome, six resulted in eviction of the losing group, with the losers usually dispersing among other clans where they could find friends or relatives willing to take them in. On 19 occasions the victorious group was able to increase its land holdings, and in the remaining nine cases the fighting ended in a stalemate, in which neither side gained territory.

Yet—and this might come as a surprise—the highly intense and lethal conflict among the Mae Enga resulted in no cultural evolution whatsoever.

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In his controversial book, *War! What is It Good For?* Ian Morris makes a distinction between the "productive" and the "counter-productive" way of war. The productive way results in larger, safer, and more prosperous societies. The counter-productive way destroys such societies. The most counter-productive way, as Thomas Hobbes famously pointed out in *Leviathan*, is a "war of all against all":

> In such condition there is no place for industry, because the fruit thereof is uncertain, and consequently, no culture of the earth, no navigation, nor the use of commodities that may be imported by sea, no commodious building, no instruments of moving and removing such things as require much force, no knowledge of the face of the earth, no account of time, no arts, no letters, no society, and which is worst of all, continual fear and danger of violent death, and the life of man, solitary, poor, nasty, brutish, and short.

Morris's distinction is a useful way of thinking about war, and I adopt it here. This doesn't mean that I agree with everything in his book. In particular, I have a different view of what makes war "productive" versus "counter-productive," as we shall see later in this chapter. I also came to think that the way Morris framed the message of his book was itself counter-productive.

Take his title, *War! What is It Good For?* Many people, myself included, do not think that war is really good for anything. War is evil. Sometimes, it is a lesser evil. When the alternative is death, slavery, or the obliteration of cultural identity, many people chose to fight. But there is nothing good about being forced to make such a choice.

Not everybody feels the same way. There are those who glorify war and advocate a "muscular" foreign policy that uses war as "a continuation of political intercourse carried on with other means," in the (in)famous phrase of Carl von Clausewitz. In the United States the most prominent of these groups are the so-called neoconservatives (or "neocons"), who were particularly influential in the administration of George W. Bush (2001–08). However, there are adherents of a policy that combines militarism with utopian ideology among both conservatives and liberals.

This ideological stance was encapsulated by Madeleine Albright, the US Secretary of State during the Clinton administration:

> It is the threat of the use of force [against Iraq] and our line-up there that is going to put force behind the diplomacy. But if we have to use force, it is because we are America; we are the indispensable nation. We stand tall and we see further than other countries into the future, and we see the danger here to all of us.

Another famous Albright quote, said in frustration to the chairman of the Joint Chiefs of Staff Colin Powell, who felt that the US should not commit troops to Bosnia in the absence of a clear political objective, goes: “What’s the point of having this superb military that you’re always talking about if we can’t use it?”

When such views are expressed by top American policymakers (Albright is unusual only in being the most candid of them), it shouldn’t be surprising that many, including a significant minority within the country, consider the US the chief threat to world peace. Given an emotionally charged polemic between the advocates of a muscular foreign policy and their antiwar opponents,[116] a dispassionate scientific analysis of the role of warfare in human social evolution is difficult, to say the least.

Yet it must be done if we want to understand how cooperation evolved. I can only appeal to the words of Lewis Fry Richardson, one of the first scientists who subjected war to quantitative analysis:

> The present book has the . . . purpose of straightening thought about war and peace . . . [I]t seemed best to refrain from condemnation altogether. For indignation is so easy and satisfying a mood that it is apt to prevent one from attending to any facts that oppose it. If the reader should object that I have abandoned ethics for the false doctrine that “to understand everything is to pardon everything,” I can reply that it is only a temporary suspense of ethical judgment, made because “to condemn too much is to understand little.”[117]

Just keep in mind that when I call war “creative” or “productive,” my intent is not to glorify it nor to argue that war is in any sense good. By "creative" I simply mean that it has been one of the important selection forces for large-scale cooperative societies.

So, under what conditions is lethal conflict between human groups creative, and under what conditions is it only destructive? Once again, we must turn to the theory of multilevel selection. Just as between-group competition nurtures cooperation and within-group competition destroys it, *external war* (war between societies) tends to be a force of destructive creation, and *internal war* (war within societies) tends to be merely destructive (or counter-productive, in Ian Morris's way of thinking about it).

This sounds simple enough. But, like most simple ideas, it conceals some important complexities. Whether war is external or internal is only the first step in determining whether it is productive or not. War between societies can be a very bloody affair, with many soldiers and civilians killed. But if it's *inconclusive*, it will not be a force of cultural group selection. This is a very important point: what makes war creative is not how many people are killed. What matters is the effect on cultural evolution. War is an evolutionary force of creation only when it results in some cultural traits outcompeting others.

Cultural group selection can work in many ways. At one extreme, it's simply genocide: the losing group is slaughtered. The effect is that cultural traits that "resided" in the brains of the losing group, as well as their collective institutions, are eliminated. The winning group may expand into the territory of the vanquished, or perhaps send a colony there. In either case, the cultural traits of the winning group spread at the expense of the losers. It's brutal and ugly, but this is one way in which cultural evolution can play out.

Cultural evolution can also take gentler forms, however. One alternative to genocide is *ethnocide*, or *culturicide*. This is when the losing group is not physically destroyed, but forcibly assimilated into the culture of the winners. Being converted to another religion and having to learn the conquerors' language and adopt their social norms and institutions can also be very traumatic, and history shows that many cultural groups prefer to fight to the death rather than give up their culture. But if they do submit to ethnocide, at least the victims keep their lives.

Ethnocide can, though, take gentler forms than conversion under the threat of death. In reality, empires rarely pursue deliberate programs of cultural destruction. Assimilation happens gradually and is mostly voluntary. For a subject people, it often makes sense to adopt the imperial culture, because of its high prestige (for example, a large stock of world-class literature and art) and because it is in the economic interests of the subjugated. In the process the vanquished join the victors, and can even, over time, become fully equal to them. This is what happened in Roman Gaul, in which Celtic languages were completely eclipsed by Latin, except in the distant Bretagne peninsula. Another example closer to our own times is France during the 17th and 18th centuries. As the historian Victor Lieberman wrote in *Strange Parallels*, the court of Louis XIV (1643–1715) actively promoted the cultural unification of France "by attracting leading painters, sculptors, musicians, and playwrights to Versailles and by creating royal academies for the fine arts, sciences, and the French language."[118]

An even gentler form of cultural selection is one that does not require any conquest. People are smart and quite capable of imitation. When one society observes that it is falling behind another, it is typically racked by lots of soul-searching. The politicians and intellectual leaders may ask *what* *are we doing wrong?* Eventually, the society may come to a collective consensus that it needs to change. During the late 1980s and early 1990s, Russia decided to abandon the command economy and switch to a market-oriented one. China did it somewhat earlier (and was more successful at managing the transition).

What all these scenarios have in common is that the cultural traits of successful societies spread at the expense of the traits of the less successful. Everything from brutal genocide to the peaceful and voluntary adoption of institutions serves the process. The "destructive" part need not result in people being killed. What need to be destroyed are those cultural traits that make societies less successful—less cooperative, less internally peaceful, and less wealthy.

It's also striking that, over the course of human history, the more dire forms of selection have been gradually giving way to gentler ones. This observation provides some grounds for optimism, and I will return to it in the last chapter. Nevertheless, throughout the vastness of human history, it has been the brutal forms of between-group selection that have predominated. We may wish it were otherwise, but if we ignore it we will be failing at our job of understanding how social evolution really works.

But war, as I warned above, is (paradoxically) subtle. It doesn't always do what you expect. Really to understand how it created civilization, we should start by looking at a place where the process *didn't* work—a place where, despite centuries of bitter conflict, cultural evolution seemed frozen in time.

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Let's go back to New Guinea, and the endless battles of the Enga. Ceremonial wars between tribes were highly regulated and did not result in the extinction of a whole tribe. The real Enga Mae warfare was between very small-scale social groups—those clans of 300–400 people occupying a few square kilometers of land. Such groups could be extinguished when one clan defeated another and took its territory. But both the winning and the losing clans had precisely the same culture—they spoke the same dialect of the Enga language, they used the same weapons in battle, they grew the same crops and raised pigs in the same way, and they followed the same rules of social behavior. In short, more than a third of the men, and quite a few women were killed every generation, some clans disappeared, and victorious clans expanded territory, but overall there was next to no change in the frequencies of cultural traits.

The Mae Enga warfare, thus, provides us with a striking illustration of the importance of cultural variation. It doesn't matter how intense the selection on clans was (and it was very strong). There was very little variation in their cultural characteristics and therefore very little evolution. Once in a while, new rituals were invented. Sweet potatoes, which are now the staple food, only caught on in the Enga area roughly 350 years ago. And that's about it.

Slow cultural evolution was the rule not only in the Mae Enga district, but across New Guinean uplands. We can tell because along with its seriously rugged geography, the region contains an astounding number of languages—more than 1,000.[119] High linguistic diversity means that cultural group extinction is rare; it is a sign of weak competition between ethnolinguistic groups.

High linguistic diversity is found in two kinds of terrain: areas overgrown by thick and impenetrable tropical forests, and mountain regions. The tropical island of New Guinea has both. Other mountainous areas with very high linguistic diversity are the uplands of southeast Asia and the Caucasus mountains. Historical linguists call areas in which languages of various families are preserved “residual zones.” A “spread zone,” by contrast, is an area where languages tend to spread out widely, driving previous languages in the area to extinction. The typical result of a spread is that only one language occupies most or all of the area.[120] Spread zones are therefore regions where competition between cultural groups is so intense that one group can drive many others to (cultural) extinction over a large area.

It should come as no surprise that broad treeless flatlands like the Great Eurasian Steppe or the North American Great Plains are spread zones. We actually know enough history of the Eurasian Steppe to time some of the great spreads, tides of conquest that swept across thousands of kilometers between what are now Ukraine and Mongolia. Three millennia ago the victors were speakers of Iranian languages—Medes, Persians, and Scythians. These ancient peoples were succeeded by the Turkic and Mongolic nomads who spread from east to west in the middle ages. Finally, the Russians spread east along the northern edge of the Great Steppe during the Early Modern era. As a result, practically everybody who lives within the steppe belt of Eurasia speaks a descendant of one of the languages spoken by these peoples.

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The significance of terrain in defensive warfare is a relatively uncontroversial topic in military history. What other factors might affect the balance of offensive/defensive war, and therefore the strength of cultural group selection? One might think that military historians would have all the answers, but that's not the case. Or, rather, they offer too many answers that sometimes disagree with each other, and at other times are simply wrong.

The first misconception is the notion that warfare among non-state people is somehow an unserious, even a slightly comic, affair. Here's how the American anthropologist Harry Turney-High, whose *Primitive War: Its Practice and Concepts* (1949) influenced a generation of anthropologists studying warfare,[121] describes war among the Australian aborigines:

> The aborigines came together, formed some kind of battle line, then tried to out-scream, out-insult, and out-threaten each other, meanwhile hurling missiles at relatively safe ranges. It is true that sometimes one or more contestants were maimed, and even killed, but this was incidental, almost accidental, to the action. In such a fatal case, both sides ordinarily disperse, if they had not done so before out of boredom. . . . The Australian confrontation, as is so much of primitive war, was a tension-release device and no more.[122]

A tension-release device? In our survey of the Mae Enga warfare, we saw that more than a third of men in that ethnic group died in wars, twice as many as those who died of old age. Ethnographic data on Australian aborigines suggest similar costs of war. Among the Murngin people—now known as Yolngu—of northeastern Australia, for example, as many as 28 percent of the men may have been killed in war.[123]

What Turney-High and many other anthropologists after him did not seem to realize is that in small-scale societies even a single death can be a significant blow. A typical Mae Enga clan has about 100 warriors. Losing two or three of them in each battle quickly adds up, and once the losses reach 10–20 percent, they begin to threaten the very survival of the clan.

It is also worth remembering that warfare in small-scale societies can take two very different forms. The highly ritualized battle in the Turney-High quote is similar to the Great Ceremonial Wars of the Mae Enga. But Mae Enga, as we saw above, also practiced a much more brutal form of warfare, whose aim was to achieve the total victory over the enemy clan.

During the Age of Discovery, when Europeans arrived on the shores of Africa, Asia, and the Americas, they encountered very unfamiliar ways of war. Most Europeans were contemptuous of the native weapons, tactics, and discipline. However, as the anthropologist Lawrence Keeley makes clear in *War before Civilization* (1996), "a review of the history of warfare between tribal warriors and civilized soldiers uncovers a number of interesting general features that are not very flattering to Western military bombast." After discussing a number of conflicts between Europeans and "primitive" warriors, Keeley concludes:

> In most cases, civilized soldiers have defeated primitive warriors only when they adopted the latter's tactics. In the history of European expansion, soldiers repeatedly had to abandon their civilized techniques and weapons to win against even the more primitive opponents. The unorthodox techniques adopted were smaller, more mobile units; abandonment of artillery and use of lighter smaller arms; open formations and skirmishing tactics; increased reliance on ambushes, raids, and surprise attacks on settlements; destruction of the enemy's economic infrastructure (habitations, foodstores, livestock, and means of transport); a strategy of attrition against the enemy manpower; relentless

> pursuit to take advantage of civilization's superior logistics; and extensive use of natives as scouts and auxiliaries.[124]

There is no question that civilized states almost always prevail against tribal warriors in the end, but they do so primarily because they are large-scale societies fighting small-scale societies. Large states have much greater resources than tribal societies, both people and material, better organization, and greater staying power. They prevailed against primitive warriors by relentlessly "grinding them up." In the modern equivalent of primitive war, guerrillas simply avoid battles against the numerically and technologically superior government forces.

Both primitive warriors and modern guerrillas rely not on brute force but on mobility, stealth, and surprise. In the previous chapter, I discussed how the mastery of ranged weapons gave the early humans the ability to defend against large predators, to bring down fleeing prey, and to level the social hierarchies. Effective ranged weapons are also an important ingredient of success in irregular warfare. They make it easier to achieve tactical surprise and then disengage from the enemy. That's why one of the most devastating weapons in the guerilla's arsenal is the light mortar. In his manual *On Guerrilla Warfare*, Mao Tse-tung recommends that guerilla bands should be equipped with mortars of local manufacture. Such home-made mortars have been used by several insurgent groups, including the Irish Republican Army.

Common sense suggests that ranged weapons should be the preferred tool in not only irregular but any kind of warfare. Surprisingly, Turney-High disagrees:

> One often encounters statements of this type: In former times fighting was man to man, while today it is with long distance weapons. This is pure nonsense, of course, as any soldier will agree. Fighting has always been man to man, and still is. Fire weapons only prepare for the shock, the closing with the enemy, and that closing is man to man; that contact is the battle. This is standard military doctrine the world over.[125]

It's quite a remarkable passage. And it gets better. After asking which of the shock weapons is the most important, Turney-High offers the following answer:

> Call it spear, lance, pike, or bayoneted rifle, it has probably caused more human deaths than any other martial invention of man. One occasionally hears veterans of the World War of 1914-1918, especially those from noncombatant units, deprecate the bayonet. Medical officers say that their hospitals were full of bullet-wounded men, while they were seldom called upon to treat a bayonet wound. Such statements are compliments to the bayonet. Its victims did not require the service of the hospital squads but the burying party. It took the second World War to reduce its value, which decline may not be permanent.

I am at a loss to explain how a trained anthropologist, who also saw military service during World War II, could write this passage. There is broad agreement among military historians that during the modern era the overwhelming majority of battlefield casualties have been caused by firearms.[126] The only question is whether it was artillery or personal guns—

such as pistols, rifles and machineguns—that killed more soldiers. The answer is, it varied. Take, for example, the view of the British military historian Richard Holmes:

> Since 1775, weapons have become more lethal, and with increased lethality has come an increase in both the number of casualties and the severity of wounds. Before 1850, about half of all battle casualties were caused by artillery. The introduction of the conoidal bullet in the mid-nineteenth century greatly increased the range, accuracy, and striking power of small-arms fire, and in the Civil War rifle fire accounted for most battle casualties. By World War I, better recoil mechanisms (which improved the rapidity and accuracy of fire), the introduction of indirect firing techniques, and advances in high explosives and shell design made artillery once again the most destructive force on the battlefield.[127]

Turney-High offers no evidence suggesting that this scholarly consensus is wrong. The question of the role that the bayonet played in World War I, however, was of great interest not only to historians but also to military professionals, including the American general John F. O'Ryan, who decided to collect data that would allow us to resolve this question. First, he looked at the official report of the War Department and discovered that, of the 266,112 soldiers admitted to the military hospitals, only 245 had suffered bayonet wounds. This cause of injury ranked just below "pistol balls," but above "falling objects." So the bayonet was a more serious weapon for inflicting wounds than "falling objects," but not by much. Of course these data still leave open the question of how many were killed by the bayonet on the battlefield and never made it to the hospital.

To get at this question, O'Ryan sent a survey to all companies in his division. According to the many testimonials he received from officers and soldiers, very few had been wounded or killed with a bayonet on either side. When coming to close quarters, soldiers typically fired their rifles and used grenades. Then, before there was an opportunity to use the bayonet, the enemy typically surrendered—or ran away. "The statements of the officers and men of the division show that the bayonet is for the most part a psychological weapon."[128]

So for the modern era, Turney-High is clearly wrong. Hand-to-hand fighting is a very minor part of modern war. The most important military technology is that which allows fighters to kill from a distance. For most of the modern period, with a brief exception during the second half of the 19th century, it was artillery that won wars. As a Russian saying goes, "artillery is the God of War."

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It would be easy to dismiss the views of Turney-High as hopelessly outdated. The problem is that, until recently, military history was very Eurocentric. Questions about the relative importance of ranged weapons against shock weapons or regular war against guerilla operations can have very different answers, depending on whether you use only European evidence or if you range more broadly across the world. It is a pity, then, that historians have so often deliberately confined themselves to the former. There is a strand in military history—one that I find particularly unhelpful—which we might call "the Western Way of War," following a book of the same name by the American historian Victor Davis Hanson.

The pre-eminence of the "Western Way of War" is enthusiastically endorsed by such well-respected military historians as John Keegan and Geoffrey Parker. Parker, in particular, recently wrote in the introduction to *The Cambridge History of Warfare*, "the approach adopted in this volume lays its authors open to the charge of Eurocentrism; but we offer three defenses." He then pointed out that it would be impossible to provide adequate coverage of the whole world, and attempting to do so in a cursory manner would be "unpardonable distortion." Finally, "for good or ill, over the past two centuries the western way of war has become dominant all over the world."[129]

No sane person would deny the last point. The problem is, two centuries is not such a long time from the evolutionary perspective. Before 1500, Europe was a backwater of civilization. Most, if not all, important developments in military technology were taking place elsewhere in Eurasia. It is natural for historians today to be impressed by the "Triumph of the West"[130] and to search for the roots of "European greatness" in Europe's medieval and ancient history. But such a biased approach to history, which starts with the conclusion and then looks for supportive evidence, is dangerous. This is not to say that everything written in, for example, *The Cambridge History of Warfare* is nonsense—far from it. The editor and the authors of the volume are accomplished historians. Nevertheless, they get a couple of important things wrong, especially when they deal with the pre-gunpowder era.

For example, Parker asserts that a battle fought at close quarters with hand-held weapons was the most decisive kind of warfare during the ancient and medieval eras. The "Western Way of War," he and other contributors to the volume argue, originated with the heavily armed infantrymen of Greece—hoplites. After that, "war in western societies has followed a unique path leading to western dominance of the globe."[131] For details, let's go to Hanson's original formulation, in his book *The Western Way of War: Infantry Battle in Classical Greece*.

What was unique about those ancient Greeks? What was the wonderful recipe for world domination that they perfected? Hanson argues that the Greeks invented "the central act of Western warfare, the decisive infantry battle. Instead of ambush, skirmish, or combat between individual heroes, the Greeks of the fifth century BC devised a ferocious, brief, and destructive head-on clash between armed men of all ages."

I couldn't disagree more. "The decisive infantry battle" relying on "destructive head-on clash" is a sure way to lose a war against an opponent who knows what he is doing. The main problem with Hanson's argument and his glorification of hoplite warfare is that his evidence comes from a very small corner of the world. His argument is not just Eurocentric, it is Hellenocentric.

Nearly all fighting that the Greeks did was against each other, when an army coming from one polis, a Greek city-state, squared off against an army from another one. The most significant experience the Greeks had of fighting a different civilization was their wars against Persia during the first half of the fifth century BCE. Then, 150 years later, it was the turn of Persia to be invaded by the Greeks and Macedonians under the leadership of Alexander.

Hanson's ideas about hoplite warfare are entirely based on the writings of the Greeks themselves. But professional anthropologists (and most historians) know that you need to take what people say about themselves with a grain of salt. Naturally, the Greeks thought that they were the greatest and the best, and that their way of fighting was supreme (except when their cowardly enemies used unfair tactics to gain victory).

The Persians, unfortunately, left few texts from which we could gain an insight into their side of the story. On the other hand, it's not that difficult to figure out what they would say if we could ask them. If we could resurrect Xerxes, he would surely point out that he had a huge empire to administer, extending from India to Macedon (which was part of the Persian empire at that time). There were many other and more important regions to pay attention to, such as Egypt. For the Persians, conquering a distant and highly fractious region of Greece (there were perhaps 700 independent polities there) was more trouble than it was worth. Five hundred years later, the Roman Empire decided not to bother conquering Germany and Scotland for similar reasons.

Persian military operations in Greece suffered from two difficulties. One was that while the Greeks were fighting close to home, the Persian army was at the end of a very long supply chain. The Athenians could require their troops to bring their own rations with them when they mustered to repel an invading army, whereas the Persians had to spend several years gathering supplies in preparation for the invasion. Second, the heavily armored infantry was indeed much better suited to defending the rugged terrain of Greece against the Persian cavalry. Despite Hanson's thesis, the Greeks did not seek to defeat their Persian opponents in a decisive battle. They preferred to defend narrow passes against the invader. Luckily for them, such places abound in Greece. Thermopylae (the "Hot Gates") is only the most famous.

Despite this advantage, the Greek record against the Persians was a checkered one. They won some battles but lost others. And don't forget that the Persians achieved their main military goal: they overran and razed the two Greek cities that they wanted to punish for supporting the Ionian revolt, Eretria and Athens. So even in a defensive role, the Greek hoplites were not quite as impressive as their portrayal in popular histories, or in Hanson.

But remember that the Western Way of War is the supposed path to global dominance. And you cannot conquer an empire by defending mountain passes. The Persians were, obviously and uncontroversially, *much* better at empire-building than the Greeks. Even the largest Greek polities, such as Athens and Sparta, had populations numbering in the tens of thousands. By contrast, the Persian empire encompassed a territory of five million square kilometers, inhabited by 30–40 million people. How the Persians managed to build this first mega-empire in world history is of course a complex question. But part of the reason was that they had a highly effective army, and their preferred way of fighting was not the infantry charge, but cavalry, killing from a distance using ranged weapons. After all, as Herodotus tells us, the first two things that Persians taught their youth was to ride a horse and to use the bow (and the third one was to tell the truth).

In terrain where they have room to maneuver, mounted archers have a huge advantage over infantry wielding short-range weapons such as spears and swords. Riders can shoot arrows at their leisure, riding away when the infantry attempts to charge them and then wheeling back when the foot soldiers are exhausted with the chase.

The paradigmatic demonstration of the advantages of this form of warfare is the Battle of Carrhae in 53 BCE, fought between an invading Roman army, predominantly infantry, and Parthian cavalry. Though heavily outnumbered, the Parthians won. They accomplished this task by shooting literally millions of arrows at the Romans. At first, the Romans anticipated that the Parthians would run out of arrows, but this hope was dashed when they saw heavily laden camels arrive to resupply the archers. The Romans knew how to defend against archers, by forming a *testudo* (a turtle), in which the legionaries locked their shields to present a seamless barrier to missiles. But the Parthian army included a regiment of cataphracts, an elite cavalry force in which both rider and horse were protected by scale armor. This heavily armored cavalry charged the testudos and broke them up, exposing the Romans to the withering storm of arrows from mounted archers. The Roman army was destroyed: 20,000 perished and 10,000 were captured.

It is hard to understand why the proponents of the Western Way of War glorify the "decisive clash" with close-range weapons. In fact, the real Western Way of War has nothing in do with this delusion. Can you imagine American infantrymen charging Taliban fighters with their bayonets affixed? The real Western Way of War is for the army to stand back and use its superior technology to kill the enemy from distance.

Even before gunpowder, ranged weapons were much more efficient than hand-to-hand fighting. Think of English archers, who defeated much larger armies of French knights at Crécy and Agincourt. The most feared weapon during the Middle Ages was the cross-bow, so effective that several popes tried to ban its use by Christians against other Christians. In the end, the Hundred Years War was won by the French because they stopped trying to charge the English to cut them down with swords and battleaxes. Instead they employed a devastatingly effective new ranged weapon—cannon.

Most of the time in modern warfare, the combatants are so far apart that they don't even see each other. The ultimate distance weapon, the

Predator drone, allows its operator to kill from many miles away. And so does the much cheaper distance weapon, the low-tech IED (Improvised Explosive Device), used to such devastating effect against American troops and their allies in Iraq and Afghanistan.

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In the previous chapter we saw how thrown stones and spears, and later slings and bows, gave early humans the ability to defend against large predators, to bring down fleeing prey, and to level social hierarchies. Ranged weapons, together with the mastery of fire, literally made us human. They also defined what may be called the "human way of war." The distinguishing characteristic of human combat is the ability to strike from a distance coupled with mobility. This worked against large dangerous animals on the Pleistocene steppe, including sabertooth cats and mammoths. These species, extremely well-endowed for shock battle, were driven to extinction by fleet-footed humans wielding projectile weapons.

Such a fluid way of war was also horribly effective in human-on-human violence, both in its ancient forms and as used by modern guerrillas. Modern regular armies also rely on their ability to kill from distance, using artillery, bomber airplanes, guided missiles, and Predator drones. Clearly, the killing power of human weapons has grown astronomically from the Stone Age to the Atomic Age. Such dramatic technological transformations had to have an effect on social evolution.

And they did. There were several periods in history when war-making capacity increased by leaps and bounds. In subsequent chapters we will be tracing the consequences of such "military revolutions" on inter-societal competition and social evolution. Of particular interest are the innovations that shifted the advantage from defense to offense.

Improvements in armor and hand-wielded weapons can also have important consequences. But students of society should pay particular attention to those technologies that are key to the Human Way of War—tools that offer enhanced range and mobility. These are the technologies that make offensive war more devastating, and therefore a more potent force of social evolution. It is no exaggeration to say that, without certain momentous breakthroughs in our capacity to shoot and run, the greatest empires in history would never have got started.

Chapter 7
The Rise of God-Kings

The alpha male strikes back

The first Europeans to see the islands of Hawaii were members of a British exploratory voyage under the command of Captain James Cook—the same who, on an earlier expedition, had "discovered" Australia. These 18th-century British sailors came from a society that was much more hierarchical than we are used to. Yet even they were taken aback by the degree of inequality they found in Hawaii. "The authority of the chiefs over the inferior people appeared . . . to be of the most despotic kind."[132]

Those words were written by James King, who served as second lieutenant on HMS *Resolution* for much of Cook's third voyage (1776–79), though he finished it in command of its consort HMS *Discovery* following the deaths of Cook, killed in Hawaii, and his successor Charles Clerke, from tuberculosis. After returning to England, King published a detailed description of the Hawaiian islands, their geography, and their inhabitants. The society that emerges from his observations is one of stark differences in status:

> The great power and high rank of Terreeoboo, the *Ereetaboo* of Owhyhee [king of Hawai'i], was very evident, from the manner he was received at Karakakooa, on his first arrival. All the natives

> were seen prostrated at the entrance of their houses; and the canoes, for two days before, were *tabooed*, or forbidden to go out till he took off the restraint. . . . The power of the *Erees* [chiefs] over the inferior classes of people appears to be very absolute. Many instances of this occurred daily during our stay amongst them, and have been already related. The people, on the other hand, pay them the most implicit obedience, and this state of servility has manifestly had a great effect on debasing both their minds and bodies.[133]

King also noted that gender inequality (to use the modern term) was noticeably higher in Hawaii than on other Polynesian islands that the expedition had visited:

> It must be observed, that they fall very short of the other islanders, in that best test of civilization, the respect paid to the women. Here they are not only deprived of the privileges of eating with the men, but the best sorts of food are *tabooed* or forbidden to them. They are not allowed to eat pork, turtle, several kinds of fish, and some species of plantains; and we were told that a poor girl got a severe beating, for having eaten on board our ship, one of these forbidden articles.[134]

Modern Western societies, such as the United States in the 21st century, are nowhere near as egalitarian as human societies were before agriculture. However, the main source of inequality in America is the great disparity of wealth. A black youth growing up in a deprived neighborhood of Memphis, Tennessee, may live in poverty but has—in theory, at least—

the same legal rights as the billionaire Bill Gates. Since the abolition of slavery, and especially after the Civil Rights Era of the 1960s, American society has made a concerted effort to abolish "structural" inequality—any form of discrimination based on class, race or ethnic group, or gender. (Of course, while structural inequality has been declining since the 1960s, economic inequality has increased.)

The first large-scale complex societies that arose after the adoption of agriculture—"archaic states"—were much, much more unequal than either the societies of hunter-gatherers, or our own. Nobles in archaic states had many more rights than commoners, while commoners were weighed down with obligations and slavery was common. At the summit of the social hierarchy, a ruler could be "deified"—treated as a living god. Finally, the ultimate form of discrimination was human sacrifice—taking away from people not only their freedom and human rights, but their very lives.

Hawaii was more inegalitarian than any other Polynesian society in all these ways, up to and including human sacrifice. Here's what Captain King says in his journal:

> Human sacrifices are more frequent here, according to the account of the natives themselves, than in any other island we visited. These horrid rites are not only had recourse to upon commencement of war, and preceding great battles and other signal enterprises; but the death of any considerable chief calls for a sacrifice of one or more *Towtows* [see below], according to his rank; and we were told, that ten men were destined to suffer on the death of Terreeoboo. What may, if any thing possibly can, lessen, in some small degree, the horror of this practice is, that the unhappy victims have not the most distant intimation of their fate.

> Those who are fixed upon to fall, are set upon with clubs wherever they happen to be, and, after being dispatched, are brought dead to the place, where the remainder of the rites are completed.

Modern research, based on many sources beside the accounts of European explorers, confirms King's observations.[135] On the eve of European contact (late 18th century) there were four Hawaiian kingdoms, each controlling one of the largest landmasses (Hawai'i, Maui, O'ahu, and Kaua'i) together with the nearby smaller islands. Although there were minor variations, Hawaiian society in each of these kingdoms was divided up into three classes. At the top were *ali'i* or the chiefly class (King referred to them as *Eree*), which included kings, chiefs of several ranks, priests and their families. These elites owned all land but did not work it.

The second class, *noa*, comprised the commoners who worked the land owned by the chiefs. Most of the Hawaiians belonged to this class. They supported the elites through obligatory payments of tribute and labor. Common people were called "reddened men" (because they worked long hours under the sun) and "kindling wood." Intermarriage between the elites and commoners was forbidden. The only major exception to this rule was when chiefs chose exceptionally beautiful women from the commoner class to become their junior (but never senior) wives.

At the bottom of the pile were *kauwa* ("towtows" in the King quote above). This term is translated variously as "slaves" or "outcasts." The *kauwa* class supplied fodder for human sacrifice rituals at war temples. Their faces were often marked with special tattoos. When a need for a sacrifice arose, they could be suddenly grabbed by the chief's retainers and killed, as King describes in his journal—though their having "not the most distant intimation" of their fate, as he suggests, seems unlikely in a class that lived with the constant possibility of such a fate.

The Hawaiian chiefly elite were different from commoners not only because they had more wealth, prestige, and power. They were also beings of a higher order because they were the vessels of *mana*—spiritual energy flowing from the gods that was necessary for the wellbeing of the overall society. The higher the rank of a chief, the more *mana* was concentrated in him, with the king as the central node in the "*mana* distribution network." "The Hawaiian divine kings," writes the American anthropologist Patrick Kirch, "as gods on earth, were essential for the reproduction of the society; they also held the power of life and death over the common people, most often exercised through the rites of human sacrifice."[136]

It was essential to protect the king's supply of *mana*, and an elaborate ritual system ensured that it would continue to flow uninterrupted. This *kapu* (taboo) system controlled the daily lives of all Hawaiians. For example, it specified that men and women could not eat together; even their food was cooked separately (and, as Captain King's journal noted, the better types of foods were forbidden to women). But the most complex system of ritually prescribed practices was the one that regulated the dwellings, the dress, and the bodies of the rulers.

The Native Hawaiian historian David Malo (1793–1853) tells us that "when a tabu chief ate, the people in his presence must kneel, and if anyone raised his knee from the ground, he was put to death."[137] Whenever the commoners see the king or one of his highest-ranking chiefs coming, "they fall down flat on their faces scarcely daring to look up, and in this position they continue till he is twenty or thirty yards past them" (as related in the journal of Captain Clerke, Cook's short-lived successor). Any commoner failing to do this was executed on the spot.

Patrick Kirch concludes: "By the time of initial contact with Europeans, Hawaiians had taken the older Polynesian concepts of chiefship and rank, and subjected them to a form of hypertrophy, the logical extension of which was that their rulers, their kings, were now held to be divine. This was not simply a quantitative extension of the Ancestral Polynesian ranking system; it was truly a qualitative change by which Hawaiian society had entered a new realm."[138]

It appears that nearly all other archaic states experienced the same qualitative change to the extreme forms of inequality that Kirch describes for the Hawaiian kingdoms. Based on his survey of seven early civilizations, the Canadian anthropologist Bruce Trigger concluded that they all had slavery, divine kings, and human sacrifice. Details varied. In Egypt and Mesopotamia, human sacrifice was practiced primarily during the earliest periods of state formation, and was relatively rare thereafter. In the other five early civilizations (north China, the Maya Lowlands, Basin of Mexico, Peru, and southwest Nigeria) human sacrifice was a regular occurrence.[139] But the general observation is that all archaic states were extremely unequal.

It appears that something strange happened to human societies when they adopted agriculture. At first, growing crops and raising livestock did not have any perceptible effect on social structure. Small-scale societies of agriculturalists were nearly as egalitarian as small-scale societies of foragers. And those farming groups that stayed small-scale retained their resistance to hierarchy, avoiding large differences in wealth, status, and power. For example, among the Mae Enga, whom we encountered in the previous chapter, there are inequalities between men and women, and between old and young. But all adult men are essentially equal—there are no slaves and certainly there are no deified rulers wielding the power of life and death over everybody else.

In contrast, those societies that went down the path to civilization—growing large, acquiring cities, developing writing and extensive division of labor, and eventually becoming states—these societies became highly unequal, even despotic.

Which is very puzzling. For more than 90 percent of our evolutionary history, the overall trend of human social evolution was towards greater equality, as we abandoned the social hierarchies of our great ape relatives. But then a few thousand years after the adoption of agriculture, humans gave up on their fierce egalitarianism and accepted despotism. Why did they agree to this change? It is highly unlikely that they did it out of free choice. In fact, it is almost certain that they were somehow compelled into it. The forager ideas of equality did not disappear. Human beings, including those who live in despotic states, still value fairness and equity. We can gain a glimpse of what common people thought of their despotic rulers from listening to their songs and proverbs, some very ancient. Their views were not complimentary. A Hawaiian chant dating from before the European contact describes the king as the devourer of common people:

A shark going inland is my chief,
A very strong shark able to devour all on land;
A shark of very red gills is the chief,
He has a throat to swallow the island without choking[140]

Among the Bemba, a Bantu-speaking people in present-day Zambia, the king was chosen from the sons of the highest-ranking woman belonging to the chiefly Crocodile clan. As in Hawaii, the Bemba king exacted tribute and labor from the commoners, had to observe ritual taboos to preserve his reservoir of life force, and could mutilate anybody who offended him. The commoners had a saying among themselves, "the Crocodile clan tears common people apart with their teeth."

This image of rulers "eating" common people in archaic states crops up time and again all across the world. Just to give another example, in ancient India, the king (*raja*) was called "the devourer of peasants" (*vishamatta*).[141]

But perhaps the most remarkable evidence of how common people viewed the ruling elites in archaic states comes from *Shi Jing*, or the *Book of Odes*. *Shi Jing* is the oldest collection of Chinese poetry, containing more than 300 songs, odes, and hymns. All are at least 2,500 years old and predate the first unification of China by several centuries. One of them goes like this:

Large rat! Large rat!
Do not eat our millet.
Three years have we had to do with you,
And you have not been willing to show any regard for us.
We will leave you,
And go to that happy land.
Happy land! Happy land!
There shall we find our place.
Large rat! Large rat!
Do not eat our wheat.

Three years have we had to do with you,
And you have not been willing to show any kindness to us.
We will leave you,
And go to that happy State.
Happy State! Happy State!
There shall we find ourselves right.
Large rat! Large rat!
Do not eat our springing grain!
Three years have we had to do with you,
And you have not been willing to think of our toil.
We will leave you,
And go to those happy borders.
Happy borders! Happy borders!
Who will there make us always to groan?[142]

The reference to oppressing elites in this poem is somewhat oblique (one wonders what would happen to a peasant who was too explicit in his social critique of the existing order). But the earliest commentaries (and the *Odes* are written in such archaic Chinese that they are more or less unreadable without commentary) are quite explicit that this poem is about corrupt officials, rather than a lament about an agricultural pest.[143]

The transition from egalitarian small-scale societies to archaic states did not happen as soon as people settled down in farming villages. Polynesians colonized Hawaii around 800 CE, and it took around eight centuries for archaic states to emerge.[144] What's more, the Polynesians already had a lot of the cultural elements needed to develop a centralized, hierarchical society. Because agriculture arrived on the Pacific islands around 1500 BCE,[145] the overall period of "gestation" for archaic states seems to be something like 3,000 years. In other areas of the globe the period between the adoption of agriculture and the rise of the first states was even longer.

The earliest archaic states, as best as we know, appeared in southern Mesopotamia and southwestern Iran during the Uruk period (4,000–3,100 BCE). By that time agriculture had been present in Mesopotamia for at least 5,000 years. In other areas of the world that developed the earliest civilizations—south Asia, east Asia, Mesoamerica, and the Andes—the interval between the adoption of agriculture and the first appearance of states was between four and six millennia.[146] Five thousand years corresponds to 200 human generations. Evidently it takes a long time for small-scale agricultural societies to evolve into archaic states.

Furthermore, not all areas with farming societies developed into states. New Guinea is the most striking such area, because New Guineans started growing crops 10,000 years ago—nearly as early as the first farmers in the Fertile Crescent of southwest Asia. The highlands of New Guinea continued to be home to small-scale farming societies for *10 millennia*! Other areas that resisted the rise of hierarchy are found in tropical Africa and South America. Numerous ethnic groups that live in the mountainous regions of Asia stretching from the hills of Indochina into eastern Afghanistan also failed to evolve inequality and state-level organization, despite being surrounded by empires from ancient times.[147]

A productive economy based on cultivating plants and animals is clearly a necessary condition for the rise of large-scale, complex societies with great disparities in wealth and power. But there is nothing automatic about this connection. It takes at least 100 human generations for agricultural societies to develop into states, and several regions around the world resisted this transition until they were colonized by modern Europeans.

Actually, it's not rocket science to see why 99 percent of people would resist the imposition of an archaic state. Unless you are one of the rulers, life as a free farmer in an egalitarian society is vastly preferable. In *Revolutionary Dreams*, his study of 19th and 20th-century Russian utopianism, Richard Stites finds the political aspirations of Russia's peasant revolutionaries to have been "a generalized longing for nothing more than peace and quiet, enough food for the stomach and—summing all this up—*volya* [freedom], their major slogan." To the chagrin of the urban intellectuals who had an exciting new economic system to sell, they just wanted to be left alone, to live as peasants on their own terms. They probably shared this sentiment with farmers stretching back to the dawn of agriculture. The big puzzle is how archaic states could have come about despite such opposition.

Our main clue is that great distinctions in power, wealth, and status invariably follow the increase in the social scale. Let's be clear about what we mean by social scale. The term for an *independent* political unit that makes its own decisions about matters of peace and war is *polity*. A Mae Enga clan of 300-400 individuals is a polity, and so was the Kingdom of Hawai'i with 120,000–150,000 subjects when it was discovered by James Cook's expedition. And so is the United States. Polity size is key. A farming society could stay egalitarian, but only while people cooperated in small groups of hundreds or, at most, a few thousand individuals. Once the size of polity grows beyond tens of thousands and, especially, hundreds of thousands, it inevitably becomes hierarchical and unequal. There is no exception to this rule.

We know that, over the past 10,000 years, larger polities consistently outcompeted smaller ones, with the result that 99.8 percent of people today live in countries with populations of one million or more. There is something about the polity size, some great competitive advantage that it confers on the group, which explains why large-scale polities have taken over the Earth. It's the principle we met in Chapter 4 in relation to sports teams, the one economists call "increasing returns to scale." Individuals must do better living in a larger group than in a small one or by themselves. We saw how this law operated in early humans, who evolved the ability to throw stones. One or two hunters are not enough to chase a lion away; 10 or 12 working together can do it without significant risk. Hunting a buffalo collectively yields more meat to each hunter than individuals chasing rabbits. Sharing kills ensures that nobody starves. It spreads the risk and puts meat on your camp fire on days when you were unlucky with hunting.

In most cases, increasing return to scale works only for a while, and if the group is too large you run into the opposite trend, "diminishing returns to scale." A group of 100 hunters is no more efficient than a group of 10 in killing that buffalo. But if the buffalo has half a ton of meat, dividing by 10 yields fifty kilos to each hunter. Divided by 100, it's only five kilos. That's diminishing returns, and you are much better splitting your 100 hunters into groups of 10, each hunting its own buffalo.

Let us now ask, what kind of return to scale should we expect for cultural groups of 100,000 people? A million? What are such groups doing more efficiently than one of 10,000? One possibility is return to scale in economic production. In the modern world there is reason to believe that larger economies are more productive than tiny ones, due to such factors as extensive division of labor. In preindustrial societies, however, economic production was never organized on the massive scale that we see today. The huge bulk of it took place within family-size units, or relatively small workshops.

One theory that was popular for a time is the “hydraulic despotism” explanation. The German historian Karl August Wittfogel thought that ancient civilizations arose because of the need to build large-scale irrigation canals and flood-control measures. Such projects required centralized control and a specialized bureaucracy, which subsequently used its power to oppress the population.

The problem with Wittfogel’s theory, published in 1957 as *Oriental Despotism: A Comparative Study of Total Power*, is that it simply lacks empirical support. First, a number of “oriental despotisms,” as he called them, had no need for irrigation, thanks—in the case of the Russian empire (which he included in his list)—to a cold and wet climate. Nor had Russia any need for flood control—every spring, Russian rivers predictably inundate their flood plains and then subside. There is no need to control these floods; you simply don’t build a house on the flood plain.

But even in societies, such as Mesopotamia, that did rely on irrigated agriculture, all the necessary infrastructure was constructed at the local level by villagers cooperating with each other. There was no need for a huge state apparatus. In fact, as research by the Nobel laureate Elinor Ostrom showed, the involvement of state officials, often incompetent and corrupt, is actually *detrimental* to the efficient organisation of such “common pool resources.”

Other possible economic benefits of a large-scale society may include long-distance trade and the ability to buffer against local environmental disasters. More generally, the archaeologist Sander van der Leeuw thinks that large societies arose in response to the need to solve complex problems, which require high information-processing capacity and, therefore, large numbers of people.[148] Let's suppose that a group of people needs to solve a problem. For example, they have learned that they can grow crops rather than simply gather seeds. How should the production process be organized: who should cultivate which plot, when to plant and harvest, how to take care of the growing plants? (Which gods to pray to, and what kind of sacrifice they require?) Increased knowledge requires new specialties (engineers for constructing irrigation canals, traders for obtaining and transporting scarce materials, priests for praying, etc) requiring a larger group. But large group size creates new problems, which need to be solved —perhaps, by creating a hierarchy of bureaucrats to manage the production process. In other words, theorists like van der Leeuw envision that a switch from hunting and gathering to agriculture creates a virtuous circle between problem-solving capacity and societal size, gradually leading to an increase of the scale of cooperation.

I find it difficult to believe that economic or information-processing advantages were the primary drivers of the transition to large-scale societies. Archaic-style states of which we have direct knowledge, such as Hawaii, did not have complex economies or specialized decision-making procedures (to deal with what kinds of problems?). The chiefs were involved with war and ritual; the economy worked well enough when left to the commoners. In any case, it's hard to imagine that commoners accepted their subordinate, even—according to Captain King—debased, position in return for merely economic benefits. People living in small-scale societies are perfectly capable of organizing networks of long-distance trade that could (and did) move valuable goods across thousands of kilometers. They also construct networks of mutual support and obligation that allow them to weather periodic episodes of scarcity. You don't need a centralized, despotic government to solve these problems.

Another possibility intensively discussed by archaeologists is that the first centralized societies arose as theocracies. They would have been brought together around large-scale rituals orchestrated by religious specialists—priests. In this view, once the religious leaders had concentrated ideological authority in their own hands, they could start to exert economic influence. Collective rituals such as communal feasting require large amounts of food. The priests could then take over the redistribution of food and other resources within the society. For example, they could direct food from areas where crops did well to those that experienced crop failure. The final step was for these religious leaders to add military functions, and that would eventually result in their turning themselves into god-kings.

The key step in this explanation is the first one, with religious leaders acquiring enough power over the rest of population to let them transmit this power from father (or sometimes high-ranking mother) to son. In other words, how was inequality of power made hereditary?

As we saw in Chapter 4, small-scale foraging societies have leaders, but these leaders acquire power as a result of being particularly good at something. Anthropologists call this "achievement-based inequality." Moreover, the power of leaders in foraging societies is very limited. Typically, it pertains to only one area, their own field of expertise. One individual might be the leader during a hunting expedition while another helps to resolve conflicts within the band. Power is also limited because leaders must lead by example and persuasion; they cannot force followers to obey their orders. And power is not transmitted to the next generation. Each leader must rise on his or her own merits. Anyone who starts putting on airs and bossing other people around—an upstart—gets dealt with by the rest of the society. Egalitarian societies practice a reverse dominance hierarchy in which the 99 percent cooperate to keep upstarts down.

Yet in archaic states we have a direct, and very extreme, hierarchy, with an upstart (the god-king) oppressing the 99 percent. Could upstarts get started by using religious and ritual functions?

In *The Creation of Inequality: How Our Prehistoric Ancestors Set the Stage for Monarchy, Slavery, and Empire*, the husband and wife team of archaeologists Kent Flannery and Joyce Marcus outline a possible scenario for such a transition. Their ideas are based on ethnographic data collected by the anthropologist Simon Harrison. In the 1970s, Harrison studied Avatip, a farming and fishing community who live along the Sepik River in New Guinea. The Avatip society had two types of leader, secular politicians and ritual specialists (there were no military leaders because by the 1970s the area had been pacified by the colonial authorities). The secular and religious leaders in Avatip were typically different individuals, but during Harrison's study he observed the attempt by the Maliyaw, one of the subclans (of which there were 16), to concentrate both kinds of power in their hands. They did it by trying to monopolize all ritual authority. Here's the conclusion that these authors came to:

> Harrison's study of Avatip reinforces one of Rousseau's most important conclusions: inequality results from people's efforts to be thought of and treated as superior. Whatever the supporting role of factors such as population growth, intensive agriculture, and beneficent environment, hereditary inequality does not occur

> without active manipulation of social logic by human agents. The privileges the Maliyaw wanted would have to be taken away from their fellow subclans. To endure, they would eventually have to be justified by changes of cosmology—attributing them, for example, to legendary ancestors or supernatural spirits.
>
> We do not believe that Avatip was an isolated case. We suspect that prehistory is full of cases where one segment of society manipulated itself into a position of superiority; the problem for archaeologists is finding a way to document the process.[149]

Using archaeological data we can trace when inequality arose in different world regions. Two very clear indicators are the appearance of lavishly furnished burials and large, elaborate private residences. Skeletons can tell us that one segment of population ate much higher-quality foods and enjoyed better health than the rest. Based on such indicators, we know that large differentials between the rich and powerful few and the rest arose within a few thousand years of agriculture in Mesopotamia, Egypt, China, Mexico, and the Andes. Somehow a segment of society succeeded in manipulating itself into a position of superiority in these regions; this is a fact accepted by all archaeologists. But was it done by monopolizing ritual authority, as Flannery and Marcus think?

I see several reasons to doubt this explanation. First, it assumes that the majority of the population would not see through the attempt. Our oversized brains evolved, in large part, to detect and resist manipulation by those who want to get ahead at our expense. It is hard to see how aspiring upstarts could fool the rest to accept their pretensions. In fact, as Flannery and Marcus mention, Avatip leaders attempting to dominate in both secular and ritual spheres were envied, and ran a high risk of being murdered. It looks like the reverse dominance hierarchy was very much alive in Avatip!

We also know, of course, that human beings are not perfectly rational calculators. Our behavior and decisions are based on a mixture of calculation, emotions, and internalized norms, with calculation often a minor component of the cocktail.[150] By the time archaic states matured, many of the subjects undoubtedly believed that rulers were different and accepted that they either descended from gods, or were living gods themselves. Religion in archaic societies legitimized the pervasive inequalities between commoners and the ruling elite, and clearly this was an important factor restraining commoners from rising up and executing the upstarts. But such restraints were by no means perfect. Peasant rebellions were as much a fact of life in complex hierarchical societies as peasant deference to their social betters.

Indeed, leaders of peasant rebellions were not above using religion to legitimize resistance against oppressive rulers. One well known example is China's Yellow Turban Rebellion (184–205 CE). Its leaders, Zhang Jue and his two brothers, were the founders of a Taoist sect that preached the equality of all people. Ultimately, the rebellion was suppressed (as nearly all peasant revolts are), but in the process it brought down the Han Dynasty and initiated a long period of political instability. (If you want to find out more about this period of Chinese history, a very interesting place to start is with the 14th-century prose narrative *Romance of the Three Kingdoms*, which opens just as the Yellow Turban Rebellion is breaking out. If you don't think you will last through all four volumes, at the very least watch the spectacular movie *Red Cliff*, which relates a later episode of the novel. Incidentally, Luo Guanzhong, who is thought to have been the author of

Romance, probably saw another great peasant revolt, the Red Turban Rebellion, which destroyed the Yuan Dynasty.)

Let's go back to the origins of ancient despotism. Did it really grow out of religious authority, as Flannery and Marcus argue? I doubt it. Religion may help explain how the social order of archaic states was legitimated and perpetuated, but it does not explain how and why social deference arose in the first place. For tens if not hundreds of thousands of years before agriculture, human societies had very effective social norms and institutions for controlling bullies. Why would they suddenly (in a few thousand years) replace them with institutions that gave the upstarts legitimacy? Long-term social "experiments"—attempts to impose a new morality from above—show that social norms and institutions which go strongly against human nature do not "take," no matter how hard they are promoted.

I grew up in the Soviet Union. Soon after the October Revolution in 1917, the Soviet regime attempted a number of cultural innovations, prompted by its Marxist-Leninist ideology. For example, they abolished marriage. This innovation did not "take." Marriage was brought back in the 1940s, and by the time I was growing up in the 1960s and 1970s, very few couples who lived together with children were unmarried.

Curiously enough, another innovation imposed by the Bolsheviks, drastic leveling in wealth and income, fared much better. While Soviet rulers amassed enormous political and military power into their own hands, even in the late Soviet Union their economic position was not very different from that of the rest of the population. A member of the *politburo*, the elite of the elites of the Soviet state, enjoyed an income five to ten times higher than that of a regular worker (a similar comparison for the United States today gives a differential of 1000:1). Russia today is as economically polarized as America, but the egalitarian ethos still persists: the majority of the population does not believe that the new billionaires came by their fortunes in a fair and legitimate way. As a result, there was scant sympathy for such “oligarchs” as Boris Berezovsky, who was forced into exile, or Mikhail Khodorkovsky, who ended up in prison.

A cultural innovation that goes against a tenet of human nature—the need for a man and a woman to form a long-term bond—is very difficult to implement. But another innovation that works *with* the grain of our evolved psychology— aversion to inequity—fared much better. These considerations suggest that there had to be a compelling reason, a very strong selection pressure in favor of institutions that legitimize pervasive inequality. The first farmers living in small-scale egalitarian societies did not surrender equality voluntarily. They were forced to give it up. How?

Chapter 8
The Iron Law of Oligarchy

Why power inevitably corrupts

> *I am Tiglath Pileser the powerful king; supreme King of Lashanan; King of the four regions; King of all Kings; Lord of Lords; the supreme; Monarch of Monarchs; the illustrious Chief who under the auspices of the Sun god, being armed with the sceptre and girt with the girdle of power over mankind, rules over all the people of Bel; the mighty Prince whose praise is blazoned forth among the Kings: the exalted sovereign, whose servants Ashur has appointed to the government of the country of the four regions and has made his name celebrated to posterity; the conqueror of many plains and mountains of the Upper and Lower Country; the conquering hero, the terror of whose name has overwhelmed all regions; the bright constellation who, according to his power has warred against foreign countries and under the auspices of Bel, there being no equal to him, has subdued the enemies of Ashur.* (Translated by Henry Rawlinson)

So proclaims a cuneiform text inscribed on four large octagonal cylinders of clay found by archaeologists in the ancient city of Ashur, the capital of the Assyrian Empire. Tiglath Pileser I, who ruled from 1114 to 1076 BCE, was not a modest man. In fact, he was a typical archaic king.

Other Assyrian kings left equally bombastic inscriptions. A black marble obelisk discovered during excavations in Nimrud, a major Assyrian city, depicts five kings bringing tribute and prostrating themselves before Shalmaneser III (reigned 859–824 BCE). The inscription says: "I am Shalmaneser, King of multitudes of men, prince and hero of Assur, the strong King, King of all the four zones of the Sun and of multitudes of men . . ." and so on.

Finding such propaganda from long-dead archaic kings is a huge coup for historians. To give you an idea of how long these inscriptions are, their translations into English can occupy anywhere between 10 and 30 pages of text. They yield a wealth of data on the countries, peoples, and rulers in the Assyrian geopolitical neighborhood, but my interest is in what they tell us about the archaic rulers.

The Assyrian royal propaganda texts are basically lists of military campaigns against surrounding states or rebellious provinces. They sound a lot like the old joke about joining the army: "Travel to exotic countries! Meet new people! Kill them . . ." (although in the Assyrian inscriptions, one should add, "Flay them and stretch their skins on the battlements!") Here's this basic formula, illustrated with some typical passages from the Tiglath Pileser inscription:

> *Then I went into the country of Comukha, which was disobedient and withheld the tribute and offerings due to Ashur my Lord: I conquered the whole country of Comukha. I plundered their movables, their wealth, and their valuables. Their cities I burnt with fire, I destroyed and ruined. . . . I crossed the Tigris and took*

> *the city of Sherisha their stronghold. Their fighting men, in the middle of the forests, like wild beasts, I smote. Their carcasses filled the Tigris, and the tops of the mountains. . . .*
>
> *The ranks of their fighting men I levelled like grass. I bore away their gods; their movables, their wealth, and their valuables I carried off. Their cities I burnt with fire, I destroyed and overthrew, and converted into heaps and mounds. The heavy yoke of my empire I imposed on them.*

Mowing enemy soldiers "like grass," piling their bodies higher than mountains, and imposing a heavy yoke on populations are typical genre tropes in these inscriptions. Tiglath Pileser actually uses the word "yoke" 17 times. Not to be outdone, the *Annals* of Ashurnasirpal II, Shalmaneser's predecessor, who reigned between 883 and 859 BCE, use "yoke" 25 times. Ashurnarsipal ("I am a King, I am a Lord, I am glorious, I am great, I am mighty, I have arisen, I am Chief, I am a Prince, I am a warrior, I am great and I am glorious") could have given the other two lessons in sadism:

> *the rebellious nobles who had revolted against me and whose skins I had stripped off, I made into a trophy: some in the middle of the pile I left to decay; some on the top of the pile on stakes I impaled; some by the side of the pile I placed in order on stakes; many within view of my land I flayed; their skins on the walls I arranged; of the officers of the King's officer, rebels, the limbs I cut off; Ahiyababa to Nineveh; I flayed, him and fastened his skin to the wall.*

(Ahiyababa was the king of the city that had rebelled against Ashurnasirpal).

Flaying was just one of several cruel and degrading punishments that Ashurnarsipal had up his sleeve for vanquished enemies. His *Annals* describe in loving detail the cutting off of limbs and tongues, and the burning alive of prisoners. His favorite trick was impaling his enemies on stakes.

What we see in Mesopotamia around 1000 BCE is the archaic state in its dreadful majesty. Although the Assyrian kings undoubtedly exaggerated the numbers of unfortunates they executed in various painful and degrading ways, the scale of violence exceeds by an order (or two) of magnitude what we saw in Hawaii. A paltry 10 sacrifices when the chief dies? Here, take 1,000 corpses staked out next to the smoking ruins of a city.

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In the previous chapter we looked at the more benign explanations for the evolution of archaic states, and we have seen that those explanations don't work very well. Several questions remain unanswered. We are still unclear about the nature of returns to scale—what did large-scale societies do more efficiently, and why did they outcompete small-scale societies? It must be something big, to persuade populations of archaic states to submit to the yoke of god-kings such as Tiglath Pileser. Next, we still need to come up with an internally consistent and empirically supported evolutionary scenario for the transition to inegalitarian chiefdoms and states. And such an account should make it clear why the transition happened in Mesopotamia, China, Mexico, and Hawaii, but not in New Guinea.

There's an elephant in the room here (or perhaps more fittingly, a severed head on the banquet table). We haven't mentioned force—violence and fear of violence. In the Kingdom of Hawaii, force was always in the background. Remember what David Malo told us: “When a tabu chief ate, the people in his presence must kneel, and if anyone raised his knee from the ground, he was put to death.” Hawaiian commoners might have thought privately that chiefs were sharks devouring land and people, but in the presence of those chiefs they humbly exhibited all the required marks of deference, because the alternative was immediate death.

It would be a crude oversimplification, however, to think that social order in archaic states rested entirely on force. Undoubtedly, the majority of people genuinely and deeply believed in gods and supernatural life forces, and were convinced that the world order would collapse without their divine rulers to bridge the gap. An occasional execution was needed, if only to eliminate any unbeliever stupid enough to demonstrate a lack of belief, for example by being too slow to prostrate himself. Such periodic executions were also a potent selection force perpetuating religious orthodoxy. When people internalize social norms (such as prostrating themselves in the presence of the ruler), they don’t need to stop and think, what should I do? An internalized, deeply ingrained rule of behavior enhances your personal fitness because you automatically do whatever is appropriate to the social occasion, without wasting time weighing alternatives.

It therefore seems plausible that force has a role in maintaining the social order of archaic states, both directly and by providing the selective pressure for norm internalization. Again, this is just part of the story. We still need to understand how the archaic social order arose in the first place. Let us think once again about warfare.

One of the most influential theories of state formation was developed by the German sociologist Franz Oppenheimer at the beginning of the 20th century. In *Der Staat* (The State), published in 1908, he wrote this often-quoted passage:

> The State, completely in its genesis, essentially and almost completely during the first stages of its existence, is a social institution, forced by a victorious group of men on a defeated group, with the sole purpose of regulating the dominion of the victorious group over the vanquished, and securing itself against revolt from within and attacks from abroad. Teleologically, this dominion had no other purpose than the economic exploitation of the vanquished by the victors.[151]

This "conquest theory" of the origin of the state was highly influential, occasioning a great deal of debate during the 1920s. Although it continues to have its adherents, few anthropologists and archaeologists are to be found among them. The major problem for the theory, at least as it was originally formulated by Oppenheimer, is that it is not supported by data. Working more than a century ago, Oppenheimer simply did not have the wealth of knowledge about different kinds of societies since collected by anthropologists, nor the abundance of data that has been (literally) unearthed by archaeologists.

Oppenheimer classed hunter-gatherer societies and peasants ("hoe-farmers" or *Hackbauern* in Oppenheimer's original German, quaintly translated as "grubbers") as "peoples without a state." States could form only when "grubbers" came into contact with nomadic "herdsmen," whose main mode of subsistence was tending flocks of domestic animals. He further thought that social stratification could easily develop among the herders, because “distinctions in fortune quickly bring about class distinctions.” He envisioned that nomadic herders could easily adopt the institution of slavery. Some impoverished members of the tribe, who were forced to borrow animals from the wealthier tribesmen, could have ended up in debt slavery, when unable to pay back what they owed. Another possible source of slaves was war captives. In either case, slaves could be employed productively in a herding economy (although it is not clear to me why Oppenheimer makes a distinction between farmers and herders—shouldn’t slaves be as easily employed in agriculture as in herding?).

Oppenheimer apparently did not know about Ibn Khaldun. At any rate, he doesn’t cite him in *The State*. But in many ways the 20th-century German sociologist was following in the footsteps of the great medieval Arab scholar.

Ibn Khaldun pointed out that nomadic pastoralists were uniquely predisposed by their way of life to becoming effective warriors. Protecting their herds from predators (including other people) trained them in martial arts. Life in a harsh environment and a constant struggle against other groups also eliminated any tribe that lacked internal solidarity, or *asabiya*, to use Ibn Khaldun’s term. Only the most cooperative tribes survived and thrived under such conditions.

Ibn Khaldun grew up in Maghreb, a part of northwestern Africa stretching from modern Morocco to Libya. In this region he saw a recurrent pattern of state-building and collapse. The cycle started with a pastoralist tribe sweeping in from the desert, conquering the farmers living in settlements along the Mediterranean coast, and establishing a state there.

Within three or four generations, however, the former tribesmen lost their *asabiya* and became susceptible to another incursion from the desert.

State-building in medieval Maghreb, then, fits Oppenheimer's conquest theory quite well. But states arose all over the world, not just in areas near steppes and deserts. Aware of this difficulty, Oppenheimer proposed that "Vikings" or sea nomads could play the same role as land nomads in state building. In Mexico, an area that lacked both pastoralists and Vikings, he invoked "wild tribes (with a highly developed military organization) breaking in from the north, as endlessly as did Iran with Turan [broadly, the region to the northeast of modern-day Iran]."

Nomadic pastoralists, therefore, are not strictly necessary for the evolution of the state. This is good, because nomadic pastoralism evolved only after 1000 BCE, whereas the first states appeared in the Near East at least two millennia before that. We will return to the question of pastoralists in the next chapter, where we will see that Oppenheimer was partially right—nomads played an extraordinary role in the rise of the largest empires.

The main empirical problem for the conquest theory, however, is that the actual conquest of one people by another was relatively rare as a cause of primary state formation—the rise of the first states in a particular world region. Archaic states in Hawaii, for example, formed as a result of internal development, well before the Europeans arrived there. Another revealing case is that of Egypt, one of the two areas with the earliest states known to us (the other being Mesopotamia). It's interesting because we know that when Egypt was unified for the first time, it was not through conquest by either land or sea nomads. Instead, the drive for unification came from within Egypt itself (Upper Egypt, to be precise).

Finally, conquest really is what centralized societies do. Small-scale, egalitarian societies fight for many reasons, but subjugation of territory or people is rarely an explicit war aim for them.[152] These observations, of course, were made in societies that have been studied by anthropologists over the past century or so, but it seems reasonable to assume that small-scale societies in the past also fought mainly from motives of revenge and plunder.

The conquest theory doesn't work very well as an explanation of the transition to large-scale chiefdoms and states, because key parts of it are not supported by data. Conquest, however, is not the only way in which warfare could drive the evolution of centralized, inegalitarian societies. Let us consider an alternative theory, which we can call "the war alliance route."

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In the previous chapter we saw that the first leap in social complexity, from nonhierarchical, independent communities to centralized complex chiefdoms and the first states, was invariably associated with a dramatic increase in inequality. The question is, what was the specific evolutionary mechanism that allowed larger societies to outcompete smaller ones, despite the downside of despotism? And the most obvious candidate, it seems to me, is war. War is *the* reason why big states emerged. No other explanation really makes sense. I don't deny that large-scale social integration can also bring economic and information benefits, but the returns to scale in these aspects of social function are primarily relevant for modern societies in which war is less pervasive. Economic and informational challenges simply did not loom as large in prehistory as the existential challenge of battle. Besides, we have seen that war was the chief preoccupation, to the point of tedium, of archaic kings like Tiglath Pileser. We don't find boastful inscriptions from Ashurnasirpal about trading networks or well-maintained irrigation systems. In their own official statements, the first kings were *all about war*. Shouldn't we pay attention to what they tell us?

There are many methods by which a polity can improve its chances in military conflict. One is to manufacture better weapons or armor. But technological evolution in prehistory was so glacially slow that both sides in a conflict would quickly exhaust the stocks of available technology that could give them the edge against the enemy. Any new technological breakthrough was rapidly adopted by all groups, and none gained more than a temporary advantage from it. We have already seen one example of such rapid diffusion of military technology: the spread of the composite bow and body armor (the Asian War Complex) through North America.

A much more promising route to victory is to bring more warriors to the conflict. Remember, "God is on the side of big battalions." A polity could breed more warriors, but that's a slow process. Or it could form an alliance with other polities, radically and rapidly increasing the size of the allied army.

While we're on the subject, just why *are* extra soldiers so useful? Perhaps this question seems foolish, the answer self-evident. But the obvious answer is not the whole story. Under the right circumstances, doubling the size of your force generates more than a twofold military advantage. This seems counterintuitive, but it's true. It was proved mathematically—and independently—by the Russian general Mikhail Osipov and the English engineer Fredrick Lanchester during World War I. Here's how it works.

Suppose the enemy has 2,000 archers, while you have only 1,000. When the two armies engage in battle, all archers start shooting at their adversaries as rapidly as they can. The enemy army shoots a volley of 2,000 arrows, so each of your troops is threatened simultaneously by two arrows (2,000 divided by 1,000—this is, of course, the average, because one warrior may be hit by three or four arrows, while another gets lucky and sees not even one). Conversely, each enemy archer is targeted by only 0.5 arrows (1,000 divided by 2,000; in other words, half of them have nothing to fear). Allowing for mishits and complete misses, let's say that only one arrow in ten actually results in a casualty, wounding or killing a combatant. The first volley, then, costs you 200 casualties and the enemy 100.

In the next exchange, the 1,900 remaining enemies hit 190 of your men. At this point you have lost 39 percent of your force. Few armies can sustain such casualties, and yours is no exception. Your surviving warriors run away. You have lost.

Before the rout, you loosed the same two volleys as the enemy, first causing 100 casualties, and then 80. Overall, they have lost 180 fighters, or only nine percent of their force. In other words, the enemy's twofold advantage in initial numbers translates into an attrition rate less than 25 percent of yours—a more than fourfold superiority in military power. Additionally, once your force is broken, the enemy will chase you down and inflict additional damage, perhaps wiping out your army completely.

This effect is known as Lanchester's Square Law, because during each round of engagement, the proportion of casualties inflicted by an army on its adversary is the square of its numerical advantage.

Lanchester's Square Law works only with armies using ranged weapons (bows, rifles, artillery, etc), and only where the terrain allows concentration of fire by the whole army. If the two opposing armies use hand-held weapons, then a different calculation applies. For example, when two phalanxes of spearmen clash, only a part of the larger army can get at the enemy. On a plain, it is still possible to exploit a numerical advantage by attempting to envelop the enemy flanks, but this assumes that the attackers' movements are not impeded by the terrain.

Let's consider a case in which you have twice as many swordsmen as the enemy, but your army is channeled through a narrow valley, so that only 10 of your swordsmen can attack 10 of the enemy at any given time. You are still likely to win because the other side will run out of swordsmen before you, but your military power is only twice theirs (not four times, as was the case of archers fighting on the plain). This is Lanchester's Linear Law in operation.

The moral of this mathematical digression is that, on flat plains, with warriors using projectile weapons, any numerical superiority that an army can achieve over its enemy is magnified out of all proportion. In other words, Lanchester's Square Law yields an *enormous* return to social scale. If the opposing forces use a mix of ranged and shock weapons, numerical superiority will still be amplified, although not as much as with purely projectile weapons. So there is an intense selection pressure for cultural groups living in flat terrain to scale up, and a very high price to pay by those that fail to do so (recall where the first states emerged). In the mountains the selection pressure for larger societies is reduced considerably.

Wars are not decided only by superior weapons and numbers of combatants. Training, discipline, unit cohesion, and overall coordination of military effort are also very important. Command and control functions are particularly challenging for the military force of a tribal alliance. An effective chain of command, with a single overall commander, is what makes the difference between a mob and a real army. It is also the job of the supreme commander and his top officers to ensure that all members of the alliance pull their weight, and to punish those that decide to defect from the coalition. This means that under conditions of intense warfare and a real existential threat to groups that are defeated, we should expect a strong selection not only for larger size, but also for effective military hierarchies. In fact, these two processes work together, because the larger the military force, the more need there is for efficient command structures to ensure that the whole force can be brought to bear on the enemy in a coordinated fashion.

However, the more effective a military hierarchy is, the more power it has. Ideally, such powers should be exercised only during times of war, when the very existence of your polity hangs in the balance. But the military leadership may be reluctant to give up the reins after the war is over. And they are constantly tempted to convert their organizational power into material advantages for themselves and their families.

There is a principle in Sociology known as the Iron Law of Oligarchy. It says that all forms of organization, regardless of how democratic or autocratic they may be at the start, will eventually and inevitably develop into oligarchies. This principle was first formulated by the German sociologist Robert Michels in 1911. Michels studied the inner workings of socialist parties and labor movements. Both the leaders and the ranks of these organizations professed a strong belief in equality and democracy. And yet in practice, as the leaders accumulated power, they began to subvert democratic procedures. Power corrupts.

Robert Carneiro, an anthropologist at the American Museum of Natural History in New York, describes how the Iron Law of Oligarchy could play out in prehistory:

> As fighting . . . intensified, autonomous villages formed alliances with each other as they sought to protect themselves from enemy attacks. To lead the fighting force of allied villages, war leaders were either chosen or imposed themselves. These war leaders were often village chiefs who, elevated to carry out a more urgent function, found their powers greatly augmented. However, once the fighting ceased and villages returned to their normal conditions of autonomy, a war chief's power reverted back to what it had previously been. Nonetheless, with each successive war, military leaders tended to enlarge their powers and entrench their position. Moreover, they became increasingly reluctant to surrender these powers when the fighting had stopped. Finally, either through a chief's peremptory refusal to relinquish his once-delegated war powers, or (less likely perhaps) through the outright conquest of neighboring villages by the chief of the strongest one, the first permanent chiefdoms were established.[153]

Carneiro has long been an advocate of the warfare theory of state evolution. As we see, he allows either the conquest route or the alliance route to the centralization of power, but thinks the alliance route the more likely. I agree. But I would add two points to his explanation.

First, it wasn't just a single man who made the decision to retain power after the war ended. Remember, a single upstart is vulnerable to assassination while sleeping (or having sex, or taking a leak, which seem to be the preferred moments to eliminate a villain in gangster movies). No, the original coup would have had to be carried out by a group, most likely a chief together with his military retinue, professional warriors who had little interest in peaceful trades. And the chief, in return, shared with his warriors the fruits of domination.

Second, the process of transition to an archaic state was a drawn-out one. There must have been many fits and starts. Who knows how many upstarts advanced to the position of military chief before they were assassinated by their followers for refusing to relinquish their war powers? It was not enough to simply grab the power; the chief had to appear to do it *legitimately*. New cultural methods for legitimating chiefly power had to evolve, and that took time. This is why there were literally thousands of years between the adoption of agriculture and the transition to primary states. Cultural evolution may be faster than genetic evolution, but it still takes many generations to run its course.

Let us consider a historical example of an initially relatively egalitarian society that evolved into a centralized polity with hereditary kings. Our case study is Germania, an area in central and northern Europe during the Iron Age. It was inhabited by a variety of tribal groups speaking Germanic languages. This particular example was not what archaeologists call “pristine state formation” because the Germanic tribes could copy state-level institutions from the Romans and the Greeks in southern Europe, with whom they had come into contact. However, as we shall see, the transition from an egalitarian tribal society to a centralized state was anything but straightforward. The opportunity to borrow from existing state-level societies speeded up the process, but the new centralized polities in Germania still had to overcome the reluctance of the 99 percent to compromise on their egalitarianism.

At the beginning of the Common Era, Germans lived in small villages and farms surrounded by forests. Germania was divided up between many politically independent tribal units. A tribe was governed by an assembly of free adult men—the *Thing*. Germanic farmers during the Iron Age were not as egalitarian as hunter-gatherers. There was “nobility”—socially prominent and wealthy lineages (with wealth measured in livestock), from which tribal leaders were selected. When conflict broke out, the *Thing* elected a war chief who had considerable authority, but only in wartime. When the fighting ended, he had to surrender his powers. There was in addition a peacetime leader, called the *thiudans*, who was concerned with religious matters and ritual, and who also presided over the *Thing*. According to the Roman historian Tacitus towards the end of the first century CE, among the Germans “the king or a leading man is given a hearing, more through his influence in persuasion than his power in command.” Thus, although there was considerable variation between different lineages in wealth and status, Iron Age German society had few of the structural inequalities that we see in archaic states.

Such was the situation when the expanding Roman Empire impinged on Germania. Initially the Romans wanted to conquer it, but they were handed a stinging defeat at the Battle of Teutoburg Forest in 9 CE. Three Roman legions led by Publius Quinctilius Varus were defeated, utterly destroyed by Germans led by Arminius. Partly as a result of this defeat, the Romans abandoned their plans to push into Germania. Instead they established a permanent frontier along the Rhine.

The rise and fall of Arminius provides an excellent illustration of the difficulties of imposing a permanent centralized hierarchy on egalitarian tribesmen.[154] Arminius belonged to the most prominent lineage of his tribe, the Cherusci. To defeat the 20,000 Roman legionaries under Varus, he built a powerful tribal coalition that included not only his own people, but also several other tribes: the Marsi, Chatti, Bructeri, Chauci, and Sicambri. This tribal confederation persisted after the Battle of Teutoburg Forest. Initially it fought against the Romans, who invaded Germania on several occasions in retaliation for the loss of Varus's legions. However, immediately after the end of hostilities with the Romans, Arminius became involved in war with another powerful tribal confederation that was expanding from the southeast. These were the Suebi, and they were led by another king-in-the making, Maroboduus.

The ultimate fates of Arminius and Maroboduus were similar. Neither man was able to convert his war-leader position into that of a king. As Tacitus writes, "the Suebi did not like the royal title of their leader Maroboduus." Deposed, Maroboduus was lucky to escape with his life. He crossed the Danube and sought asylum with the Romans, who set him up in comfortable exile in Ravenna, where he died of old age 18 years later.

Arminius ran into the same problems with his own supporters. Tacitus reports that "the Roman evacuation of Germany and the fall of Maroboduus had induced Arminius to aim at kingship. But his freedom-loving compatriots forcibly resisted. The fortunes of the fight fluctuated, but finally Arminius succumbed to treachery from his own relations."

These tales of bravado and betrayal are part of what makes history so enjoyable. But how do they look when seen in the light of our theoretical framework? Arminius and Maroboduus were ambitious upstarts who got themselves elected as war leaders of their tribal alliances. They then used the constant warfare on the Roman frontier to enlarge their powers and to entrench their positions. This worked, for a while. Unfortunately for them, when the military pressure from Rome subsided and they refused to relinquish those powers, they were dealt with as are all upstarts in egalitarian societies: Maroboduus, as we have seen, fled into exile, but Arminius met an end that fits particularly well the pattern described by Christopher Boehm in *Hierarchy in the Forest*. He was slain by his own kin when he least expected it.

There must have been thousands of upstarts in human history who failed to make the leap to a permanent kingship. Let's briefly consider the story of perhaps the most famous—Gaius Julius Caesar, who belonged to a society that was making its own transition to a highly centralized, large-scale state, while retaining a number of egalitarian institutions.

In 509 BCE, the Roman aristocrats overthrew and exiled their last king, Tarquinius Superbus, and established the Republic. Tarquinius, whose nickname means "proud" or "arrogant," was another classic upstart. He came to power by murdering the previous king, and he instituted a reign of terror against the aristocrats who opposed him. At least, this is what Roman histories tell us—but we should take those with a grain of salt, because victors tend to rewrite history to suit themselves.

Whether or not Tarquinius was as bad as his legend suggests, Rome's nobles, wise after their experience with his brand of despotism, evolved a highly elaborate political system that was designed to prevent other upstarts from arising. The Roman Republic was by no means an egalitarian society, but the aristocracy (members of the senatorial class) governed it in a collective and consensual way. They needed leaders, of course. However, these leaders, the consuls, were elected for a term of only one year, and there were two of them to check each other's regal pretensions. In times of national emergency, the senators would elect a single dictator whose power was unlimited, except in duration (no more than six months, and the dictator was expected to resign as soon as the emergency passed).

This system worked remarkably well for almost 500 years. In fact, it only started to break down during the final century BCE. One reason for its eventual collapse was that legions were not disbanded at the end of wars, meaning that, over time, successful generals could build up a military force that was loyal to them personally. After a series of wars during the 90s and 80s BCE, the most successful military leader, Lucius Cornelius Sulla (138–78 BCE) defeated his opponents and forced the Senate to appoint him dictator indefinitely. Surprisingly, perhaps, Sulla surrendered the dictatorship after only a year and then soon retired altogether from public life, dying peacefully in his bed.

Caesar thought Sulla’s resignation was a mistake. If you’ve won power, why give it up? When he found himself in a similar situation, he had himself appointed dictator and kept the office for as long as he could. That turned out to be just until he was assassinated, four years later.

Caesar’s assassination also fits the pattern described by Boehm. There are two practical problems involved in putting down an upstart. First, he is likely to be a powerful fighter, so attempting to kill him is dangerous. For this reason, assassination must be plotted in secret and executed when the upstart does not expect it. Second, after the deed is done, there is a danger that his relations may decide to avenge his death by starting a vendetta against the perpetrators. That danger can be defused by convincing the upstart’s kin that he must go. This is what apparently happened with Arminius.

Alternatively, the responsibility for the killing may be diffused among the whole community, so that there is no single individual or kin group to direct a vendetta against. Remember that, when /Twi was killed, the members of the community "all fired on him with poisoned arrows till he looked like a porcupine. Then he lay flat. All approached him, men and women, and stabbed his body with spears even after he was dead."

Caesar's assassination was eerily similar. He was killed by a cabal of senators, who called themselves Liberators. There were at least 20, and perhaps as many as 60 conspirators. Caesar was stabbed 23 times, with most of the blows falling after he had already received the fatal wound.

In the end, not even his death could prevent the transition from Republic to Empire. After another decade of civil war, Caesar's adopted son and heir, Octavian, became the supreme ruler of the Roman state. Octavian succeeded where Caesar had failed, primarily because after two decades of incessant civil wars the common Romans yearned for peace and internal order. The old Republican system had discredited itself. The senatorial class was no longer able to deliver social peace and internal order. The Roman people had come to believe that only political centralization, with a monarch at the top of the chain of command, could guarantee peace. Much later, writing in 17th-century England and influenced by the civil war that he had just lived through, Thomas Hobbes gave this argument brilliant expression in *Leviathan*.

Octavian also differed from Caesar in that he was much more interested in the substance of power than its external trappings. He didn't style himself dictator or emperor, but merely *princeps*, the first among equals, and in 27 BCE took the name Augustus (meaning "sacred" or "venerable" and sharing its Latin root with *augur*, a religious official whose job was to interpret omens). Instead of accumulating offices, he divested himself of them, as he consolidated power. In 23 BCE Augustus even gave up the annual consulship that he had held since 31. Interestingly, the people of Rome, fearing the diminution of his authority and the return of political instability, rioted in an attempt to make him accept the office. The rule of Augustus rested on a broad popular consensus.

This is how upstarts succeed—by avoiding arrogance and cultivating modesty. But even more important, they need to demonstrate to the people that the hierarchical social order is preferable to the alternative. In the Roman case, it was the fatigue of persistent internal wars that led to the re-establishment of monarchy.

Monarchies can also arise under the conditions of incessant external warfare. This is what eventually happened in Germania. We can reconstruct the social evolution of kingship in the Germanic societies between 100 BCE and 500 CE based on a series of reports from the Romans and Greeks. In 100 BCE, when the Romans first encountered two Germanic tribes, the Cimbri and the Teutones, their "armies" were a swarm of small bands of marauding warriors without much in the way of centralized command structure. One hundred years later, we see temporary tribal alliances such as those led by Arminius and Maroboduus. The armies wielded by these leaders were much more cohesive forces. According to Tacitus, "the old German unsystematic battle-order and chaotic charges were things of the past. Their long wars against Rome taught them to follow the standards, keep troops in reserve, and obey commands." Nevertheless, when a war ended, the tribal alliances dissolved and alliance leaders were dispensed with.

The establishment of a permanent Roman frontier in Europe interrupted that pattern. An enemy on the doorstep encouraged continuous warfare. The Roman Empire was a source of unimaginable wealth—

prestige goods there for the raiding or the trading. In a shifting pattern of alliance and rivalry, the tribes fought among themselves for better access to the frontier. By the third and fourth centuries these temporary tribal alliances had settled into permanent confederations, such as the Goths, the Alamanni, and the Franks. Each confederation amalgamated many tribes within one overarching organization.

In fact, to call these political units "confederations" is not really correct. Under conditions of constant warfare and severe between-group selection, they evolved into centralized chiefdoms with permanent leaders who wielded enormous power over the rank-and-file warriors. The Iron Age division of labor between military and religious leaders was gone. In their place we see hereditary sacral kings, such as the Frankish Merovingians, or the Ostrogoth Amals. During the fifth century, several Germanic chiefdoms—the Franks, the Ostrogoths, and the Visigoths—underwent another transformation, to archaic states.[155]

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We are fortunate to have the sources to trace the evolution of Germanic kingdoms. But they raise a question. These archaic states arose in the vicinity of older state-level societies, which radically speeded up their development. Instead of the 5,000 years that elapsed between agriculture and the "pristine" states, Frankish and Gothic kingdoms coalesced in a mere half a millennium. Clearly, a big factor in this relatively rapid evolution was not needing to invent all the necessary institutions from scratch.

In addition, states make war, and existing states project an "aura" of warfare and militarization around them. Like sharks that need to keep moving or suffocate, most empires have to keep expanding. Stateless societies on imperial frontiers live under the constant threat of war. Even a stationary frontier, such as that between the Roman Empire and Germanic tribes, projects violence into the tribal zone. Apart from the lure of all those desirable, exotic goods, an empire also creates demand for slaves and raw materials (gold, furs, ivory, ostrich feathers).

Such militarized zones around imperial frontiers are important, because intense warfare is a necessary condition for the rise of states. This explains why, once the first state arises in a certain region, more tend to follow.

But what about "pristine" states, societies that centralize without a nearby state? What do we know about the incidence and intensity of war before the states arose?

Many readers will know that this is an extremely controversial question. There is a bitter "war over war" in academia, which periodically spills out into the blogosphere and popular magazines. Because my conclusions critically depend on the answer to this question, I also need to enter this contested field.

There are two extreme positions, neither of which makes sense to me. The first is the myth of the peace-loving "noble savage," which we discussed earlier. Even when such "savages" fought, their wars were somehow non-lethal and non-serious, even comic affairs (according to the Eurocentric notions of "primitive war").

We saw in Chapter 6 how this myth has been demolished in Lawrence Keeley's ground-breaking book, *War Before Civilization*. To recap briefly, Keeley writes in particular of how archaeologists "pacified the past" by refusing to see evidence of prehistoric warfare, sweeping such evidence under the rug when it "stared them in the face." He collected data from archaeological and ethnographic sources and demonstrated that death rates (in other words, the probability of being killed in war) were an order of magnitude higher in pre-state societies than in our own.

The opposite extreme is the view that the distant human past was an unrelenting Hobbesian "war of all against all." This position has been recently occupied by the psychologist and author of popular books Steven Pinker in *The Better Angels of Our Nature: Why Violence Has Declined.* Here's how Pinker starts Chapter 1, "A Foreign Country":

> If the past is a foreign country, it is a shockingly violent one. It is easy to forget how dangerous life used to be, how deeply brutality was once woven into the very fabric of our lives.

The bulk of Pinker's book is devoted to showing that the long-term trend for all forms of violence, including homicides, civil wars, and interstate wars, has been one of decline. There were some local peaks and valleys, but the violence curve starts very high and then gradually declines. It's a "declining sawtooth."

Pinker's book triggered a lot of controversy, with both supporters and detractors dissecting the data on which his conclusions are based (I will return to it in Chapter 10). Of particular interest to our goals here is the assessment of the Pinker thesis by academic anthropologists. One of the most thorough such critiques is *War, Peace, and Human Nature*, a collection of articles by a number of eminent archaeologists, anthropologists, and primatologists, edited by Douglas Fry.

In his summary of the evidence, Fry makes several excellent points. He agrees with Pinker that *after* the rise of large-scale states, or roughly over the past 5,000 years, the overall trend in violence has been downwards. But he fervently disagrees about the trajectory during the 5,000 years following the adoption of agriculture, but before the rise of the states. He argues that violence, and especially warfare, actually increased before it started to decline.

I concur. Multiple lines of evidence suggest that during the past 10,000 years the curve of war can be represented with the Greek letter Λ (lambda). Both the ascending and the descending trends are of course "jagged," because there were local increases and decreases superimposed on the long-term Λ-trend. The peak position also varies among world regions, and generally coincides with late pre-state and early state societies.

However, Fry and others who contributed chapters to *War, Peace, and Human Nature*, go too far when they suggest that "war was simply absent over the vast majority of human existence" prior to 10,000 years ago.

Yes, during the climate chaos of the Pleistocene, warfare was probably rare. Human populations were in much greater danger of being wiped out by the advancing glaciers than by another foraging band. When the glaciers receded, enormous areas opened up for re-colonization. Avoiding aggressors by moving away was both preferable and feasible. Yet there must have been periods of relatively stable climate when the local landscape would fill up. Nomadic foragers can be as territorial as farmers, and will defend rich hunting grounds or patches of valued plant resources. Once one group resorted to violence, war would spread: pacifist groups would be eliminated by natural selection. Such episodes of warfare could have been relatively rare during the Pleistocene, leaving no clear evidence in the archaeological record. If someone was killed by a well-thrown stone (or died later of the injury), how can we distinguish that from another unfortunate person who died in a hunting accident? In any case, we have very few skeletons from the Pleistocene, leaving us with scarce evidence for statistical analysis.

An additional problem underlying the prehistoric war controversy is that different people use different definitions of war. So let me be clear about the definition I use. My primary interest is in cultural group selection, and thus I define warfare as lethal group-on-group violence, no matter what form it takes (battle, raid, ambush of stray individuals, etc).

By this definition, both chimpanzees and wolves fight wars. Take Yellowstone National Park, where wolves were reintroduced in 1995, having been hunted to extinction there earlier in the 20th century. Once the wolf population increased to the point where all territory was divided up among the packs, between-pack violence flared up, ultimately becoming the chief cause of wolf mortality. We now have at least one example of one pack exterminating another. It happened, not in a single glorious battle, but by a thousand cuts, picking off one individual here, another there. The winning pack then expanded its territory and split into two.

When one pack of wolves exterminates another, I call it warfare because it is between-group competition carried out by violent means. Other scholars use different definitions. Some insist that conflict should be "organized" to count. Others consider only large-scale conflict and exclude "primitive war." Such alternative definitions may be as valid as mine, being appropriate to the kinds of questions and conceptual approaches that other investigators use. But I am interested in warfare as a form of between-group competition.

We run into further difficulties when trying to assess the prevalence of war in prehistory. Clearly, we need to distinguish between interpersonal violence and group-level war. This can be difficult. A skull bashed in by a blunt object may indicate a death in battle or a murder resulting from a domestic dispute. For this reason, many anthropologists want to see additional indicators of group-level conflict before they can agree that it was warfare. Such archaeological signs could be fortifications or weapons specialized for man-on-man fighting (warclubs, swords). Bows and arrows, however, are useful equally in hunting and in war. As a result, much warfare between small-scale societies, who tend to use ranged weapons and rely on raids and ambushes, will be invisible to archaeology.

Let's step back from this debate and consider how it affects the question we are currently investigating, the role of war in the rise of archaic states. While there is confusion resulting from competing definitions, and a great degree of controversy about evidence and how to interpret it, all parties agree on one thing: warfare was particularly vicious among pre-state farming societies. There is a lot of empirical support for what I called the Λ-shaped curve of warfare during the past 10,000 years. It is quite possible that the period after agriculture spread but before states arose was the most violent in human history—at least when measured by the proportion of people who can be shown to have died as a result of war. If this is correct (and this is a very active research area, so we should expect more data soon, especially as the methods of forensic anthropology improve), it will strengthen the proposed link between war and the evolution of states. Watch this space.

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Bringing together the various strands of the argument, I see the following sequence of events leading to the despotic archaic states. With the end of the Pleistocene around 12,000 years ago, the climate grew warmer and, more important, much less variable. Human populations began to increase everywhere. Migrations and colonization peopled new areas as they became habitable, and over the next few thousand years, the Earth's landscapes filled up with foraging bands. Eventually, few places suitable for human habitation remained unoccupied. Areas where people were already present in substantial numbers during the last Ice Age, such as the Near East, filled up first.

According to the standard archaeological model, this is what happened next. Around 10,000 years ago, human beings started to domesticate plants and animals. This allowed them to increase production of food dramatically, which in turn enabled greater population densities, sedentary ways of life, villages—and then cities, complex societies, states, writing—in a word, civilization. The adoption of agriculture, then, created a resource base capable of sustaining high population densities and an extensive division of labor. It also generated a "surplus" capable of supporting craftsmen, priests, and rulers. At this point, the standard theory branches out into several different models, with some emphasizing the need to manage the economy, others focusing on warfare, and still others stressing the role of ritual and religious specialists. Details vary, but the common denominator is that a rich resource base is not only a necessary condition, but also a sufficient one for the rise of complex societies.

I call this the "bottom-up" theory of the evolution of social complexity, because it treats social complexity as a sort of "superstructure" on the material resource base. In other words, if you stir enough resources into your evolutionary pot, social complexity will inevitably bubble up.

The problem with the bottom-up theory is that in several places where we can date the key stages in this process, we see a different sequence of events. The two sites with early monumental architecture that we discussed in Chapter 1, Göbekli Tepe and Poverty Point, arose before agriculture.

So here we have an inverted sequence of events. First, a fairly large-scale society arises, with quite sophisticated ritual activities and buildings requiring the mobilization of large numbers of workers. Only later comes agriculture. Has the standard theory reversed cause and effect?

Second, hunter-gatherer societies share food. Conversely, hoarding food marks you as an anti-social deviant. What this means is that the first wannabe farmer could put all that work into growing plants (clearing the field, planting, weeding), but others would think nothing of appropriating the crop when it had ripened. Or you could get to the point of harvesting and storing the crop, but then everybody else in your community would expect you to share it.

Third, agriculture has a dark side—a markedly negative effect on human health. Evidence is overwhelming that, after switching to agriculture, human stature decreased, a very reliable indicator of a decline in overall wellbeing. People fell sick more often because of higher population density and because pathogens jumped from domesticated animals to humans. The quality of nutrition declined, as is abundantly documented in ancient bones and teeth.

But the switch to agriculture did occur, and farming did spread, so there had to be a compelling reason why.

Here's what I think happened.

Go back to the post-Pleistocene landscape. It has been filling up with many local groups, each with a territory that it uses for hunting and gathering. Now, suppose that something happens that raises the level of warfare in the region—climate change, say. When the climate became dryer and cooler during the period known as the Younger Dryas (12,800–11,500 years ago), the productivity of plant communities declined, which caused a decrease in the carrying capacity for people who depended on these resources (the availability of game animals also decreased because their food base shrank). Scarce resources led to a spike in conflict between tribes (ethno-linguistic groups) as each group attempted to expand its territory to compensate for its reduced carrying capacity. Alternatively, perhaps no special climatic trigger was needed. As the landscape grew more crowded, neighboring groups increasingly came into conflict over resources that were growing harder to find.[156]

The new conditions of intense warfare raised the probability of extinction when a group lost a war. This meant there was now a strong pressure to increase the size of the cooperating group, something most readily accomplished by allying with other, culturally similar groups.

But size, as the saying goes, isn't everything. Melding an alliance into a cohesive force required additional cultural elements. It is not easy to keep a large group of people internally cohesive. You need a new type of social "glue." As we saw in Chapter 1, monumental sites where large-scale rituals could take place—henges and megaliths—appear to have served as a mechanism for binding together a community of thousands. Such internally cohesive societies had a better chance of surviving the conditions of constant warfare that developed after the end of the Pleistocene. But it wasn't enough.

Most likely, people who lived in the Fertile Crescent had already known about techniques needed to intensify plant production (there is scattered evidence of episodic cultivation going back 100,000 years). Previously there had been no reason to switch to the more laborious and less healthy life of a cultivator. But another way to increase group size, in addition to building alliances, is simply to have more warriors. Growing their own food enabled human groups to raise more warriors and concentrate them within larger war bands. Additionally, growing food in concentrated patches near a fortified settlement was safer than sending foraging parties to gather dispersed food resources.

Why was cultural group selection the key to the transition from forager to farmer? Because you cannot switch to farming when everybody else in your community is foraging. The whole group needs to shift together. It requires a new set of cultural norms and institutions shared by all. The most important such institution would have been property rights over the food that you have grown.[157]

The logic of cultural group selection also explains why agriculture was adopted in spite of its huge health costs. Groups of poorly nourished—perhaps even chronically sick—farmers were able to exterminate healthy and tall foragers simply by force of numbers. So individual fitness (both in the evolutionary sense and in the everyday sense of physical condition) declined, but evolutionary group fitness increased, and that is what drove the whole process.

Here, then, is the logic of my explanation. Rampant warfare leads to intense selection for larger society size. In order to make this transition, a number of seemingly disparate, but actually synergistic cultural traits need to coevolve. One necessary bundle of cultural traits is what makes agriculture possible—not only knowledge of how to cultivate plants and herd livestock, but also new social institutions such as property rights. Another set of cultural traits was large-scale rituals that bound together cooperative groups. Because both agriculture and large-scale rituals are driven by a third factor, warfare, in principle they could arise in any sequence. However, I'd expect that it was easier for our ancestors to adopt new rituals, because all they needed was to expand the scale of previously existing, small-scale ones. On the other hand, a transition to agriculture requires private property norms, and that goes against the grain of egalitarian forager principles. This is why monuments, used for ritualistic purposes by large groups of people, could appear before farming, as they did in several well-documented cases.

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Growing food instead of gathering it, requires more work and has substantial health costs, but it makes land much more productive. Gardens and fields can be cultivated near a stronghold, providing greater security against sudden attack. Tilled fields can support many more warriors than the same area under forest. The military value of agriculture is huge and trumps the costs. When farmers and foragers come into contact, farmers always win eventually and farming spreads (unless the area is unsuitable for agriculture). And with farming spreads private property.

Once property evolves, so do differentials in wealth. There is a kind of inevitability about it, so much so that social scientists came up with a name for it: the Matthew Principle. It goes back to what Jesus Christ said in the Gospel According to Matthew, in the New Testament: "For whosoever hath, to him shall be given, and he shall have more abundance: but whosoever hath not, from him shall be taken away even that he hath." (Matthew 13:12). In short, the rich get richer, and the poor get poorer.[158]

Here's a simple model showing why concentrations of wealth are inevitable unless it is periodically redistributed. Think of a society of cattle herders. Cows are their main form of wealth (which seems appropriate since the Latin word for wealth, *pecunia*, originally meant livestock). Because it is almost always men who own property in herding societies, let's follow the fortunes of two men. One, call him Abel, starts with 20 cattle. Another, Cain, has only 10. Perhaps Abel was the only son and inherited all his father's animals, while Cain had a brother and only got half the herd.

Both Abel and Cain marry and have children. They need to feed their families. Let's say it takes 15 cows to support a family. Fortunately, cows make calves, so every year the number of animals doubles. Abel's herd increases from 20 to 40, of which they eat 15, leaving him with 25 cows. Next year, the herd doubles again to 50, of which 15 are eaten, leaving 35. With every year his wealth grows: 20→25→35→55 and so on.

Cain's herd also doubles, from 10 to 20 cows, but he has to butcher 15 of them to feed his family. He is left with only five. Next year, they double to 10. So Cain's family eats all the cows he has and begins to starve. However, Abel's 55 cows are really too many for him to handle alone, so he hires Cain as a cowhand. Abel's livestock now needs to feed two families, but by this point there are enough for all. Next year the herd doubles to 110 cows, of which 30 are eaten and 80 left. From 80 it grows to 130. Now Abel needs to hire another cowhand . . . you get the idea.

This Abel and Cain model is, of course, a caricature, but like any good caricature, it captures something important about a complex reality. In *Capital in the Twenty-First Century*, using mathematical models and large datasets, the French economist Thomas Piketty demonstrates the economic truth of those lines from St Matthew (even if they were intended in the gospel as a spiritual metaphor). Just as cows breed more cows, wealth breeds more wealth. The Matthew Principle means that economic inequality always increases. Short of a destructive war or a revolution that expropriates from the rich, economic inequality can only be kept in check by some kind of periodic redistribution, such as progressive taxes on wealth and inheritance.

In small-scale societies, wealth differentials never became extreme, with one lineage owning all the property (which is where the pure economic logic leads). There were a variety of institutions that redistributed wealth and prevented runaway accumulations. Men who amassed significant wealth were expected to contribute more to community projects, perhaps—building a ritual house or funding a communal feast. A well-known example of this is the ceremony of *potlatch* of the indigenous peoples of northwestern America, which involved feasting, dancing, and prolific giving of gifts. Half the world away, in the mountainous Assam province of India, we see similar practices among the Naga men who wanted to achieve renown. A man could become a *kemovo*, a "holy man," by accumulating a huge amount of wealth, which would enable him to sponsor a series of increasingly lavish rituals, culminating in a "stone-pulling" event. A hundred men hauled a stone monument weighing several tonnes from a distant quarry to the host's village. After the job was done, the sponsor provided a feast, in which 12 bulls, eight pigs, and hundreds of gallons of rice beer were consumed.

In all these small societies, men who merely hoarded possessions were not respected. They were envied and ridiculed. But men who chose to spend their wealth on behalf of the community gained much prestige and influence. Competition between ambitious men in small-scale farming societies (and some foragers who lived in particularly rich areas) encouraged them to accumulate riches—and then to give it away, converting wealth into respect.

Leaders in such societies, whom anthropologists call “Big Men,” could not issue peremptory orders to other men. Big Men were not arrogant upstarts. They led by example, persuasion, and diplomacy. They also could not pass their status to their children. The sons of Big Men had to accumulate their own wealth, and then spend it, if they wanted to achieve a similar position of respect and influence. And so leadership in Big Man societies was based on personal achievement, and could not be inherited.[159]

The transition from Big Man societies to centralized chiefdoms in which power passed from father to son was not a simple matter of accumulating wealth and setting oneself up as a chief, with powers of life and death over others. As I discussed earlier in this chapter, other tribesmen would never allow this to happen (would you?).

But in areas where war became so intense that it threatened the survival of the whole tribe, ambitious men could also pursue the military route to power. They negotiated alliances and led warriors in battle. If they were successful, they acquired much prestige and power. In wartime they were even given powers of life and death over the rank and file, because they needed to be able to maintain discipline and punish deserters or traitors. Keeping these temporary powers after the war, however, turned out to be an exceedingly difficult proposition, as Arminius and Maroboduus discovered. A successful upstart who wants to become king needs something extra. His authority cannot be maintained by force alone; he needs to persuade others that he has *legitimate* authority.

Strangely enough, it is easier to become a god-king than merely a king.

To become god-king the successful upstart needs several things. Obviously, he must be at the top of the military chain of command. But he also needs to become the ritual leader, so that he controls the religious hierarchy—large-scale ritual cults that evolved to cement tribal alliances. Finally, the king-in-the-making needs a fanatically loyal retinue that will follow his orders without question and compel others to do the same. The king needs loyal warriors to protect him from assassination, and to put to death any commoner who shows insufficient respect and obedience. Basically, the king and his retinue are a coalition of upstarts, with the king as the alpha male and his followers as lesser upstarts, but who also do quite well out of the deal.

History knows many examples of war leaders who combined military skills with exceptional charisma and luck. Think of Alexander the Great, who never lost a battle, even when heavily outnumbered. Such a leader acquires an aura of being more than just a man; a supernatural being. Alexander, for example, claimed to be the son of Zeus-Ammon. In fact, he succeeded in becoming god and was worshipped as such during the last years of his life, and especially after his death. A cult of Alexander flourished for centuries in the Hellenistic world, and only died out (or was suppressed) with the spread of Christianity.

While the career of Alexander is quite instructive, he was probably unique in going from being the son of a Macedonian chief to a god-king ruling a huge empire in a single lifetime. The "apotheosis" (becoming god) of Alexander was greatly aided by long cultural evolution in the Near East before him; he merely stepped into a pre-evolved role. Nor should his empire-building accomplishments be exaggerated. His empire was essentially just the Persian one, with very few additions.

But there must have been many other men in prehistory who parlayed military success into a kind of *mana*, an aura of invincibility and supernatural ability. Here's how the religious scholar Robert Bellah sees this critical transition:

> An increasing agricultural surplus allows larger groups to form—groups beyond the face-to-face bands of hunter-gatherers—and the age-old techniques of dealing with upstarts are harder to apply in such larger-scale societies. But the opening wedge for a successful upstart is most often militarization. . . . In a situation of endemic warfare, the successful warrior emanates a sense of mana or charisma, and can use it to establish a following. . . . It is when the outstanding warrior can mobilize a band of followers that he can challenge the old egalitarianism and, as a successful upstart, free the disposition to dominate from the controls previously placed on it.[160]

Perhaps something like this happened in Germania in late Antiquity. It took several centuries, but eventually the Germanic societies made the transition from purely military leaders like Arminius and Maroboduus to the sacral kings of the later Germans, who traced their ancestry to supernatural beings. The position of the Merovingians and the Amals was much more stable, because their authority was buttressed by multiple sources of social power: military, political, and ideological (ritual).

Even the Germanic kingdoms did not develop in isolation. The Roman Empire radiated war across its frontier but it was also a source of state-level institutions to borrow or imitate. States that had to find the path on their own evolved much more slowly. In the Near East—Mesopotamia and Egypt

—where agriculture has been practiced for 10,000 years, the first priest-chiefs show up roughly 7,500 years ago, and the first god-kings 5,000 years ago.

Archaic states spread because they were more efficient military machines than chiefdoms or tribes. The power of kings and nobles who ruled these early states was not limited by moral considerations. On the contrary, the prevailing ideology of the day exalted the rulers and legitimized the gulf between them and the other 99 percent. In their degree of despotism, the archaic states far exceeded even the ancestral great-ape societies. Chimps and gorillas do not deify their alpha males, perform ape sacrifice, or enslave other members of the troop.

If my argument is correct, the main culprit in all this is war. During the ascending arm of the Λ-curve, war fulfilled the worst expectations. Not only had its intensity been increasing, but it also created hugely unequal, despotic societies.

Then something strange happened. War's power as a force for cultural group selection continued to increase. Three thousand years ago it went up another notch, thanks to the introduction of even more powerful military technologies. And yet, instead of a continuing trajectory of ever more carnage and despotism, there was a turn-around. Somehow, military competition between societies became a force for greater equality, less violence and, ultimately, a better life for all. How could that be possible?

Chapter 9
The Pivot of History

The spiritual awakening of the Axial Age

> *Beloved-of-the-Gods speaks thus: This Dhamma edict was written twenty-six years after my coronation. My magistrates are working among the people, among many hundreds of thousands of people. The hearing of petitions and the administration of justice has been left to them so that they can do their duties confidently and fearlessly and so that they can work for the welfare, happiness and benefit of the people in the country. But they should remember what causes happiness and sorrow, and being themselves devoted to Dhamma, they should encourage the people in the country to do the same, that they may attain happiness in this world and the next. These magistrates are eager to serve me. They also obey other officers who know my desires, who instruct the officers so that they can please me. Just as a person feels confident having entrusted his child to an expert nurse thinking: "The nurse will keep my child well," even so, the magistrates have been appointed by me for the welfare and happiness of the people in the country.*

The hearing of petitions and the administration of justice have been left to the magistrates so that they can do their duties unperturbed, fearlessly and confidently. It is my desire that there should be uniformity in law and uniformity in sentencing. I even go this far, to grant a three-day stay for those in prison who have been tried and sentenced to death. During this time their relatives can make appeals to have the prisoners' lives spared. If there is none to appeal on their behalf, the prisoners can give gifts in order to make merit for the next world, or observe fasts. Indeed, it is my wish that in this way, even if a prisoner's time is limited, he can prepare for the next world, and that people's Dhamma practice, self-control and generosity may grow.[161]

This remarkable statement, known as the Fourth Pillar Edict of Ashoka, is carved on a massive sandstone pillar 15m (50 feet) tall, which today stands in Delhi (it was moved there from the town of Torpa in northern India by Firuz Shah Tughlaq, who ruled the Sultanate of Delhi in the 14th century). The Fourth Pillar Edict is one of many ancient inscriptions found on huge stone slabs and pillars in India, some still standing more than two millennia after they were erected. The steles were made on the orders of the third Mauryan emperor, Ashoka the Great (ruled 268–239 BCE). Altogether, Ashoka left 33 inscriptions carved on pillars and rocks. They give us an extraordinary insight into the mind of one of the most powerful rulers in the ancient world.

Because of the informal, even chatty, style of many passages, scholars believe that the inscriptions were dictated to a scribe by the king himself. The First Rock Edict, for example, starts by enjoining people not to slaughter animals for food or sacrifice. Then Ashoka says, "Formerly, in the kitchen of Beloved-of-the-Gods, King Piyadasi [the name by which Ashoka refers to himself], hundreds of thousands of animals were killed every day to make curry. But now with the writing of this Dhamma edict only three creatures, two peacocks and a deer, are killed, and the deer not always. And in time, not even these three creatures will be killed." This certainly doesn't sound like it was drafted by an official committee. As the Buddhist scholar Richard Gombrich writes, "Here as so often the rather clumsy style seems to have the spontaneity of unrevised dictation."[162]

The official starting date for the Mauryan Empire is 322 BCE, the year when Ashoka's grandfather, Chandragupta Maurya, overthrew the ruler of Magadha and installed himself as king. Magadha was a large and powerful kingdom on the Ganges river. Using it as his base, Chandragupta conquered most of northern India, including what is now Pakistan and even parts of Afghanistan. His successors expanded the empire until it encompassed nearly all of the Indian subcontinent and some 50 million people.

The Mauryan Empire was one of the new kind of state—mega-empires, controlling millions of square kilometers of territory and governing populations numbered in the tens of millions. Mega-empires suddenly cropped up all over Eurasia during the final millennium BCE. The Mauryan Empire followed the Achaemenids in Persia and the Middle East (550–330 BCE), and preceded the Han Dynasty which ruled the eastern end of Eurasia (206 BCE–220 CE). These empires were unprecedented in human history—not only because of their huge scales, but also because they introduced a model of society quite different from that of the archaic states, as well as radical ideas about the essential dignity of human life.

At the beginning of his reign, Ashoka behaved much like a typical king. He expanded his territory by conquering the Kalinga state, which until then had been able to resist the Mauryan advance. The Kalingas put up stiff resistance, and the conquest proved so bloody that it changed Ashoka's life:

> *Beloved-of-the-Gods, King Piyadasi, conquered the Kalingas eight years after his coronation. One hundred and fifty thousand were deported, one hundred thousand were killed and many more died from other causes. After the Kalingas had been conquered, Beloved-of-the-Gods came to feel a strong inclination towards the Dhamma, a love for the Dhamma and for instruction in Dhamma. Now Beloved-of-the-Gods feels deep remorse for having conquered the Kalingas. Indeed, Beloved-of-the-Gods is deeply pained by the killing, dying, and deportation that take place when an unconquered country is conquered.*[163]

As a result of this soul-searing experience, Ashoka converted to Buddhism and adopted a policy of non-violence—"victory through Dhamma."

So what is this *Dhamma* that Ashoka cared so deeply about? Modern scholars usually translate it as "righteousness" or "virtue." Here's how Ashoka himself explains the concept: "Beloved-of-the-Gods, King Piyadasi, speaks thus: Dhamma is good, but what constitutes Dhamma? It includes little evil, much good, kindness, generosity, truthfulness and purity. . . . Respect for mother and father is good, generosity to friends, acquaintances, relatives, Brahmins and ascetics is good, not killing living things is good, moderation in spending and moderation in saving is good."

Ashoka not only exhorted others to cultivate Dhamma, he practiced what he preached. He abolished human and animal sacrifice. He "made provision for two types of medical treatment: medical treatment for humans and medical treatment for animals."

> *Wherever medical herbs suitable for humans or animals are not available, I have had them imported and grown. Wherever medical roots or fruits are not available I have had them imported and grown. Along roads I have had wells dug and trees planted for the benefit of humans and animals.*

This concern for animals is particularly touching. He was the first ruler ever to publish a list of protected species: "parrots, mainas, *aruna*, ruddy geese, wild ducks, *nandimukhas*, *gelatas*, bats, queen ants, terrapins, boneless fish . . ." He appointed special Dhamma officials, whose job was to propagate virtue and help the disadvantaged—the old and orphans, even prisoners. He urged all to treat slaves, servants, and the poor well. And he strove to provide fair and efficient justice, via his "expert nurses," the magistrates.

Ashoka comes through as a sincere man who genuinely wants to do good and work for the wellbeing of all of his subjects.

> *Thinking: "How can the welfare and happiness of the people be secured?" I give attention to my relatives, to those dwelling near and those dwelling far, so I can lead them to happiness and then I act accordingly. I do the same for all groups. I have honored all religions with various honors. But I consider it best to meet with people personally.*

Ashoka, as he emerges in the inscriptions, fits quite well the ideal of a "philosopher king" imagined in Plato's *Republic.* Of course, Ashoka was drawing on Indian and not Greek ideals. When he says, "It is good to have few expenses and few possessions," he channels Buddha. And, as Gombrich notes, "he not only urges diligence on others, but leads by example: he attends to business at any time, whether he is eating, in the women's quarters, in his bedroom, in his litter, in his garden, or even—if our understanding is correct—on the toilet. 'For I am never satisfied with my efforts and with settling business, because I think I must work for the welfare of the whole world'."[164]

How much of this was reality, and how much propaganda? Even if it is just propaganda, it signals a remarkable change in tone and message from the proclamations by the rulers of archaic states, such as the Assyrian kings (Chapter 8). This bombast, characteristic of archaic god-kings, was captured so wonderfully by Shelley:

> My name is Ozymandias, King of Kings,
> Look on my works, ye Mighty, and despair!

Ozymandias, by the way, was the Greek name for the Egyptian pharaoh Ramesses II, also known as the Great (ruled 1279–1213 BCE). We know quite a lot about him, thanks to the many inscriptions surviving from his reign. The longest one, the Great Abydos Inscription, is found on a wall of a temple at Abydos, in Upper Egypt. In one passage, Ramesses' sycophantic courtiers praise him in the following fashion:

> *Thou art Re* [the Egyptian Sun God]*, thy body is his body. There has been no ruler like thee, for thou art unique, like the son of Osiris, thou hast achieved the like of his designs. . . . Since the time of the god, since the kings have taken the crown, there has*

> *been no other like thee, neither seen in face, nor heard in speech. . . . every city should know that thou art the god of all people, that they may awake to give to thee incense at the command of thy father, Atum; that Egypt as well as the Red Land* [the deserts flanking the Nile Valley] *may adore thee.*[165]

In comparison, Ashoka sounds quite modest, almost self-effacing. His greatest concession to vanity is referring to himself as "Beloved-of-the-Gods," but unlike Ramesses II, he doesn't claim to *be* a god, nor even the son of a god.

Ashokan inscriptions represent more than just a shift in the tone of royal propaganda. The 33 texts dictated by Ashoka over two decades of his life have enough material to convince scholars (and me) that he was genuine. There are voluminous Buddhist chronicles that paint, if anything, an even rosier portrait than his own edicts. And historians agree that, following the conquest of the Kalingas, there were no more wars during his long reign. It was time of astonishing prosperity. Culture and arts flowered in a huge territory unrivaled by any other contemporary empire.

I think this is enough to show that Ashoka was a very unusual king, especially by the standards of the despotic states we saw earlier. It is hard to imagine a ruler less like the archaic kings, those greedy and arrogant upstarts who only wanted power and wealth and, if they could swing it, to become living gods, worshipped by the multitudes. But while Ashoka is unusual in his exceptional degree of care for the wellbeing of his subjects, he is not unique. In fact, he represents a new trend: all across Eurasia, rulers were getting interested in what today we would probably call *social justice*.

In part, we can trace this new attitude to the influence of Ashoka himself. His example was constantly invoked by kings in southeast Asia, where Buddhism spread during the early centuries of the Common Era. The greatest ruler of the Khmer empire, Jayavarman VII (1181–1218), followed Ashoka's example in building hospitals and rest houses along the roads, and his inscriptions expressed a desire to increase the wellbeing of his subjects. King Ramkhamhaeng (1279–90) expressed Ashokan sentiments; in particular, he ordered that for urgent business he should be disturbed even in the bathroom.[166]

But the idea of a good and just ruler who cares about his people appears in the Judeo-Christian tradition, too, where Ashoka's influence is less credible. "He that ruleth over men must be just, ruling in the fear of God," wrote the prophet Samuel (2 Samuel 23:3).

Among Christian rulers, the most Ashoka-like was surely King Louis IX of France (reigned 1226–70), whom we met briefly in Chapter 1. But Louis' virtues went well beyond stained-glass window donations: during his long rule, France enjoyed perhaps its best period during the Middle Ages. Internecine conflict halted, the economy grew, and beautiful Gothic cathedrals popped up all over the country. After his death, Louis was canonized as a saint.

We find a similar period of internal peace and prosperity under the five "good emperors" who ruled Rome between 96 and 180 CE. Edward Gibbon considered this a Golden Age, when "the Roman Empire was governed by absolute power, under the guidance of wisdom and virtue." And there were similar Golden Ages in China during the "good" phases of the Chinese dynastic cycles.

This is not to deny that there have been plenty of wicked kings in the past 2,500 years. Most likely they were in the majority. Nevertheless, the new trend was that rulers were at least *supposed* to be good. And many did try to govern in ways that benefited the common people, not just the ruling class. This remarkable turnaround happened virtually simultaneously in the Mediterranean, the Near East, India, and China. Why?

The answer, simply put, is religion. Well, religion plus lots of war. This combination of factors isn't usually considered very congenial to human flourishing. Throughout history it has indeed wreaked terrible destruction, as it still does. And of course, the rise of the mega-empires themselves was hardly a peaceful affair. Nevertheless, in the Old World in the few centuries before Christ, war and religion together brought about the greatest reversal in the tide of violence the world has ever seen. Here's how they did it.

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In the previous chapter, we saw how warfare between agricultural societies created military chiefs with loyal retinues. These clever upstarts succeeded in taking power from the people and setting themselves up as nobles and kings. They lorded it over their societies and reaped the proceeds of raw domination.

Such despots can be highly effective on the battlefield. However, a centralized military hierarchy has drawbacks when it comes to governing in times of peace. A complex society cannot be held together by force alone. What's more, the great inequities that result when rapacious military chiefs plunder from the poor tend to alienate the population, making it fractious and restive. Early chiefdoms and archaic states were therefore very fragile. They frequently did not outlast their founders. A historically well-known example is the Zulu kingdom. Despite the brilliance of its founder, Shaka Zulu, and the innovative military and social reforms that he instituted, he only ruled for 12 years. Shaka was assassinated by his half-brother, Dingane, who in turn was assassinated 12 years later by another half-brother, Mpande.

Robert Bellah, whom I have already had a chance to quote,[167] makes a very useful distinction between “dominance” (or despotism) and “hierarchy,” with hierarchy defined as “legitimate authority” (that is, authority that is recognized to be right and proper). In order to ensure a greater degree of permanence, large-scale societies needed to make the transition from domination by military chiefs to “a new form of authority, of legitimate hierarchy . . . which involves a new relation between gods and humans, a new way of organizing society, one that finds a significant place for the disposition to nurture as well as the disposition to dominate.” Bellah believed that a major driver in the evolution of religion was the need to reconcile the tension between the need for hierarchy and the need for legitimacy and equity.[168]

A tentative step in this direction was made when the chiefs combined military command with ritual activity, becoming priest-chiefs. But then, in the absence of any restraint on their power, they aggrandized themselves into god-kings, destroying any equity that was left—and therefore scuppering their own legitimacy.

The breakthrough, when it came, took place somewhere between 800–200 BCE—the Axial (or “Pivotal”) Age. The idea of an Axial Age was proposed by the German philosopher Karl Jaspers, in a 1949 book called *The Origins and Goal of History*. Jaspers noticed that the middle centuries of the closing millennium BCE were a period of remarkable intellectual turmoil in the Old World, a spiritual awakening that gave rise to a completely new kind of religion. What is amazing is that simultaneous

Axial shifts affected a huge swath of territory extending from eastern Mediterranean through the Middle East to northern India and China.

One of the most significant Axial developments was the rise of monotheism in the Middle East. The most important monotheistic religions of today, Islam and Christianity, developed much later, of course. But they were following in the footsteps of notable Axial precursors—Zoroastrianism and Judaism respectively.

However, this is just to scratch the surface of the Axial Age's spiritual innovations. Northern India was where Buddhism sprang up, and the Buddha was a contemporary of some of the most important prophets of Judaism. China produced Confucianism and Taoism. Meanwhile the Greek sphere, stretching from Anatolia (modern Turkey) to southern Italy, was where philosophy was born. Today we think of theology and philosophy as separate fields, but the ancients did not make this distinction. Socrates, who was merely the most prominent figure in the brilliant constellation of Greek philosophers, was a deeply religious person. During his trial (which eventually led to his execution by drinking poison) Socrates told the jury that he could not promise not to practice philosophy, because "this is what the god orders me to do, and I think there is no greater blessing for the city than my service to the god."[169]

It is remarkable to think that Confucius and Laozi (the founder of Taoism) in northern China, Siddhartha Gautama (the founder of Buddhism) and Mahavira (the "fordmaker" of Jainism) in northern India, Zarathustra (the founder of Zoroastrianism) in Iran, and the Greek philosophers Heraclitus in Anatolia and Parmenides in southern Italy, all walked the Earth at roughly the same time.[170] But whether or not these prophets and philosophers were contemporaries in the strict sense is unimportant. What is clear is that something unusual happened in a vast tract of Eurasia around 500 BCE. The pre-Axial, archaic societies were characterized by an enormous fusion of power in the person of the ruler. They had some sort of divine kingship, and usually practiced human sacrifice on a massive scale, both indicators of extreme forms of inequality. During this phase we also observe the appearance of "gods," who are distinguished from other powerful supernatural beings in that they are worshipped. Worship, according to Bellah, suggests that the relationship between human and supernatural beings also became much more unequal during this phase of our evolution. As the study of religion shows us, heavenly arrangements are often a reflection of very earthly concerns.

The archaic chiefdoms and states persisted through several millennia (with the first chiefdoms appearing in the Middle East roughly 7,500 years ago, and first archaic states dating to 5,000 years ago). Their typical pattern was of recurrent rise and collapse. Simple chiefdoms (a chief governing several villages) were repeatedly unified into complex chiefdoms (a paramount chief over subordinate chiefs) before collapsing back into simpler configurations. In the same vein, complex chiefdoms cycled to archaic states and back.

Around 2,500 years ago, we see qualitatively new forms of social organization—the larger and more durable Axial mega-empires that employed new forms of legitimation of political power. The new sources of this legitimacy were the Axial religions, or more broadly ideologies, such as Zoroastrianism, Buddhism, and Confucianism (and later Christianity and Islam). During this time, gods evolved from capricious projections of human desire (who as often as not squabbled among themselves) into transcendental moralizers concerned above all with prosocial behavior by all, including the rulers.

The most remarkable feature of all the Axial religions is the sudden appearance of a universal egalitarian ethic, credited by Bellah to “prophet-like figures who, at great peril to themselves, held the existing power structures to a moral standard that they clearly did not meet.” Bellah calls these figures, who scorned riches and passed harsh judgment on existing social conditions, “renouncers” (and, in their fiercer strain, “denouncers”).[171]

Renouncers abandoned their worldly status as husbands and workers for a life of ascetism and travel. The most famous was, of course, the Buddha. Born as Prince Siddhartha into a royal family, he gave up his beautiful wife and his comfortable life in three palaces (one for each season: the cold, the hot, and the wet). He begged for alms in the street, studied with yoga and meditation masters, and starved himself almost to death trying to eat one leaf or nut per day. After attaining the Enlightenment, he became the Buddha (the Awakened One) and started to teach a growing community of monks and lay disciples. His teachings spread and penetrated all levels of society. Bimbisara, King of Magadha (the future core of the Mauryan Empire) became a lay disciple (as was Ashoka 200 years later). Buddhism eventually faded in India, but it took root in an enduring way in Sri Lanka, central Asia, southeast Asia, China, and Japan.

One central tenet of the Buddha’s teachings was that the path to Enlightenment was open to all people, regardless of class and ethnicity. Buddhism is a universal religion—anybody can sign up. This is what Bellah means by a “universally egalitarian ethic.” By abandoning the narrowly tribal bias of archaic religions, Buddhism became a world faith. The same principle of equality is found in the New Testament: “In Christ, there is neither Jew nor Greek, slave nor free, man nor woman” (Galatians 3:28).

If we go to the Axial roots of Christianity, we find a series of Hebrew prophets who sharply criticized both the rulers and common people when they did not measure up to their rather exacting ideas of moral behavior. Many of these “denouncers” were not shy about directing their ire at the powers-that-be. The prophet Amos, who preached during the eighth century BCE, wrote that the rich and powerful “pant after the dust of the earth on the head of the poor and turn aside the way of the meek” (Amos 2:6–7). We hear similar criticisms in Greece (in Plato’s *Republic*) and in China (from the Confucians, most notably Mencius). The Daoists in China were both renouncers and denouncers.

Were there denouncers in archaic states? They would have had to be insanely brave. If they existed, presumably the reason we don’t know of them is that they were summarily put to death and their message was suppressed. Even during the Axial Age, many denouncers came to a sticky end. According to the ancient account, the *Lives of the Prophets*, which was probably written around the turn of the Common Era, the prophet Isaiah was sawn in two on the orders of King Manasseh of Judah. Amos himself met almost as gruesome an end. He was first tortured by the priest Amaziah and then clubbed to death by Amaziah’s son (according to an alternative version, Amos was only mortally wounded and made his way home, where he died). Zechariah, son of Jehoaida, was stoned to death because he denounced King Jehoash of Judah. Jeremiah and Ezekiel were also stoned to death.

I should mention that many modern scholars doubt the historicity of the *Lives of the Prophets*. It's quite likely that at least some of the lurid details were invented, when it was written 2,000 years ago, to support the emerging tradition that some prophets paid for their social critique by being martyred. But it stands to reason that many denouncers who angered the powers-that-be, would have been murdered. After all, nobody doubts that Jesus of Nazareth was crucified, and that a host of early Christian saints were martyred, some in particularly unpleasant ways. Even today, denouncing can be a risky business.

Still, even according to the *Lives of the Prophets*, most Old Testament prophets lived to a ripe old age, because they were no longer isolated voices. Some enjoyed a good deal of social support. And so did the Buddha, Confucius, and, later, Paul the Apostle. "It seems apparent that some degree of unease about the state of the world must have been relatively widespread, even among the elite," remarks Bellah.[172] *Something* about the Axial Age must have brought a shift in the social environment, tilting the field to favor the message of the prophets and philosophers. But what?

The answer lies to the north of the civilizations of the Ancient World—within the plains of Eurasia.

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The Great Eurasian Steppe is a virtually uninterrupted belt of grassland that stretches from Ukraine in the west to Manchuria in the east. During the second millennium BCE the western steppes, north of the Black and Caspian seas, were inhabited by Iranian-speaking pastoralists, who included the progenitors of such groups as the Persians, Medes, Cimmerians, and Scythians. Around 1000 BCE these steppe dwellers developed a new military technology, one of the very few that can truly be said to have changed the course of history.

I should pause here to make a remark about the nature of such epochal developments. Their roots can be very mysterious. Ideas are not predictable, because to predict an idea is to have it, at which point it already exists. From the perspective of Cultural Evolution it may be helpful to see innovations as sheer random variation—a quirk of fate as motiveless as a miscopied gene in a dividing cell. This isn't quite right, of course: human ingenuity is intentional in a way that biological evolution never can be. But it retains a large component of randomness for all that. It isn't human desire that determines whether an idea can work. It needs to be accepted by other people, the society at large, for an inspiration to turn into technology. And as far as the technology of horse-riding is concerned, it was the nomadic peoples of the Eurasian steppe during the second millennium BCE who were ready for it.

Horses were already a familiar part of life. They were domesticated around 3,500 BCE in what is now Kazakhstan. At first, though, they were just another kind of cattle—to be milked and slaughtered for meat. It was only around 2,000 BCE that the Eurasian pastoralists belonging to the Sintashta culture in Kazakhstan figured out how to harness the animals for military purposes. They invented and perfected the chariot—a light cart with two spoked wheels pulled by a pair of chargers. Very quickly this innovation spread to the Near East, northern China, the Indian subcontinent, and Europe.

The chariot revolutionized warfare in the ancient world. To start with, it fueled the expansion of the Sintashta pastoralists from the steppe into Iran and India. We know these people as the Aryans. Next, it was eagerly adopted by the agrarian states. Towards the end of the Bronze Age, Near-Eastern empires fielded thousands of chariots. The largest chariot battle ever was fought between the Egyptians and Hittites in 1274 BCE at Kadesh (in Syria). A total of five or six thousand chariots contended for victory—nearly as many as there were tanks in the biggest tank battle ever, the Battle of Kursk in 1943.

The proper use of the chariot was as a mobile platform for archers. Each chariot had a driver and one or two marksmen who rained arrows on the enemy. During the Bronze Age this set-up became *the* weapon of mass destruction: it perfectly combined the power of ranged weapons with mobility. It worked with the grain of the Human Way of War. But while these Bronze Age chariots were wonderful machines, human ingenuity could do better. Cavalry was a much more efficient way of using horsepower in war.

It took another thousand years for the Eurasian pastoralists to figure out how to ride horses. The main problem was not riding as such, but control. There is a scattering of graphical evidence that riding was attempted before 1000 BCE, but the early riders are shown perched precariously too far back and without any effective means of steering the steed. On one Mesopotamian plaque, dated to 2000–1750 BCE, the rider sits behind a girth, a belt around the horse's trunk, which he grasps with his left hand, along with the control line, or reins, fixed to a ring passed through the horse's nose, as though it were a bull. The right hand holds a stick or goad. A nose ring and a goad may work reasonably well when steering a pack animal. They are completely inappropriate for fine control of a horse during battle.[173]

The most important breakthrough was the bitted bridle. The bit induces the horse to turn in the desired direction by putting pressure on the soft parts of its mouth. Bronze bits suddenly appear in great numbers around 1000 BCE.

Effective horse-riding, good enough to use the horse in war, required very substantial technological evolution. Both the bridle and the saddle are complex contraptions, consisting of many components. Perfecting them took literally thousands of years, with constant improvements added in a cumulative fashion. The stirrups alone emerged more than 1,000 years after the first cavalry.

Iranian pastoralists combined the ability to ride horses effectively with two other technologies. The first was the composite bow, made from layers of horn, wood, and sinew glued together. A wooden self bow, such as the one used so effectively by English archers against French knights during the Hundred Years War, needs to be very long to store enough energy to drive an arrow through an armored man. Such a long bow is too unwieldy to be used on horseback. Composite bows, on the other hand, can be made small, and are just as powerful as long bows. The technology for making such bows was already known by the late Bronze Age, and it was natural for the steppe pastoralists to combine them with horse-riding.

The final technology was iron smelting, which developed around 1200 BCE. Iron is much more plentiful than copper and tin, the components of bronze. Once human beings had mastered the technique of converting its ore into metal, they began mass producing iron and steel weapons and armor. An iron arrowhead keeps its edge better than bronze. When shot from a powerful bow, it can punch through most kinds of armor. This combination of horse-riding, composite bows, and iron yielded an exceptionally effective military technology, which ensured the dominance of steppe horsemen for 2,500 years (until gunpowder made their mounted archery obsolete).[174]

It did not take long for Iranian pastoralists to use their new military superiority against the farming societies. Towards the end of the eighth century BCE, two waves of invaders, known to the Classical authors as Cimmerians and Scythians, invaded the Middle East across the Caucasus mountains. The Cimmerians wrecked the powerful kingdom of Urartu in Armenia and then moved west into Anatolia. The Kingdom of Phrygia in central Anatolia was overwhelmed, and its capital, Gordium, utterly destroyed. The Cimmerian raids brought another Anatolian kingdom, Lydia, to its knees. The Lydian capital, Sardis, was sacked. The Greek cities in Anatolia fared somewhat better. Ephesus succumbed but escaped serious destruction. Only the temple of Artemis, which stood outside the city walls, got burned. The steppe invaders, however, destroyed several smaller cities, among them Sinope and Magnesia, perhaps because they lacked strong fortifications.[175]

Meanwhile the Scythians had established a powerful supra-tribal confederation in Azerbaijan, from which they raided far and deep into the Near East, reaching as far south as Egypt.[176] Herodotus reports that

> *For twenty-eight years the Scythians ruled Asia, and in their outrageous arrogance they devastated everything. They not only assigned and exacted tribute from one and all but in addition, by riding all around, each group plundered whatever they could.*[177]

What was the secret of the horse warriors' success? The main military advantage of the horse is not just in its "shock" value (although cavalry charges have won many a battle). More important is the mobility that it confers on its rider. Mounted troops can choose when to engage the enemy and when to pull back—a huge tactical advantage. But mobility is also very important at the strategic level. The army that can better concentrate its regiments to achieve local superiority over the enemy will tend to win overall.

It was very difficult for civilized agrarian empires to fight off the horse-riding nomads. When the civilized state concentrated its forces in one place, the nomads simply raided the undefended villages and towns elsewhere. When the state troops were spread out to defend the towns, the nomads concentrated their force and defeated the agrarian contingents piecemeal—"in detail" in the military jargon. It did not take long for the civilized states to understand the importance of warhorses. Obviously they had to acquire their own cavalry. And so buying horses from the steppe dwellers or establishing horse-breeding programs became a central preoccupation of Eurasian empires all the way into the 19th century. Both the Urartians and Assyrians, the first states to experience the new form of mobile warfare, took immediate steps to build up their cavalries. This, by the way, is why even though horse riding was invented in the steppe, our best pictorial record of early cavalry is found on the Assyrian reliefs (in the steppe there were no temples to decorate with reliefs).

The first thing the Assyrians did was transform some of their chariot troops into cavalry. This was done simply by dispensing with the chariot, and mounting the two warriors on the horses. The driver now had the job of directing both animals while the archer shot his arrows. As depicted in a seventh-century relief, both riders sat too far back, where they couldn't use their knees to guide the horse. A century later we see much more capable-looking Assyrian cavalry. Each now has a bow and sits on the horse in the proper position for the best control and stability. Eventually, the riders could dispense with the reins during battle, relying entirely on their bodies and legs to tell the horse where to go, leaving their hands free to loose volleys of arrows at the enemy.

Such perfection endures. For more than two millennia after horse-riding was invented, the warhorse remained the most important military technology bar none. A plentiful supply of horses was critical even in the 19th century, well after firearms had replaced the bows and arrows. Have you ever wondered why Napoleon, who won all of his battles until 1812, lost one battle after another in 1813 and 1814, leading to defeat and abdication? The surprising answer is: horses. Here's what the British historian Dominic Lieven writes in his excellent *Russia against Napoleon*:

> The horse fulfilled the present-day functions of the tank, the lorry, the aeroplane and motorized artillery. It was in other words the weapon of shock, pursuit, reconnaissance, transport and mobile firepower. The horse was the crucial—perhaps even the single most decisive—factor in Russia's defeat of Napoleon. The enormous superiority of the Russian light cavalry played a key role in denying food or rest to Napoleon's army in the retreat from Moscow and thereby destroying it. In 1812 Napoleon lost not just almost all the men but virtually all the horses with which he had invaded Russia. In 1813 he could and did replace the men but finding new horses proved a far more difficult and in the end disastrous problem. Above all it was lack of cavalry which stopped Napoleon winning decisively in the spring 1813 campaign and persuaded him to agree to the fatal two-month

> summer armistice, which contributed to his ultimate defeat. The final allied offensive in 1814 which led to the fall of Paris and Napoleon's overthrow was sparked off by the Russian light cavalry's interception of secret French dispatches revealing all of the emperor's plans and his capital's vulnerability.

There is a military saying: "Amateurs talk tactics, but professionals study logistics." A cavalry charge that smashes the enemy formations is heady stuff, and historical tales are full of such heroic deeds. The intricate details of how the troops were supplied with food and munitions, or how they slogged through the mud to get to battle are much more boring, and few popular books devote any time to them (Lieven's being a happy exception). Yet it is logistics that determine whether one society will prevail over another in the long run. The fact is, before the internal combustion engine, the only practical way to move armies with their supplies and artillery trains rapidly across country, or to scout the location and movements of the enemy, was on horseback.

Eurasian steppe dwellers were the masters of mobile warfare. "The Mongols were capable of moving in widely dispersed columns over all sorts of terrain, while maintaining communication between the separate columns so as to assure concentration of all forces at the decisive time and place," writes William McNeill in *The Rise of the West*. "Subotai, the general in charge of the invasion of Europe in 1241, thought nothing of co-ordinating columns operating in Poland with others pressing into Hungary, despite the Carpathian barrier between them. No comparable feats of co-ordination over such distances were achieved by European armies until the late nineteenth century."[178]

The invention of cavalry, then, revolutionized warfare in Eurasia. The horse archers from the steppe were able to overrun civilized states, defeat their armies in detail, and destroy towns unprotected by walls. They couldn't storm walled cities but they could starve them out by denying them the use of the countryside.

Cavalry works even better as part of a well-balanced military force. Once warhorses had been introduced into the areas of settled agriculture that bordered the steppe, the civilized states could begin combining them with infantry and siege engines. However, it was not one of the civilized states that first learned how to integrate cavalry with other combat arms. It was a group of steppe origins: the Medes.

Led by Cyaxares I, the Medes, in alliance with the Scythians and Babylonians, smashed the Assyrian kingdom and established an empire stretching from Anatolia to Afghanistan. A change of dynasty couldn't halt their expansion. The new rulers were known as the Achaemenids. They were Persian, a people related closely to the Medes. The first Achaemenid emperor actually claimed to be Cyaxares's grandson. He is known to posterity as Cyrus the Great.

The Achaemenid empire (550–330 BCE) was an entirely new scale of operations. At its peak it stretched over eight million square kilometers of territory (about three million square miles), inhabited by some 25–30 million subjects. Just to give you an idea of the evolutionary leap this represents, consider that, prior to the Achaemenids, the largest states were the New Kingdom of Egypt and Assyria. The Persian empire conquered *both* Assyria and Egypt, and much else beside. In the west the Persians annexed the Greek cities of Anatolia, turned Macedonia into a tributary state, and made an attempt on Greece itself. In the east the empire extended into the Indian subcontinent, with the Indus river as its border.

The invasions of horse archers from the steppe into southwest Asia triggered a cascade of interrelated military, political, and religious upheavals. The centuries around 500 BCE saw a military revolution and intensification of warfare, which made agrarian states much more vulnerable to extinction. At the same time we see the spread of qualitatively new Axial religions and the rise of unprecedentedly large Axial empires.

It's hard to believe that these developments are merely coincidental. The Axial Age began in the Great Eurasian Steppe.[179]

Here, again, we find the principle of Destructive Creation in action. The new forms of warfare ramped up competition between societies. Some—Urartu, Phrygia, Assyria—went under. Others responded with feverish innovation. First, they did the obvious, attempting to secure a supply of horses and train cavalry. But the agricultural regions abutting the steppe are, generally speaking, not as favorable for raising horses, because they lack the grasslands on which horses can be pastured. The farming societies had to figure out how infantrymen could counter the menace of the mounted archer.

To do this, they needed two things. First, protection against arrows. Second, a counter to the cavalry charge. In *Early Riders* (2004), Robert Drews proposes that the classical hoplite, the heavily armed infantryman of Greece and Italy, was developed precisely in response to this pressure from the Iranian raiders. The large wooden shield (*hoplon*) and bronze armor were excellent defenses against the archers. In an infantry battle you don't actually need the incumbrance of a large and heavy shield, but you will be really glad of its protection when arrows start raining on you and your buddies. A crouching hoplite depicted on a sixth-century Attic drinking cup has the *hoplon* covering his whole body, with only his head (protected by a bronze helmet) sticking up above the shield.

A dense phalanx formation, bristling with spears, is an excellent counter to a cavalry attack. Most horses won't even charge a compact body of infantry who stand their ground. And if lightly armored steppe warriors do close with the phalanx, heavy infantrymen have an advantage as long as they stay in formation.

Although hoplites and hoplite warfare are depicted in the 2004 movie *Troy*, that's a complete anachronism. Troy was destroyed during the Bronze Age, while classical hoplites are decidedly an Iron Age development. They appeared in Greece only in the seventh century BCE, and it is quite possible that it was not even the Greeks who invented this way of war. The review of evidence by Drews suggests that heavy infantrymen were first used in western Anatolia by Carians (a non-Greek group living just east of the Greek city of Miletus). And the Carians presumably hit upon the combination of a large shield, body armor, and spear in response to raiding pressure from the Cimmerians. There is no mention in our sources that any Carian centers, which were not fortified, were pillaged. Perhaps the infantry of Caria was able to drive off the steppe raiders.

While hoplites were a reasonably effective way of dealing with the steppe raiders, heavy infantry cannot be used *offensively* against cavalry, which has the advantage of much greater mobility. Heavy infantrymen did not solve the strategic dilemma of the agrarian states. Should they try to protect all settlements, while running the risk of being picked off piecemeal. Or should they concentrate all their troops and abandon the countryside to the plunderers?

There was only one way out of this quandary: drastically to increase the size of the state. More population translates into greater numbers of recruits for the army and a larger taxpaying base to support the soldiers. With more soldiers, the state can both garrison the forts and field an army large enough to chase the raiders away. Larger states could also construct “long walls” to protect themselves from the nomads (of which the Great Wall of China is the most spectacular example).

This is why we see a qualitative jump in the size of states during the Axial Age. Achaemenid Persia (550–330 BCE) with its 25–30 million subjects was only the first of the new mega-empires. It was followed by the Mauryan Empire (322–185 BCE), China under the Han Dynasty (206 BCE–220 CE), and the Roman Empire (27 BCE–476 CE), each with a population of 50–60 million people.

Once the empires that were directly menaced by the horsemen had scaled up in size and power, they become a threat to regions farther from the steppe, such as southern China and India. Some agrarian states employed steppe nomads as shock troops. Others built their own cavalries. They also expanded their infantries, because horses were difficult to obtain where grasslands were limited. Having large armies, the first empires naturally used them to conquer more territory in their hinterlands. Their appetite for expansion couldn’t help but trigger a defensive reaction on the part of their neighbors. Intense warfare originated in the steppe, but its diffusion throughout Eurasia did not require the actual presence of steppe horsemen. And the diffusion of intense forms of warfare was followed, after a time, by the spread of large states.[180]

But once again we see that size isn’t everything. Coordination, cohesion, and cooperation matter at least as much. The unprecedented size of the new Axial empires created a burning need for new institutions that would enable these huge conglomerates to function reasonably efficiently without disintegrating. In fact the first Axial empires were fairly ramshackle constructions. The Achaemenid Empire was racked almost constantly by rebellions and civil wars. Cyrus himself became emperor by successfully revolting against the last Mede king, Astyages. Cyrus's successor, Cambyses II, died (or was assassinated) during Bardiya's revolt (Bardiya was either Cambyses' brother or, according to the rather outlandish reports of his own assassins, a wizardly impersonator by the name of Gaumata). Bardiya was succeeded by Darius, a son of a provincial ruler (satrap). Darius's son Xerxes was assassinated by the commander of his bodyguards . . . and so on.

With time, things improved. Following the collapse of one empire, the next tended to be a little more cohesive and stable. We can see this progressive stabilization most easily in China, with its more than two millennia of imperial history. The Chinese historian Victoria Tin-Bor Hui has calculated that the length of interregnum periods, times of disunity and internal war between unifying dynasties, gradually decreased with each iteration. Each dynasty built upon, and then added to, the accumulated store of knowledge on how to govern large empires. Across the centuries and millennia, this toolkit became steadily more sophisticated and effective.

The Axial religions were an important part of it. A major source of tensions within the Axial mega-empires was their massively multi-ethnic character. In Achaemenid Persia, only a small minority of inhabitants spoke Persian. The main official language of the empire was in fact Aramaic.

All pre-modern empires were transnational organizations that relied on the cooperation of a multitude of ethnic groups, many of which provided key services to the imperial center. Here's how the distinguished British historian Henry Kamen described the Spanish Empire, a truly hegemonic world power during the 16th century:

> The role of conquest was deceptive. Spain's rise to power was actually made possible by the collaboration of international business interests, including Italian financiers, German technicians and Dutch traders, in the task of setting up networks of contact ranging across the oceans. At the height of its apparent power, the Spanish Empire was in reality a global enterprise in which non-Spaniards—Portuguese, Basque, Aztec, Genoese, Chinese, Flemish, West African, Incan and Neapolitan—played an essential role. It is this vast diversity of resources and people (which included many of the greatest adventurers and soldiers) that made Spain's power so overwhelming.[181]

What was the glue that held this polyglot assemblage together? It was Catholic Christianity. (And it was religious schism, picking up speed in the late 16th century, that tore the empire apart.) Spain's was a relatively late empire, of course. It profited from 2,000 years of post-Axial cultural evolution. But the pattern of a universal empire administered in the name of a universal religion first emerged during the Axial Age. Achaemenid Persia promoted Zoroastrianism. Ashoka Maurya converted to Buddhism. Han China had Confucianism. The Roman Empire converted to Christianity.

The rise of such religions was momentous enough. Even more crucial was the appearance of the egalitarian ethic associated with them. As we saw in Chapter 3, inequality corrodes cooperation. In the perilous new competitive environment created by the military revolution of the Axial

Age, states could not afford to crush their own populations in the manner of Hawaiian chiefs or archaic god-kings. The state's survival now depended on being able to produce large armies of armed commoners. If you want your soldiers to fight bravely, you cannot oppress them. And if you *have* been oppressing your own people, it's foolish to give them weapons.

In short, the despotic states couldn't survive in the new military environment. Many were simply wiped off the map. In others, there must have been unease among the elites that made them more receptive to the message preached by the denouncers. In such states, the new egalitarian message fell (as one of the later denouncers might have put it) on good soil.

As an example of how the pressures of war can force the elites to give up their privileges for the sake of collective survival, let's go to Italy during the Iron Age. Around 500 BCE Italy was inhabited by a multitude of "nations" that constantly warred with each other. Cultural group extinction was common. We know for example that the Romans extinguished the Etruscan city-state of Veii and the Italic-speaking tribe of Auequi. Other expansionary nations, apart from the Romans themselves, were the Samnites, an Italic people in south-central Italy, and the Gauls (Celts), who migrated from continental Europe and conquered northern Italy.

Life was very precarious for all these cultural groups. Rome itself came to the brink of extinction on several occasions, most notably in 390 BCE, when the Celtic army under Brennus defeated a Roman army and sacked the city. In the end, of course, it was the Gauls and the Samnites who went under.

Roman society under the Early Republic (fifth and fourth centuries BCE) was divided into the elites—"patricians"—and the common people —"plebeians." The patricians were a group of wealthy aristocratic families who monopolized political and religious offices. They formed an exclusive hereditary caste by forbidding intermarriage between patricians and plebeians. Plebeians were a more diverse group. Some of them were as rich as patricians and wanted their share of political power. Most, however, were poor and wanted land and debt relief. The struggle between the patricians and the plebeians over these issues is known as the Conflict of the Orders.

The plebeians used a very clever tactic in pushing their claims. While the wealthy served as cavalry, they were a small minority of soldiers. The bulk of the Roman army was the common people serving as heavy infantrymen (hoplites). On several occasions when Rome was threatened by an invading army, the plebeians simply went on strike and refused to defend the state. These incidents are known as “secessions” because when the commons were called to serve in the legions, they instead went to the Sacred Mount, located about three miles away from the city. These secessions began in 494 BCE, when Rome was fighting a war against the Aequi, Sabines, and Volsci.

The sack of Rome and almost continuous raiding of central Italy by the Gauls during the fourth century frightened the patrician aristocracy and convinced them that they must cooperate with the commons to overcome the external threat. After each secession, the plebeians pushed through legislation that increasingly eroded the patrician privilege, and eventually made patricians and plebeians politically equal. There was also probably some debt relief. However, the most important development, the one that really helped to solve the problem of plebeian poverty, was imperial expansion. Common Romans participated in the division of land that Rome conquered.

Modern states have come a long way since the first large-scale centralized societies—pre-Axial archaic states. And it's not just more sophisticated technology and greater wealth. Today even the most oppressive regimes, such as North Korea, are "post-Axial." After all, Kim Jong-un, the Supreme Leader, doesn't claim to be god, or even a son of god (merely the son of the previous Supreme Leader). North Koreans don't practice human sacrifice. At least in theory, all North Koreans are equal.

What this means is that the trend to greater social inequality, which set in after the transition to agriculture, was reversed at some later point in time. When?

Most people would think of such key historical documents as *The Bill of Rights* (1689), *The Declaration of Independence* (1776), and *The Declaration of the Rights of Man and Citizen* (1789), adopted by national legislatures that came to power as a result of revolutions in England, the United States, and France. These declarations are rooted in the European Enlightenment, also known as the Age of Reason (17th and 18th centuries).[182]

The modern idea of human rights is, thus, quite recent. But it would be a mistake to consider human history before the European Enlightenment as an unrelieved Age of Despotism. As we saw in this chapter, extreme forms of inequality and despotism began receding much earlier, during the Axial Age. We see massive evidence of this in the writings of the Axial Age thinkers, from Greek philosophers and Old Testament prophets to Indian renouncers and Chinese sages. And the reign of the Mauryan king Ashoka shows how these ideas influenced rulers and elites of Axial mega-empires.

The ideas that drove this change originated within a swath of Eurasia stretching from the eastern Mediterranean to China. These were the regions where new forms of horse-based warfare, invented within the Great Eurasian Steppe, spread first. Western Europe was a late-comer—it got Axial ideas second- or third-hand. The Franks, who gave rise to the French and Germans, converted to Christianity only around 500 CE (and Christianity itself was a secondary development, building on earlier Axial ideas of Near Eastern monotheism). The British Isles and the Scandinavian countries, the bastions of human rights today, abandoned the cult of Odin in favor of Christianity even later (the last holdout was Sweden, which remained pagan until the 12th century).

Although the ideas of the Enlightenment accelerated and deepened the movement of humanity towards greater equality, the roots of this macrohistorical trend go back to the Axial Age. And the moving force behind the trend was not reason, but faith. Neo-atheists such as Richard Dawkins, who considers religion nothing but a pernicious delusion, will not like this conclusion. Nevertheless it's true.

The Axial religions introduced several innovations that enabled post-Axial states to increase the scale of social cooperation. In this chapter I've been paying attention mainly to how Axial religions constrained rulers and elites to act in less selfish and despotic ways, thus decreasing inequality and promoting cooperation. Another Axial Age innovation was the shift from tribal, ethnically based religions to universal, proselytizing ones. You don't need to be born a Christian, a Muslim, or a Buddhist. These religions welcome—indeed seek—converts. Successful proselytizing religions create huge communities of the faithful, coming from diverse ethnic backgrounds and speaking many languages. In other words, universal religions expand the circle of cooperation beyond the ethnolinguistic group; they work as a glue that holds together diverse groups in multiethnic empires. Of course, the obverse side is that by creating a much stronger feeling of “us,” the universal religions deepen the chasm between “us” and “them”—the adherents of a rival faith.

However, it’s not enough to increase the circle of potential cooperators. One of the key preconditions for cooperation is trust. In our ancestral small-scale societies it was much easier to know whom you could trust. Everybody knew everybody else. You didn’t even need to rely only on your own experience with people. All it took was to keep your ears open to gossip. I am not saying that generating trust in small-scale societies is trivial. After all, our huge and energetically expensive brains developed as engines of social memory and computation. Still, the problem of trust is much easier in small-scale societies integrated by face-to-face interactions, than it is in huge, anonymous societies of millions in which we live today.

And here’s where another key religious innovation comes in, according to Ara Norenzayan’s *Big Gods: How Religion Transformed Cooperation and Conflict* (2013). “Big Gods” are supernatural beings who have three important abilities. First, they are capable of looking inside your head to find out what you think. In particular, they know whether you really intend to fulfill your part of the bargain, or whether you are planning to cheat. Second, Big Gods care whether you are trying to be a virtuous person or not. And third, if you are a bad person, they can (and will) punish you.[183]

Now, even if you are not an atheist like me, let’s suppose for the sake of argument that gods don’t exist. How could the belief in them spread? Well, the problem with large-scale anonymous societies is that one constantly has to decide whether to trust people whom one doesn’t know individually, even by reputation. You can’t trust just any stranger. However, if the stranger sincerely believes in Big Gods, she won’t cheat you, because she won't want to burn for eternity in Gehenna, for example, or be reincarnated as an earthworm. So large groups in which belief in a moralistic, all-knowing punisher became rooted would be more cooperative than the atheistic ones. In small-scale societies, people behaved prosocially because they were being watched by acquaintances and neighbors. In large-scale anonymous societies they had to be good because gods watched them.

Once the belief in a supernatural, moralistic punisher is pervasive in a group, non-belief becomes personally costly. People will not make deals with you, because you cannot be trusted. You may also be persecuted for not conforming to the group's beliefs. You are better off at least professing belief and following the necessary rituals that prove it (attendance at prayer, fasting, etc). In fact, it becomes advantageous to become a true believer, because most people are not very good liars.

In Norenzayan's words, "watched people are nice people." It doesn't matter whether the watchers are your friends and neighbors or supernatural beings (or even "Big Brother," as in our modern societies). As long as people are watched, they behave nicely. And groups of people who behave nicely to each other win over groups that don't.

Sincere belief in supernatural moralistic punishers is particularly important because of the way it can restrain the powerful. A monarch may not care very much what peasants think of him, but he would think twice before crossing an all-knowing omnipotent god. And if a ruler is an atheist, he risks getting overthrown by a coalition of elites who would prefer to be ruled by a godly person. Even today, in countries like the United States, an atheist has no chance of being elected to the presidency. This is a genuinely ancient prejudice—its roots go right back to the Axial Age. But it seems to work. As we have seen, religion has proved to be an excellent ideological foundation for empire.

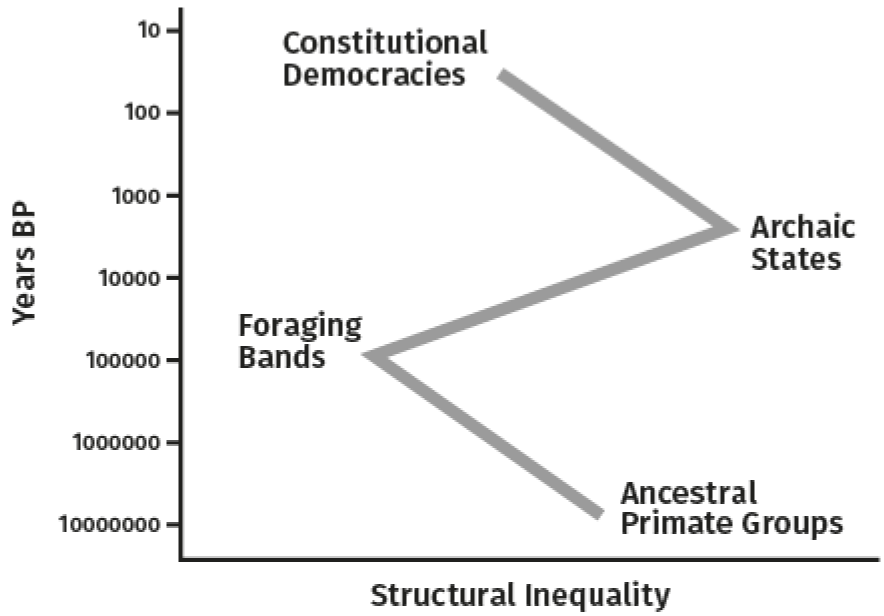
Chapter 10
Zigzags of Human Evolution

And the science of history

The road from ancestral villages and tribes to modern ultrasocieties has not been a straight one (as I pointed out at the beginning of our journey, in Chapter 1). Particularly strange were the zigzags in the evolution of human equality.

Our Great Ape ancestors lived in hierarchical societies. We believe this because our closest relatives, chimpanzees, bonobos, and gorillas, all live in societies with very strong dominance hierarchies (although details vary[184]). As we saw in Chapter 5, early humans broke the pattern, evolving a reversed dominance hierarchy whose goal was to suppress potential alpha males. This worked for tens of thousands of years—until the adoption of agriculture and the rise of the first centralized polities allowed the alpha male to resurface with unfettered power in archaic states that were the most despotic societies in which people have ever had the misfortune to live.

The anthropologist Bruce Knauft called it "the U-shape" of human social evolution.[185] Christopher Boehm in *The Hierarchy in the Forest* and Robert Bellah in *Religion in Human Evolution* were two other influential thinkers who wrote about it. But as Bellah himself argued in his book, the first U-turn was followed by a second. The two turns together make a Z:



The second turn, away from despotic archaic states, is much more ancient than might be supposed—the Axial Age, rather than the Age of Enlightenment. In Chapter 9 we saw that the military revolution of 1000 BCE that began deep in the Eurasian steppe triggered momentous developments in the belt of agrarian societies stretching from the eastern Mediterranean to China. The new ideologies—Axial religions—introduced a number of cultural innovations that buttressed our capacity for cooperation in large groups. These innovations included social norms and institutions that constrained rulers to act in less selfish and despotic ways. New ways of defining "us" expanded the circle of cooperation beyond single ethnolinguistic groups. And Big Gods provided one solution to creating trust in huge, anonymous societies of millions.

Although my focus has been on the great turn of the Axial Age, it is not my intent to belittle the achievements of the European Enlightenment. It was the modern age that saw such momentous developments as the abolition of slavery and serfdom, the rights revolution, the spread of democracy, the rise of welfare state, equal treatment for women and minorities, and the expansion of the circle of cooperation to encompass the whole of humanity. These are big topics, however, and to deal with them would require another book.

It will probably not surprise the reader to learn that such a book is in the works, nor that Destructive Creation will again be the protagonist. However, instead of the Military Revolution of 1000 BCE we will be exploring the consequences of the Military Revolution of 1500. According to a famous dictum of Francis Bacon, gunpowder, navigation, and the printing press created the modern world.[186] My plan is to trace how these transformative technologies changed the nature of competition between societies, and how they may shape the future. Those topics are for that book, but there is one thing we still need to discuss here. How did war's role as a force for Destructive Creation change over the long run of human evolutionary history? Indeed, just how close is the connection between war and social evolution? Might it ever be severed?

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We encountered Steven Pinker's book, *The Better Angels of Our Nature*, in Chapter 8, when discussing long-term trends in violence throughout history. *The Better Angels* is an imposing book in every sense: not only very long but also practically unavoidable. It has reached a lot of readers and, together with Jared Diamond's *Guns, Germs, and Steel*, it may be the main source of what most of them know about human history in the long run. But the reason that I, in particular, cannot avoid it is its claim that violence has declined over the course of history, and that this decline has been enormous—at least a whole order of magnitude.

Although the central question of the book you are holding is cooperation, we have seen that we cannot explain it without understanding war and despotism—some of the ugliest forms of violence. For this reason, we need to engage with *The Better Angels*. What has Pinker got right, and where did he go wrong? Let's talk first about his empirical claim—what happened to violence in history—and then deal with theoretical questions—why things went the way they did. One thing I must stress right away is that it is not useful to talk about "violence" in general. Different forms of it—war, despotism, homicide by individuals—have followed different historical trajectories, driven by different causes. Let's start with war, by which I mean violence between human groups and societies.

In Chapter 8 we saw that Pinker's thesis on the decline of war needs to be qualified. War followed far less of a linear trajectory than is suggested by *The Better Angels*. During the past 10,000 years the curve of war resembled the Greek letter Λ, with an initial rise followed by a decline (remember, however, that both the ascending and descending movements were jagged, with local fluctuations superimposed on the overall trend).

The climatic chaos of the Pleistocene, the geological epoch that began 2.6 million years ago and lasted until 10,000 BCE, did not permit any sustained population growth of early human groups. There must have been sporadic conflict leading to violence between small bands of foragers, but the main agent of selection between groups would have been the harsh environment. Groups that solved collective-action problems, such as hunting large prey, defending against dangerous predators, and coping with scarcity, thrived—or at least hung on. An important part of their survival strategy was the ability to accumulate cultural information about their environments, and transmit it across generations.[187] Bands that failed to sustain cooperation, or to preserve their cultural store of information, went extinct. During the Pleistocene, then, competition between human societies was usually not direct. Successful groups grew in size, split into daughter groups, and colonized areas where unsuccessful ones had gone extinct.

When the Pleistocene ended and the climate oscillations of the ice ages and interglacial periods settled down, human groups rapidly spread into all the habitable areas of the globe. The new stability allowed them to increase unchecked by their environment, which was good—for a while.[188] But as landscapes filled up, populations inevitably came into conflict over valued resources; a great fishing spot, say, or a grove of nut trees.

Long before this, people had learned how to fight. Sophisticated weapons such as the spear-thrower (atlatl), the sling, and the bow, which made killing from a distance efficient, have existed for tens of thousands of years. During the Pleistocene these weapons had been needed primarily for hunting (and, yes, for putting down obnoxious upstarts). The overall level of intergroup violence was low because there was plenty of unoccupied space to retreat to when threatened—or for that matter, to occupy instead of fighting your neighbors for their land. A few thousand years into the newly stable environment of the Holocene, however, humans started running out of empty areas to colonize. Regions where we had already been present during the Pleistocene, such as the Mediterranean and the Near East, filled up first. It was in these places that war first became a way of life, only later spreading to all the world's habitable areas.

War's trend during the past 10,000 years, thus, was not linear. Initially, the rise of the first centralized societies went hand-in-hand with increasing conflict. It was only when even larger-scale societies appeared that the probability of being killed by another human being started to decrease. Later in the chapter I will return to the question of why this happened.

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But first, let's talk about those strange zigzags in the evolution of human equality. This is important because inequality, and especially extreme forms of it (let's refer to them as despotism), is another source of violence: not violence between societies—war—but violence within a society, inflicted on those without power by those with it. In *The Better Angels* Pinker gives many examples: human sacrifice, witch killing, persecution of heretics, torture, cruel and unusual punishments, slavery, and despotism.[189]

Take a closer look at that part of the Z-curve covering the past 10,000 years. What does it tell us about inequality-driven violence? In highly egalitarian bands of foragers, inequality-related violence was actually directed against those who held power and wanted more: the upstarts. Violence wielded by the powerful against the powerless—sacrifice victims, slaves, serfs, and persecuted minorities, including women, ethnic groups, and outcasts—first increased and then declined. Again, the trajectory was certainly not a linear decline as suggested by *The Better Angels*. In fact, the overall shape looks a lot like the Λ-curve of war—but only during the past 10,000 years. Before that, war and despotism moved along divergent trajectories.

Finally, let's briefly consider a third kind of violence, homicide—individuals killing other individuals, either for gain or in a fit of passion. Homicide rates followed a different trajectory from that of war. The trend in individual-on-individual violence was pretty much as described in *The Better Angels*—starting high among the hunter-gatherers and then gradually declining, albeit in fits and starts. Here the evidence is on Pinker's side. The main area of disagreement between Steven Pinker and his critics, such as Douglas Fry and Brian Ferguson, is about the curve of war, not interpersonal crime. In an article published in 2013, Fry and Patrik Söderberg show that in foraging-band societies more than half of lethal violence is perpetrated by lone individuals. So this looks like one thing that Pinker got right.

But the broader message is that different kinds of violence have followed distinct trajectories in the history of human societies. This happened, probably, because the increases and decreases in war, despotism, and homicide were driven by different causes.

Strangely, Pinker's explanatory theories have not been subjected to the same degree of scrutiny as his empirical claims. This is partly due to the approach taken by the author. Although his subtitle—*Why Violence Has Declined*—promises an explanation, this question is only dealt with in the last (and shortest) chapter.

But studying what happened to violence in the past should be only the first step. We really need to understand what makes violence wax and wane. Of course, we may take comfort in the observation that violence has declined over the past few millennia. Then again, there have been lots of fluctuations within this long-term trend. In the United States, for example, the rates of homicide and other violent crimes surged in the 1960s. Pinker refers to this surge as "decivilization of the 1960s" (and the subsequent decline as "recivilization of the 1990s").

Even more important, who can guarantee that the long-term—millennial—trend is not going to be reversed? As investment advisors warn us, "past performance is no guarantee of future returns."

Let's start our quest for understanding why violence declines with the explanation in *The Better Angels*. Pinker proposes five historical forces that he says have made us less violent:

> The *Leviathan*, a state and judiciary with a monopoly on the legitimate use of force, can defuse the temptation of exploitative attack, inhibit the impulse for revenge, and circumvent the self-serving biases that make all parties believe they are on the side of the angels. *Commerce* is a positive-sum game in which everybody can win; as technological progress allows the exchange of goods and ideas over longer distances and among larger groups of trading partners, other people become more valuable alive than dead, and they are less likely to become targets of demonization and dehumanization. *Feminization* is the process in which cultures have increasingly respected the interests and values of women. Since violence is largely a male pastime, cultures that empower women tend to move away from the glorification of violence and are less likely to breed dangerous subcultures of rootless young men. The forces of *cosmopolitanism* such as literacy, mobility, and mass media can prompt people to take the perspective of people unlike themselves and to expand their circle of sympathy to embrace them. Finally, an intensifying application of knowledge and rationality to human affairs—the *escalator of reason*—can force people to recognize the futility of cycles of violence, to ramp down the privileging of their own interests over others', and to reframe violence as a problem to be solved rather than a contest to be won.[190]

If that sounds like a hodgepodge of reasons, it is. To Pinker, the decline of violence is the result of many almost accidental (as he puts it, “exogenous”) developments in human history. “We should not expect these forces to fall out of a grand unified theory,” he says.[191] But why not?

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Of course, the thesis of *this* book is precisely to propose just such a theory—that these forces *do indeed* share a single cause. The key process in the decline of violence has been the increase in the scale of human cooperation. Remember, peace is not just the absence of war; lasting, stable peace demands a lot of management. And the only way to accomplish it is by cooperation. As the circle of cooperation increased during the past 10,000 years, more and more people found themselves living in huge, ultrasocial societies—*ultrasocieties*. Over time, ultrasocieties evolved ever better institutions to keep internal peace and order. These effective institutions served to suppress crime and outbreaks of internal political violence, such as insurrection and civil war.

Institutions, however, are only a part of the story. Equally important are the *values* held by the majority of the population. One can design a perfect judiciary, but as long as the majority of people see nothing wrong with bribing the cops and the judges, and those officials themselves consider bribes the normal way of doing business, the system will not deliver justice. To work effectively, good institutions should be buttressed by matching moral values. An inclination to help relatives and friends is a prosocial value appropriate for small-scale societies. But in large-scale societies, it needs to be subordinated to a disposition against nepotism and cronyism. So, in reality it was the coevolution of institutions and values that made cooperation in ultrasocieties possible. And a unified theory must account for both.

It is true that as societies became larger and more internally cohesive, interstate war also became more destructive. The scale of war increased along with the scale of societies, culminating in the tragic three decades between 1914 and 1945 that saw two world wars. But although the number of casualties grew in the absolute sense, it decreased in relative terms. For the average citizen, the probability of dying in a war declines as political units became larger. Absolute numbers deceive. One might think that World War II was a much more serious blow to the United States than the American Revolutionary War. After all, the 20th-century conflict killed more than 400,000 Americans, while the 18th-century one caused 25,000 deaths. And yet death rates relative to population were 0.3 percent in World War II and 0.9 percent in the Revolutionary War. The huge population increase, from 2.5 million to 133 million, "diluted" war deaths. This threefold difference in the relative death rate means that a person living in 1940s America was three times less likely to be killed or to lose a loved one in war than a person who lived in the America of the 1780s.

What we have here is a paradoxical conclusion. It was violence—societies making war on each other—that drove the evolution of ultrasociality, and it was ultrasociality that ultimately made violence decline. There is nothing "exogenous" about this dynamic.

Steven Pinker is one of the leading lights of the relatively new discipline of Evolutionary Psychology.[192] Now, Evolutionary Psychology and Cultural Evolution might share the word "evolution" in their names, but they take very different approaches to the study of human behavior. Pinker, in particular, seeks reasons for the decline of violence in the psychology of individual human beings. In the *Preface*, when explaining the goals of his book, he writes:

> A large part of this book will explore the psychology of violence and non-violence. The theory of mind that I will invoke is the synthesis of cognitive science, affective and cognitive neuroscience, social and evolutionary psychology, and other sciences of human nature that I explored in *How the Mind Works*, *The Blank State*, and *The Stuff of Thought*. According to this understanding, the mind is a complex system of cognitive and emotional faculties implemented in the brain which owe their basic design to the processes of evolution. Some of these faculties incline us towards various kinds of violence. Others—"the better angels of our nature," in Abraham Lincoln's words—incline us toward cooperation and peace. The way to explain the decline of violence is to identify the changes in our cultural and material milieu that have given our peaceable motives the upper hand.

Pinker does mention the changes in our cultural environment, but his emphasis is on how this environment molds the psychology of individuals. To him, culture is one of the "exogenous forces that have engaged our mental faculties in different ways at different times." He is highly critical of Cultural Evolution and, especially, the idea that the main engine of social evolution is competition between societies. In an essay called *The False Allure of Group Selection*, published in 2012, Pinker writes, "The more carefully you think about group selection, the less sense it makes, and the more poorly it fits the facts of human psychology and history."[193] The argument that Pinker builds against the theory of cultural multilevel selection follows closely that of Richard Dawkins, with which we engaged in Chapter 3. Like Dawkins, Pinker looks to theories of kin selection, reciprocal altruism, and reputation management as alternative explanations for the evolution of cooperation.

Because Pinker effectively subscribes to the "by-product" theory of social cooperation, what's missing in his analysis is an appreciation of the role that cultural change played in the pacification of modern societies. In short, the problem with the thinking of Steven Pinker and other evolutionary psychologists is their neglect of *culture*—socially transmitted information that, together with genes and environment, shapes people's behavior. Thus, discussion of that key historical dynamic, the coevolution of institutions and values that made cooperation in ultrasocieties possible, is entirely missing in their writings.

So, how do Steven Pinker's "five historical forces" stack up in the light of cultural evolution?

Leviathan. There is no question that the rise of the state was one of the most important steps towards the pacification of modern societies. The institutions of the state, such as a judiciary and police force, clearly are vital to maintaining internal order and peace. Let's also not forget the legislatures that pass laws and the executive branch that collects the taxes, without which the state would cease to exist.

Pinker, however, doesn't explain why states arose and how they became more capable with time. To him, the rise of a well-functioning state is another one of those "exogenous forces that have engaged our mental faculties in different ways at different times." Yet as we have seen, the state didn't "just happen." It evolved in response to the pressures of war. As the historical sociologist Charles Tilly famously quipped, "States made war, and war made states." They were an adaptation to intensifying conflict, and in turn they caused conflict to intensify.

Commerce. Here things are more complex. Although commerce is indeed a positive-sum game overall, there are always some who gain more and others who lose. And so there is a great temptation to use force to redirect trade flows in ways that favor one's own nation. In the absence of international institutions and norms that restrain war, what's to prevent a powerful nation taking what it needs by force? Not much, which is why the history of European colonialism provides so many examples of this principle in action. The last bout of colonial expansion was only a century ago—the Scramble for Africa (1881–1914), at the end of which the entire continent, with the sole exception of Ethiopia, was divided among the European powers.

On the other hand, there really is something to the idea that economic development helped to reduce violence. In Chapter 10 of *The Better Angels*, Pinker considers the possible ameliorative effects of wealth, but dismisses this as a general explanation for the decline in violence. However, his emphasis is again on the behavior of individuals, rather than on the evolution of societies. Let's consider how increasing wealth reshaped the forms of competition between societies.

We saw that, although war remained the most important contest between societies, violence itself actually declined during and after the Axial Age, simply because in mega-empires a smaller proportion of the population was on the front lines. This did not mean the rest of the population was irrelevant to the war effort. It had to mass-manufacture the military equipment and supplies and deliver them efficiently where needed. In other words, material wealth was becoming more important than martial prowess *for war*. Post-Axial empires could also use their wealth to buy off barbarians, or to pay them to attack rival states. Here we see Destructive Creation not only shaping human societies, but also reshaping itself.

Wealth-based forms of competition became even more important after the next great military revolution in 1500 CE. By the 20th century, prowess on the battlefield was definitely taking a back seat to industrial organization and productive capacity. During World War II, German soldiers fought better than their American or Russian counterparts.[194] However, and this is well known, the United States simply outproduced Germany. Less familiar is the fact that the USSR did so, too. Although its efforts were bolstered by supplies convoyed in from the USA, the Red Army won because the Soviet Union produced more tanks, artillery pieces, and airplanes than Nazi Germany.

After the end of World War II, competition between societies shifted even more from the military to the economic and ideological spheres. The USSR and the USA, thankfully, have never fought a direct war. Instead, the USSR lost the war of living standards and ideas. Unlike post-war Japan, on which the victors imposed new institutions without much consultation with the defeated, the Russians changed their political and economic system themselves. The process was messy and the results have disappointed many, but it is undeniable that Russian society changed dramatically during the 1990s and early 2000s.

The point I am making is that both post-war Japan and post-Soviet Russia are examples of rapid cultural evolution resulting from competition between societies. But while war—hot war—was the dominant selection force in the case of Japan, in Russia the dominant forces were economic in nature.

Feminization. Here again situation is more complex than is depicted by Steven Pinker. I agree that “the process in which cultures have increasingly respected the interests and values of women” played an important role in the decline of violence. But I see it as part of a broader trend towards greater equality, which set in following the moral revolution of the Axial Age. All forms of inequality increase violence. Deified rulers require human sacrifice, slave owners can kill and torture slaves with impunity, and nobles who murder peasants have a better chance of avoiding prosecution than peasants who strike back. When these forms of discrimination, including against women, subsided, there was a direct effect on violence. Greater equality between men and women has removed the right of men to beat, or even kill, their wives and daughters.

However, an equally important influence is the way in which inequality reduces cooperation. Inequality between the nobles and peasants reduces the willingness of the 99 percent to cooperate with the one percent. Inequality between men and women reduces the willingness of the worse-off sex to cooperate with the other 50 or so percent. Morale is important for cooperation, and inequality undermines it.

Cosmopolitanism. Pinker himself uses a better name for this force in Chapter 10: “the expanding circle of sympathy.” But again, his focus is too narrow. He only remarks upon the Humanitarian Revolution of the 18th century. In fact, the expanding circle of sympathy accompanied the expanding scale of cooperation; indeed, it has been an important force throughout the evolutionary history of our species.

In our distant ancestors, who solely relied on face-to-face cooperation, the circle of sympathy included only relatives and friends. Anybody you didn’t know was a potential enemy. An important evolutionary breakthrough was the capacity to tag cooperating groups with symbolic markers such as language and dialect, styles of clothing and ornamentation (including tattoos), and behavioral characteristics—for example, participation in collective rituals. Symbolically-tagged cooperative groups, or tribes and nations, allowed us to increase the scale of cooperation beyond the circle of people personally known to us. Of course, the downside of increasing cooperation within a tribe or a nation was greater intensity of conflict with other tribes and nations.

The next important waypost was the rise of Axial religions, which encouraged cooperation in multiethnic societies that shared a single world faith. Again, the downside was a greater intensity of "holy wars"—crusades and jihads—conflicts between religiously-defined multiethnic and multinational communities. But once again, this turns out to be a better trade-off than it looks.

While it is true that nationalism and religion have caused much human misery, we shouldn't forget their positive accomplishments. These ideologies provide some of the building blocks that evolution uses in creating large-scale societies. Nationalism and religion (of the post-Axial type) permitted the development of "imagined communities"—huge groups of people who didn't know each other personally, but who were inclined to cooperate with others of the same persuasion. And once again, while war intensifies as societies grow larger, the *relative* degree of violence declines. And so nationalism and religion simultaneously increased cooperation *within* and conflict *between* groups. The key point is that in enabling larger scales of cooperation, they reduced relative casualty rates.

A further advantage to the tagging of cooperating groups by means of symbols is that it opens up the possibility of manipulating those symbols to expand the circle of cooperation to encompass all of humanity. This last step was made (intellectually, at least) during the Humanitarian Revolution of the 18th century—but it was only the last step of many. Furthermore, it's worth putting this development in perspective. Theoretically, all "nice people" agree that the lives of all human beings are equally precious. In practice, the governments of even the most enlightened nations tend to value the lives of their own soldiers and the wellbeing of their own citizens well above those of the soldiers and citizens of other countries. They would argue of course that they have a particular responsibility to their own people, but nevertheless we have a long way to go before the ideas of the French and Scottish thinkers of the Enlightenment become internalized at anything close to the international scale.

The escalator of reason. The fifth and the final reason for the decline of violence is the weakest part of Pinker's argument. Pinker contends that "superstitious killings, such as human sacrifice . . . crumbled under the scrutiny of a more intellectually sophisticated populace."[195] But the timeline is completely wrong. Superstitious killings crumbled *long* before any intellectually sophisticated populace was around to do any scrutinizing. In fact, human sacrifice was a common characteristic of many of the early centralized societies. It disappeared as societies scaled up to larger, more mature states. It was not reason but religion that drove this shift—the new religions that arose during the Axial Age.

Within Europe, human sacrifice lingered longest in Scandinavia. For example, we know of sacrifices held at Gamla (Old) Uppsala during the Viking Age, thanks to the medieval chronicler Adam of Bremen. Such pagan practices were finally stamped out by Christianity—well before the Age of Reason. It would be hard to argue that these developments were accompanied by any independent increase in intellectual sophistication—Scandinavia was Christianized between the eighth and 12th centuries, during a period of retreat of reason also known as the "Dark Age."

Human sacrifice is, of course, only one of many kinds of violence that Pinker lists under the rubric of "superstitious killings." But this specific example brings out a general problem with his argument. Strange as it may sound, and despite the many graphs and a long list of scientific studies cited in *The Better Angels*, Pinker does not utilize the scientific method in all its awful majesty. His approach is inductive: he sieves through enormous empirical material in the first nine chapters of his book and then looks for "common threads" in the last one. This is fine when we are making first steps in developing a new scientific discipline. But science matures when it develops theories and starts testing them systematically with extensive data. The new discipline of Cultural Evolution does just that. It has a well-developed theory, and we have already started testing it with massive databases of historical and archaeological data (I'll talk more about that at the end of this chapter).

The Better Angels tells a story about human history that coincides to an extent with the one I've been developing in this book. But Pinker's version is both less powerful theoretically and less supported empirically. It's an interesting example of trying to do history in a "sciency" way, an approach that I completely support. But I think we can do better. If we want make sure that violence declines, we need to understand *why* it declines.

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Let's return to the question of the changing nature of competition between societies. Even in the past, Destructive Creation could take forms other than war. World religions didn't spread only when the victors forcibly converted the defeated (although of course there was a lot of that). Buddhism spread into southeast Asia without war and conquest. The early medieval empire of Kievan Rus adopted Christianity in 988 because old-style pagan religions were simply not up to the job of binding together the diverse peoples encompassed by the huge territory ruled by princes in Kiev.

The world today is by no means free of war. However, nonviolent forms of Destructive Creation have become more important than violent ones. Earlier we saw that wealth-based forms of competition have become more important, especially in the past 500 years. Another mode of cultural evolution is a constant battle of ideas about how societies should be organized. Are democracy and free markets the best way to promote economic growth and social wellbeing? Or is political stability, propped up by state repression and state direction of the economy the way to go? In other words, will the Washington Consensus prevail over the Beijing Consensus? Which system of democratic government—presidential or parliamentary—works better? Should tax rates be set high or low? Is it a good idea for states to pursue pronatalist policies, or should families themselves decide how many children to have?

All these “ideas” are cultural elements. They are the fodder for cultural evolution because they constantly compete against each other (presidential or parliamentary system?). When one cultural trait increases in frequency at the expense of another, that is cultural evolution. There are many reasons why some ideas outcompete others. Some may appear to make more sense than an alternative, and become implemented after a public discussion. In other cases, prestige and fashion may play a role, or it could be sheer chance. However, their fate ultimately depends on how well they work for the societies that adopt them.

Consider monogamy, the cultural institution limiting a man to one wife and a woman to one husband. Since the advent of agriculture, multiple marriage, or polygamy (discussed briefly in Chapter 5), has been the norm in most human societies until quite recently, most commonly in the form of polygyny, especially among elites who could afford to support more than one wife. According to the Stanford historian Walter Scheidel, the explicit prohibition of polygamous marriage first appeared among Greeks and Romans during the Classical period. Monogamy became part of Christianity through this Greco-Roman influence (for comparison, it was only much later, in 1000 CE, that the Jews banned polygamy). Up until about 1900, Christianity was the vector that spread monogamy to the wider world.

In the 20th century, however, the practice expanded rapidly beyond historically Christian Western societies—to Thailand in 1935, China in 1953, India in 1955, and Nepal in 1963. And even though the Quran allows up to four wives, polygamy was formally outlawed in such Islamic countries as Turkey (1926) and Tunisia (1956).[196]

The main mechanism of spread to non-Western countries was "prestige-based cultural transmission," as it is known in the cultural evolutionary jargon.[197] In other words, European societies and their New World offshoots were so successful that other countries began copying their cultural characteristics wholesale. After Japan went through the Meiji Revolution of 1868, for example, it copied Western ways of organizing its economy, Western approaches to education, and Western styles of dress. It also adopted Western attitudes to marriage, outlawing polygamy in 1880.

It is doubtful that copying 19th-century Western dress was an important factor in Japan's rise as a Great Power. Woolen three-piece suits are poorly suited to the hot and humid climate of Japan. Monogamy, on the other hand, turned out to be a really good idea. Recent research by Joseph Henrich, Robert Boyd, and Peter Richerson shows that monogamous societies reliably outcompete polygamous ones. When some men marry many wives, others must marry none. Monogamy reduces competition for mates and increases equality among men. It also reduces gender inequality. In monogamous societies, crime rates, including rape, murder, assault, robbery and fraud, go down. Instead of seeking additional wives, men invest more in their children. Monogamy increases savings and economic productivity.[198]

This should not be surprising. Just as in team sports (Chapter 4), a reduction of within-group competition and inequality makes groups stronger competitors. This general principle works equally well for football teams and for whole societies.

It is worth repeating the main conclusion of Chapter 4: increasing the competition within a group usually makes it perform worse. According to the logic of prophets of individualism such as Ayn Rand and Jeff Skilling, polygyny should induce males to make greater efforts to become rich so that they can afford a wife, and then even richer so they can afford many. If this were so, polygynous countries with hard-working male populations should enjoy greater economic growth than monogamous countries.

But the opposite is the case. A comparison of tropical developing countries shows that GDP per capita in monogamous countries is *three times higher* than in polygamous ones.[199] Differences between individual countries can be staggering. Compare Botswana, where polygamy is banned, with Burkina Faso, in which more than half of married women are in polygynous families. Botswana's GDP per capita is 10 times that of Burkina Faso.

Cultural Evolution is a young discipline, and I am not suggesting that it's ready to be mined for specific recipes on how to improve our societies. On the other hand, we already have abundant examples of specific cultural practices that yield social benefits, such as monogamy. And there is a general theoretical result about the divergent effects of different kinds of competition on cooperation (whether it is within a group or between groups). These theoretical and empirical insights can already start helping us "nudging" our societies in the right direction.

I have written before that the nature of competition between societies has been changing. Increasingly, the nature of competition is now non-military. Non-violent means of economic competition, which first evolved in the service of military imperatives, have acquired a life of their own. Societies compete not only to build the most impressive and destructive military machines, but also to provide a better existence for their citizens. People everywhere are beginning to demand that their governments deliver sustained improvements in the quality of life. Such demands were much in evidence during the Arab Spring of 2011–12 (even though its promise was not fulfilled, and it was succeeded by what some now call the Arab Winter). This, then, is the great hope for humanity: that war can finally fade away, displaced by more obviously constructive contests.

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The central question of this book is why, during the past 10,000 years, large-scale, complex societies have replaced small-scale societies. The ability of today's large-scale societies to construct viable states and to nurture productive economies varies enormously from country to country, as we have just seen. If we rank all countries along the scale of how good life is for ordinary people in them, at one end we will see countries like Denmark and France with productive economies, low levels of inequality, high political stability, and low crime rates. At the other end are failed states like Afghanistan and Haiti.

Why do some states fail to meet the basic needs of their populations? Why do economies decline, or fail to grow? Social scientists have debated these questions endlessly and, so far, have not agreed on an answer. The problem is that, in their search for explanations, most economists and other social scientists have focused on current conditions or the recent past. Yet modern societies did not suddenly appear 10, 30, or even 100 years ago. They gradually evolved from earlier societies over many millennia. In this book we have traced the trajectories of human societies from the Agricultural Revolution through the Axial Age. As we have seen, the adoption of agriculture doesn't immediately result in the rise of complex societies—typically, several thousand years are needed for cultural evolution to bring them forth. The pace of cultural evolution is faster today, but research shows that the economic development and political stability of a modern country depend on cultural innovations and political decisions made decades and even centuries ago.[200]

If we want to make life better for people everywhere, we need to learn how to fix failed states and restart failed economies. The key, as we have seen, is cooperation. Where millions of strangers cooperate with each other, we see strong states and thriving economies. Where cooperation fails, so do states and economies. That is why it is so important to solve the puzzle of ultrasociality; to understand how the human capacity for cooperating in huge, anonymous societies evolved.

I will not pretend that I have all the answers. Yet I am convinced that cracking the big questions we have dealt with in this book—the evolution of cooperation, the destructive and creative faces of war, and the strange trajectory of human egalitarianism—will be the critical step in developing effective policy recommendations. What we need to do now is develop the science of cooperation to the point where we can use it to improve people's lives.

And this brings me to the last topic of the book. How *do* we develop the science of cooperation? As we have seen repeatedly, researchers disagree on virtually all the big questions addressed throughout the book. The theory that I have developed and explained here is just one of the multitude. Why should you believe that I have the correct explanation?

Actually, I don't want you to *believe* it. First and foremost I am a working scientist, and I know only too well that no theory in science can be the ultimate Truth (with a capital T). Over the source of my scientific life I've seen several radical changes of paradigms (it helps that Cultural Evolution is a rapidly developing field). What's important is not that one's ideas are *correct*, but that they are *productive*. Productive ideas lead to new theories and hypotheses that can be confronted with data. Data destroy some hypotheses and force us to modify others. Then we repeat the process. As the German socialist Eduard Bernstein said in 1898, "the final goal is nothing; the movement is everything." And while the final goal is indeed nothing, the movement ensures that we successively approach the Truth with better and better theories. This is what is happening now with our understanding of how human societies function and change. We are at last in a position to use science to start *ruling theories out*.

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What, you may ask, prevented us from letting the scientific method run amok among all the existing theories before now? The short answer is, lack of data. Well, actually, the data existed. Knowledge is scattered across myriad published and unpublished articles. A substantial chunk resides in the heads of historians and archaeologists specializing in particular regions and epochs. The only way to make all this material useful for systematic theory-testing is to translate and transcribe it from human brains and paper onto electronic, computer-readable media. Thousands of historians and archaeologists collectively can tell us a lot about the past. If we can somehow bring all their knowledge together, it will give us an amazingly rich historical tapestry. Most important, it will allow us to reject a lot of theories—and build new and improved ones.

In 1919, the eminent American archaeologist and historian James Henry Breasted, who held the first chair in Egyptology and Oriental History in the United States and who in 1928 became president of the American Historical Association, wrote:

> Here, then, is a large and comprehensive task—the systematic collection of the facts from the monuments, from the written records, and from the physical habitat, and the organization of these facts into a great body of historical archives. The scattered fragments of man's story have never been brought together by anyone. Yet they must be brought together by some efficient organization and collected under one roof before the historian can draw out of them and reveal to modern man the story of his own career. The most important missing chapters in that story, the ones which will reveal to us the earliest transition from the savagery of the prehistoric hunter to the social and ethical development of the

> earliest civilized communities of our own cultural ancestors—these are the lost chapters of the human career which such a body of organized materials from the Near East will enable us to recover.[201]

For nearly a century, Breasted's grand vision has remained unfulfilled. But that is changing. Together with a talented crew of social scientists, historians, archaeologists, and computer scientists, I have been working to make it reality. We are building a new tool that will transform our understanding of past societies. We call it *Seshat: the Global History Databank*. It is named after the Egyptian deity of scribes, writing, and—literally—databases: ancient Egyptians depicted Seshat in the process of compiling records about, for example, the number of years each king had in his reign.[202]

Our project aims to organize systematically the vast amount of knowledge about past human societies, held collectively by thousands of historians and archaeologists, and make it available to all through the internet. Once this happens (and as I write this book in 2015, we are gearing up to begin analyzing the first batch of Seshat data), we will be able to subject rival theories about the social evolution of human beings to an unprecedented degree of empirical scrutiny. I expect that the great majority of previous explanations will not survive this new process of destructive creation, nor is the theory of Destructive Creation itself guaranteed to emerge unscathed.

Although, as we have seen throughout the book, a lot of empirical work has already gone into the theory of Cultural Multilevel Selection, a confrontation with a massive historical database such as Seshat will be a challenge of a much higher order of magnitude. Vulnerability to rejection is of course a virtue, as far as scientific theories are concerned. Scientists are not prophets, and we don’t claim to know the ultimate truth. On the contrary, science is a process of gradually working towards the truth, even if it never gets all the way there. We propose testable explanations and then confront them with data. We reject and modify ideas, and put them through another cycle of testing. What emerges is not the ultimate truth in any sense, but it is pretty good. Science has enabled us to build all kinds of wonderful things, reach out into the space beyond this planet, and cure previously incurable diseases. Similarly, by transforming the study of human societies into a real science, we will learn how to cure many social ills.

The difference between this and history’s business-as-usual is that we are about to subject the theories—both the one I favor and its scientific rivals—to the harsh challenge of data. I think Destructive Creation will fare quite well, but this is something that we will learn in the next couple of years. It is, after all, in the nature of our own peculiarly scientific form of competition that we can’t all be right. May the best idea win.

Acknowledgments

This book has been many years in gestation, and while working on it I incurred many debts—intellectual, professional, and personal. Let me begin by acknowledging the major thinkers who have influenced me. These were, first and foremost, Pete Richerson and Rob Boyd, the fathers of modern Cultural Evolution. David Sloan Wilson, whom I met in 1983, was an early proponent of multilevel selection who soldiered on even through the 1980s and 1990s, two decades of the most bitter hostility to the topic. David has also been a great colleague in the Evolution Institute, of which more below. Robert Bellah, the author of *Religion in Human Evolution*, started me on the road that eventually led to the Z-curve of human equality. I enjoyed engaging with Robert in the special issue of the journal *Religion, Brains, and Behavior*, devoted to discussion of his monumental oeuvre, and I appreciated his gracious response to my critique. It is one of the lasting regrets of my life that I was unable to meet him in person before he passed away in 2013. Chris Boehm, whom I met in Santa Fe many years ago, has been a major influence on my understanding of the first "zig" in the Z-curve, the one from the hierarchical great apes to the fiercely egalitarian human foragers.

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Institute, who include Jerry Miller, Brittany Sears, and Jill Levine. The Evolution Institute also provides the home for *Seshat: Global History Databank* (see Chapter 10). I wish to thank Harvey Whitehouse, who has been with me from the very beginning of this project, and other members of the governing board: Pieter François, Tom Currie, and Kevin Feeney; my postdocs Dan Hoyer and Dan Mullins; and my current research assistants, Edward Turner and Agathe Dupeyron, as well as former assistant Rudy Cesaretti.

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Once I decided to release *Ultrasociety* myself as an independent publisher, I needed to put together a talented crew who would ensure that

the book was produced completely professionally. Easily the best move I made was linking up with Ed Lake, the deputy editor at *Aeon* magazine. I had met Ed when he invited me to write for *Aeon* on the long-term dynamics of inequality in America. I was impressed by his ability to take my somewhat disorganized initial ideas and turn them into a streamlined, seamlessly argued article. So I asked him whether he would be willing to do the same thing to a book-length manuscript. Little did I know that his suggestions would force me to restructure the book completely and write two new chapters, as well as countless extra paragraphs. It was a lot of work, but I hope you'll agree that the end result was worth it. It was also Ed who came up with the title and subtitle.

Through Ed I found another consummate professional and—I am not afraid to use this word—wordsmith, Simon Reynolds. Simon and I went through two rounds of line-editing and copy-editing. One unexpected benefit of being my own publisher was that, in addition to doing more work, which I expected, I also enjoyed the hands-on involvement with the book's production. I learned a lot from these two "knights of the sharp pen," and I believe I became a better writer in the process.

The technical aspects of the book production were handled by two talented Poles (that they both come from the same country was a coincidence, a quirk of the selection process through Elance, which I used to find them). Marta Dec designed the cover and tirelessly went over many revisions with me. In this task I was helped by an improptu committee, consisting of Ed Lake, Joe Brewer, Dan Mullins, Dan Hoyer, and Robert Kreuzbauer. Grzegorz Laszczyk typeset the manuscript in three formats, suitable for publishing on CreateSpace as a trade paperback, and as e-books on the Amazon and Smashwords.

Pete Richerson, Joe Brewer, and Dan Mullins read the first draft and provided an incredible amount of valuable feedback. If you can understand my discussion of the Price equation in Chapter 4, thank Dan for that. (If not, blame me.)

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167. See Chapter 8.

168. Bellah, R. N. (2011). *Religion in Human Evolution: From the Paleolithic to the Axial Age*. Cambridge, MA, Harvard University Press, p. 261.

169. Plato's *Apology.*

170. Dating these historical figures is a very chancy business, but here are the dates accepted by most historians (all BCE): Confucius (551–479), Laozi (sixth century), Siddhartha Gautama (563–483; alternatively 480–400), Mahavira (540-468 BCE), Heraclitus (575-435 BCE), Parmenides (c.515/540–c.450), and Zarathustra (sixth century). The last one, Zarathustra, is the one for whom the dates are very uncertain.

171. Bellah, R. N. (2011). *Religion in Human Evolution: From the Paleolithic to the Axial Age. Cambridge*, MA, Harvard University Press, p. 573.

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174. David Christian, *A History of Russia, Central Asia, and Mongolia*, Oxford: Blackwell, 1998, p. 125.

175. Drews, R. (2004). *Early Riders: The Beginnings of Mounted Warfare in Asia and Europe*. New York, Routledge: Chapter 5.

176. Christian, *A History of Russia*, p. 134. Vogelsang argues that the Scythians entered Middle East through the more traditional nomadic route of Parthia and Hyrcania; see Willem J. Vogelsang, *The Rise and Organisation of the Achaemenid Empire: The Eastern Iranian Evidence*, Leiden: Brill, 1992.

177. Herodotus 1.106.1. Quoted in Drews, R. (2004). *Early Riders: The Beginnings of Mounted Warfare in Asia and Europe*. New York, Routledge, p. 106.

178. On the Mongols as masters of mobile warfare see Note 16 on p. 492 of McNeill, W. H. 1963. *The Rise of the West*. New American Library, New York.

179. Karl Jaspers, who introduced the idea of the Axial Age, also thought that the Eurasian nomads played a crucial role in bringing it about: Jaspers, K. (1953). *The Origin and Goal of History*. New York, Routledge & Kegan Paul.

180. See the maps showing the spread of macrostates in Turchin, P., et al. (2013). "War, Space, and the Evolution of Old World Complex Societies. PNAS, published online Sept. 23, 2013. PDF." PNAS 110: 16384–16389.

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187. See Boyd, R. (2012). "Culture: the Engine of Human Adaptation: Social Learning Leads to Our Greatest Achievements and Worst Errors." *Being Human* (12.09.2012).

188. Tallavaara, M., et al. (2015). "Human population dynamics in Europe over the Last Glacial Maximum." Proceedings of the National Academy of Sciences.

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190. Pinker, S. (2011). *The Better Angels of Our Nature: Why Violence Declined*. New York, Penguin Books, p. xxvi.

191. Pinker, S. (2011). *The Better Angels of Our Nature: Why Violence Declined*. New York, Penguin Books, p. 672.

192. I use the caps here to indicate scientific schools. Similarly, Cultural Evolution is the scientific discipline that studies the cultural evolution of human societies. For more on Evolutionary Psychology see *How the Mind Works* by Steven Pinker and *The Adapted Mind* by Jerome Barkow, Leda Cosmides, and John Tooby.

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195. *The Better Angels*, p. 690.

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202. You can learn more about our project by visiting its website: http://seshatdatabank.info/

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