Guns, Germs, and Steel

INTRODUCTION

BRIEF BIOGRAPHY OF JARED DIAMOND

Jared Diamond grew up in Boston and studied at Harvard, and later at Cambridge, where he obtained a doctorate in physiology. He taught physiology at UCLA for many years, while also pursuing his own interests in ornithology and ecology. Diamond published his first book in 1991: *The Third Chimpanzee*, on human evolution. Since the 90s, he's published a series of successful books, few of which relate back to his academic field of study. His most famous book, *Guns, Germs, and Steel* (1997), won the Pulitzer Prize for general nonfiction, and is credited with popularizing the theory of geographic determinism: the idea that differences between civilizations have environmental causes. In the last decade, Diamond has been an important popular intellectual, penning articles on ecology, archaeology, and social science in many publications, and speaking at universities around the world.

HISTORICAL CONTEXT

It would be impossible to list all the historical events mentioned in *Guns, Germs, and Steel*—the entire book is about human history. However, there are two historical milestones that arguably stand out from all the rest: first, the development of agriculture 13,000 years ago in Mesopotamia, since it paved the way for civilization, political centralization, and the development of complex technologies; second, Columbus's voyage to the New World in 1492, since it marked the start for European hegemony over the other civilizations of the world—in a way, the phenomenon that Diamond is trying to explain.

RELATED LITERARY WORKS

As a work of social science, *Guns, Germs, and Steel* has few overt literary influences. Nevertheless, with its macrocosmic scope and easy, readable style the book bears comparison with earlier works of social science like *Argonauts of the Western Pacific* (1922) by the anthropologist Bronislaw Malinowski, which studies the structures of West Pacific societies, and *Tristes Tropiques* (1955) by the anthropologist Claude Levi-Strauss. Both works use an expansive, literary style to study the differences between civilizations, even as they use scientific methods to do so. Diamond's book also riffs on the famous first sentence of Leo Tolstoy's famous novel *Anna Karenina*.

KEY FACTS

- **Full Title:** Guns, Germs, and Steel: The Fates of Human Societies
- **When Written:** 1996-97
- **Where Written:** Primarily Los Angeles, with frequent trips to New Guinea
- **When Published:** Fall 1997
- **Genre:** Social science, Non-fiction
- **Setting:** The Earth, the last 13,000 years
- **Point of View:** Primarily third-person omniscient, with many first-person asides

EXTRA CREDIT

So romantic. Jared Diamond isn't just a brilliant writer and thinker—he's also a talented musician who's played the piano since he was a young child. To propose to his girlfriend, he played a piece by the classical composer Johannes Brahms. Needless to say, she said yes.

Renaissance man. It takes a brilliant man to write a book about the history of the entire world. Yet amazingly, Diamond had almost no formal education in history when he began writing *Guns, Germs, and Steel*—at university, his focus was the physiology of the gall bladder. Diamond is a highly educated man, but as far as the fields he discusses in *Guns, Germs, and Steel* are concerned, he's almost entirely self-taught.

PLOT SUMMARY

In *Guns, Germs, and Steel*, Jared Diamond outlines the theory of geographic determinism, the idea that the differences between societies and societal development arise primarily from geographical causes. The book is framed as a response to a **question** that Diamond heard from Yali, a charismatic New Guinean politician. Yali wanted to know, "Why is it that you white people developed so much cargo … but we black people had little cargo of our own?"—in other words, why have European societies been so militarily, economically, and technologically successful in the last 500 years, while other societies have not approached such a level of achievement?

In Part One of the book, Diamond sketches out the course of recent human history, emphasizing the differences between civilizations. Beginning about half a million years ago, the first human beings emerged in Africa, and eventually migrated around the rest of the world in search of game and other sources of food. About 11,000 years ago, certain human beings developed agriculture—a major milestone in human history. By the 15th century A.D., enormous differences had arisen between civilizations. For example, when Francisco Pizarro led

a Spanish expedition to the Inca Empire in the early 16th century, he was able to defeat the Incan Emperor, Atahuallpa, easily. Why did the Europeans colonize the New World, and not the other way around?

In Part Two, Diamond talks about the dawn of agriculture and explains why it arose in certain parts of the world, but not others. Using carbon-dating technology, archaeologists have determined that the first sites of agriculture were Mesopotamia (in the Middle East), followed by Mesoamerica and China. Agriculture arose in those areas for a few reasons. Most of the human beings on the planet at the time were hunter-gatherers, meaning that they hunted game and picked nuts and berries for their food. But in the parts of the world that first developed agriculture, game and fruit were becoming scarcer, motivating experimentation with new forms of food production. In Mesopotamia, ancient humans used trial and error to learn how to plant certain large seeds in the earth, resulting in crops that could be harvested and converted into highly nutritious foods. These early peoples also learned how to domesticate wild animals, breeding familiar modern animals like dogs, cows, and horses. Humans used their domesticated animals to assist with agricultural work, while also learning how to domesticate certain wild crops, breeding most of the world's familiar modern crops.

Agriculture arose in Mesoamerica and China. Due to environmental qualities like soil fertility, availability of domesticable animals, and availability of edible crops, however, it took a longer time for agriculture to supplant hunter-gatherer culture in most other regions. Once agriculture had arisen around the world, it spread or diffused to neighboring regions. By and large, Diamond argues, it is easier for ideas, goods, and foods to spread from east to west than it is for them to spread north and south—this is because the Earth spins east-west, meaning that areas with the same latitude share a similar climate and environment. Archaeological data indicates that agricultural innovations diffused east and west far sooner than they diffused north and south.

In Part Three, Diamond shows how basic agricultural differences between early societies magnified over time, leading to vast differences between societies' health, technology, and social structure. First, he shows that agricultural societies developed immunities to deadly diseases like smallpox. Constant proximity to domesticated animals, combined with increased population density, meant that new germs were constantly circulating in agricultural societies. As a result, these societies became resistant to many epidemics—those who couldn't survive died off, while those with immunities survived and passed on their immunities to their offspring.

Another important development in the history of agricultural societies was the invention of written language. While it's difficult to show exactly why writing emerged in certain agricultural societies but not others, it's clear that the structure of agriculture society (which requires lots of record-keeping for crops) put a high premium on a writing system. Furthermore, east-west diffusion patterns ensured that, once *one* society developed language, it diffused, along with agriculture itself, to surrounding areas, particularly those with similar latitude.

The history of language acts as a case study for the history of technology in general. While it's again difficult to explain why certain inventors develop certain inventions, the structure of agricultural societies favored the invention of new technologies. This is true for a number of reasons. Agricultural societies lead to the creation of leisure time, since crops can be stored for long periods—in their leisure time, citizens of early agricultural societies experimented with the resources and raw materials around them. Additionally, agricultural societies were denser than hunter-gatherer societies, increasing the velocity with which people exchanged ideas. As a result, agricultural societies developed more new technologies than hunter-gatherer societies, and passed on their innovations to neighboring agricultural societies.

Ancient agricultural societies tend to develop into large, complex states. While the earliest agricultural societies were "bands" and small tribes, these small tribes gradually merged into larger and larger societies, either through conquering or mutual agreement. As societies became larger and denser, they tended to develop centralized structures of power—in other words, a central leadership that commanded a set of subordinate leaders, who in turn commanded local groups of people. States ruled through a balance of kleptocracy—i.e., leaders ordering their subjects to give up a portion of their possessions—and religion or patriotic fervor. By the 16th century—not coincidentally, the time when Europe was beginning its conquest of the New World—the state had become the dominant mode of society.

In Part Four, Diamond looks at a series of case studies that support his theory. In the first, he demonstrates that the New Guineans developed agriculture, sophisticated technology, and political centralization while the neighboring aborigines of Australia did not, due to geographic distances and factors like the ones sketched out in Part Two. He also argues that China was able to become the world's first large, centralized state for environmental reasons—the temperate climate and homogeneous geography enabled easy communication and political unification between the states of China. The New Guineans were more successful than their neighbors, the peoples of Java and Borneo, in staving off European colonization and massacre in the 18th and 19th centuries, largely because their agricultural practices made them resistant to malaria, preventing colonists from staying for too long on their island. In the New World, agriculture arose in certain regions, but did not diffuse to neighboring regions due to the presence of geographic barriers like deserts and

mountains. Finally, Diamond studies the history of Africa and argues that the Bantu peoples of North Africa were more militarily successful than their sub-Saharan neighbors because they developed some limited forms of agriculture. In the sub-Saharan environment, however, peoples didn't have any way of developing agriculture, so their societies never had the time or organization to develop complex technologies.

In conclusion, Diamond argues, the differences between different peoples and societies of the world are largely attributable to geographic differences between different regions of the world. In certain parts of the world, humans began pursuing agriculture because the fertile soil and temperate climate made agriculture a good use of time and resources. Agricultural societies then gained tremendous advantages over non-agricultural societies, because the increase in leisure time enabled people to develop technologies and centralized political structures, and the proximity to animals gave people immunities to deadly diseases. As a result, some societies were able to conquer others.

CHARACTERS

Yali – An intelligent, charismatic New Guinean politican who asks the question—"Why is it that you white people developed so much cargo … but we black people had little cargo of our own?"—to which *Guns, Germs, and Steel* is the 500-page answer.

Francisco Pizarro – Spanish conquistador in the early 16th century who conquered the Incan Empire and killed its emperor, Atahuallpa.

Levi – A Native American from the Blackfoot tribe who inspired Jared Diamond to research the environmental differences between Native American and European civilizations.

Johannes Gutenberg – A 15th-century German blacksmith, printer, and inventor often credited with designing the modern printing press, which marked a major milestone in European history.

Aristotle – Ancient Greek philosopher.

Jean-Jacques Rousseau – French Enlightenment philosopher who posited that human beings are born in a state of perfection and are then corrupted by civilization.

Christopher Columbus – Italian explorer who, funded by Spanish royalty, led a series of voyages to the New World beginning in 1492 A.D.

Atahuallpa – The powerful Incan emperor defeated by Pizarro in the early 16th century.

THEMES

In LitCharts literature guides, each theme gets its own color-coded icon. These icons make it easy to track where the themes occur most prominently throughout the work. If you don't have a color printer, you can still use the icons to track themes in black and white.

GEOGRAPHIC DETERMINISM

At the heart of *Guns, Germs, and Steel* is a theory that has since become known as "geographic determinism": the idea that civilizations develop over time in different ways in response to environmental factors such as temperature, soil fertility, availability of large mammals, and physical barriers to travel. While Diamond wasn't the first to propose such a theory, he was the first to compile all the existing data to paint a convincing picture of how environment has influenced the development of civilization throughout human history, not just in a few isolated areas.

Diamond traces the cause of differences between civilizations—for example, the differences between the Inca Empire, which had no guns, swords, ships, or written language, and the Spanish nation-state, which had all four—to one underlying cause: the geographical features and locations of the Earth itself. As a result of the Earth's angle of rotation, there are certain parts of the planet where large, nutritious seeds grow easily, the soil is fertile, and there are a greater number of large mammals. The people who live in such areas are likely to develop forms of agriculture; i.e., a society founded on the organized cultivation of crops. In other regions, geography makes human beings more likely to be hunter-gatherers, meaning that they migrate between areas, hunting game and picking fruits and nuts.

So environmental differences lead to differences in how societies feed themselves. These differences in turn trigger further, even more pronounced differences between societies. Members of agricultural societies, because they have to migrate less and have more leisure time, can then develop specializations in certain professions. Social specialization in turn leads to the need for and discovery of new technologies, giving agricultural societies a big advantage over hunter-gatherer societies in warfare. Furthermore, agricultural societies' proximity to large domesticated animals tends to make them immune to more deadly diseases, another big advantage in clashes with societies that lack domesticated animals. Thus, as a result of basic environmental differences, different peoples of the world develop in different ways over history, so that in the end, certain of these peoples are more capable of conquering and dominating other peoples.

Geographic determinism is the central idea of *Guns, Germs, and Steel* (in a way, the other four themes discussed here are particularly important aspects of the theory of geographic determinism), but it can also be a counterintuitive way to think about human history. A "deterministic" model of history

suggests that there are limits on how greatly human beings can change their own societies. Individual humans can strive for greatness or success (or do whatever they want), but their freedom has always been constrained by what resources and ideas are available to them—and therefore, by geographic factors. Diamond acknowledges some examples of human beings who have "shaped history," but admits that he doesn't have a good theory for the relationship between individual achievement and history, diluting some of his claims for strictly geographic determinism (see the "Technology and Creativity" theme for more on the limits of Diamond's model of human individuality and free will).

Diamond's theory has come under fire in the academic world for many other reasons, mostly notably that it's an overly general, vague idea. Diamond argues for why agricultural societies defeated hunter-gatherer societies in warfare, but by his own admission, he lacks a full geographic explanation for why certain agricultural societies prevailed over *other* agricultural societies—again suggesting that geography is important but perhaps not as central to explaining history as Diamond maintains. *Guns, Germs, and Steel* is an ambitious book, but it wasn't written to be the final word on history: even if it can explain a lot, the theory of geographic determinism needs further analysis, and Diamond hopes that other thinkers will refine and strengthen his ideas.

RACISM, VIOLENCE, AND COLONIZATION

One of the basic assumptions of Diamond's theory of geographic determinism is that there are no fundamental differences in the intelligence, propensity for violence, or talent of peoples from different parts of the world—the cause of differences between civilizations is, in a word, geography. Nevertheless, Diamond contrasts his theory with another "theory," which, unfortunately, has been all-too popular over history: racism. There are many who have argued that certain societies rise to power because their populations are physically, intellectually, or even genetically superior to people of other races. *Guns, Germs, and Steel* is written in part as a rebuke to racism, which has frequently been used as a justification for powerful civilizations to colonize and even wipe out other civilizations.

Diamond attacks racism on two main fronts. First, and mostly toward the beginning of the book, he explicitly argues against racism by showing, empirically, that people of societies that traditionally haven't wielded much power on the global stage are as intelligent and innately talented as people from any other society. For example, the people of New Guinea—who've been the victims of European colonialist racism for hundreds of years—excel at many cognitive challenges, albeit not ones that Europeans would typically consider valuable, and show the same cognitive potential as any other human being.

Second, and more importantly, Diamond shows that throughout history, societies in different parts of the world have almost always behaved "rationally," in the sense that they've made use of all available resources to improve their quality of life. An Australian aborigine making use of stone tools exhibits the same cognitive ability as an ancient Mesopotamian experimenting with planting seeds—the difference is that the latter person has access to different resources (resources that, if given enough time, enable major changes in the structure of society).

Ultimately, Diamond disrupts the racist paradigm of the "civilized" colonialist with books and electricity conquering the "primitive" hunter-gatherer armed with less advanced technologies. While agricultural societies' access to technology and government give them huge military and economic advantages over other forms of society, members of the former society are no more intelligent or talented on an individual level than members of the latter society; instead, they're just "lucky" that their ancestors had access to useful resources and neighbors, and lived in a temperate climate. Powerful, militarized civilizations often claim that their people are superior to other races, or even that other races are sub-human—Diamond demonstrates that such claims are nonsensical. Because Diamond is writing a work of history, not a polemic, he sometimes describes disturbing, genocidal violence without passing judgment on it. Nevertheless, by his own admission, *Guns, Germs, and Steel* was written in part to end (or at least put a dent in) the pseudoscientific racism that has often motivated such violence.

DIFFUSION, TRADE, AND DISEASE

One of the most important aspects of Diamond's theory of geographic determinism is the concept of diffusion: the many different ways that technologies, ideas, goods, and resources are transported and spread both within a society and between separate societies.

One of the most important and representative forms of diffusion that Diamond discusses is trade. Trade is particularly important because it often involves the literal exchange of goods and ideas, meaning that a society that trades with its neighbors can benefit from its neighbors' natural resources and its intellectual breakthroughs. A society that trades with its neighbors can remain on the cutting edge: either the society itself discovers an important resource or idea, or a neighboring society does and the first society acquires it through trade. In many ways, Diamond suggests that a society would be better off in the long run with normal citizens and connections to many neighbors than with brilliantly talented citizens but no neighbors to trade with. No matter how advanced and self-sufficient a society might be, there are big historical advantages to trading with neighbors. This is one reason why China, a highly technologically advanced society that deliberately cut

itself off from other societies during the 15th century, fell behind Europe, a less technologically advanced region that nonetheless benefited from diffusion between itself many other cultures.

One "side effect" of trade between societies—but also a form of diffusion in its own right—is the spread of disease, since societies exchange germs and viruses when they interact. While the spread of disease has caused countless deaths, it also acts as a net benefit to dense, agriculture-based societies. Frankly put, the steady diffusion of disease strengthens large populations by gradually eliminating humans with weak immune systems and replacing them with humans with stronger immune systems. The result is that societies benefit from "germ diffusion," building up immunities to deadly diseases like smallpox—furthermore, when such societies encounter a non-agricultural society that's never participated in large-scale diffusion, the latter society is often wiped out by the spread of unfamiliar new diseases. Large agricultural societies benefit greatly from the diffusion of diseases, but not because of any deliberate action on their part—emphasizing the role of "geographic luck" in history.

In all, diffusion generally benefits the societies that participate, whether they're fully aware of what they're gaining or not. The role of diffusion in *Guns, Germs, and Steel* reinforces the importance of environment in human history, and, more abstractly, the notion that history is largely beyond conscious human control.

GOVERNMENT, CENTRALIZATION, AND THE STATE

One of the most important developments in modern human history—and one of the major reasons why certain societies were able to colonize other societies—is the development of the modern state. Diamond defines a state as a large (at least 100,000 people, usually) society organized around a single central leadership (that leadership could be a king, a parliament, or a combination of President, Congress, and Supreme Court, as in the United States). The central leadership passes orders down to lower-level leaders, who in turn carry out these orders for a specific, local part of the population they're responsible for governing. Diamond makes a series of points about how states form, how they're run, and why they're so powerful, many of which are crucial to understanding *Guns, Germs, and Steel*.

In part, Diamond argues, states arise over time as a function of a society's size and population density, which themselves result from agricultural developments, military conquering, and voluntary integration. Agricultural societies permit large population density: more people stay in a smaller area, nourished by crops. As agricultural societies get larger and denser over time, they may conquer or merge with other agricultural societies. At some point, the society will reach a point where it has so many people that centralized, hierarchical leadership—i.e., a state—is the most stable form of government. Of course, there's never been a point in history when an agricultural community has literally *decided* to form a state. Nevertheless, communities that venerated, or even worshipped a single authority (a king, for example) gradually developed complex institutions of power centered around enacting that authority's commands, because such institutions more effectively governed the state. In this way, modern states often emerged.

Why, then, are states so powerful and so important to modern history? In large part, states are powerful because they produce surplus resources that can be spent on ventures like exploration and technological research. A state authority—for example, King Ferdinand and Queen Isabella of Spain in the 15th century—can collect taxes from its people (who will pay willingly, due to their religious or patriotic respect for the authority) and use them to fund important long-term projects—for example, Columbus's exploration of the New World. So while a smaller, less centralized society might not have the extra funds or the organization for a war or an expedition, a state often does.

In all, states are founded on the control and organization of large groups of people, and that's exactly why they're so powerful. In almost every case, a state organizes and runs the domination or colonization of other, less centrally organized countries–the very phenomenon that Diamond aims to study in his book.

TECHNOLOGY AND CREATIVITY

As its title would indicate, *Guns, Germs, and Steel* is largely about technology—in particular, how civilizations develop technologies and then use them to gain a comparative advantage over other civilizations.

By his own admission, one of the big blind spots in Diamond's book is how civilizations, or rather, individual people, discover technologies in the first place. Diamond is writing a book of world history, which means that he has limited time to study what motivates individual famous inventors to design their inventions. And it's not clear if there's a better explanation for why an inventor creates something, other than that the inventor is smart and creative—in other words, the kind of explanation based on intellectual superiority that Diamond's theory of geographic determinism aims to avoid entirely.

Yet, even if he can't explain how specific technologies arise, Diamond shows how certain civilizations' structures and environmental qualities can popularize these technologies and preserve them over time. A society with a centralized structure of leadership is most likely to make an invention popular and accessible within the society, once the invention is designed.

Similarly, a society with connections to neighboring societies is (eventually) likely to spread technology to neighbor societies. By contrast, a society without centralized leadership or communication with other societies—qualities that can be traced back to environmental causes—is more likely to miss out on technological breakthroughs or, having developed a technology, forget it. For example, Japanese leaders acquired guns from neighboring societies in the 16th century, but chose to discard the technology soon afterwards. Because the country was isolated from the rest of Asia by water, Japanese society forgot about gun technology, and didn't get it back again until the 19th century.

Technology gives societies a clear advantage over societies that lack the same technologies. For example, when the explorer Francisco Pizarro brought an expedition from Spain to the Inca Empire in South America, he defeated the empire because of his society's guns, steel swords, maritime technology, etc. Even if Diamond can't explain the individual, creative act of technological discovery or invention in purely environmental terms, he does show how the diffusion and preservation of technology result from environmental causes—showing that one society's technological superiority over another isn't the result of its people's intellectual superiority, but rather of geographic chance.

SYMBOLS

Symbols appear in **teal text** throughout the Summary and Analysis sections of this LitChart.

YALI'S QUESTION

Since *Guns, Germs, and Steel* is a work of historical nonfiction, it doesn't have many symbols. Still, Diamond writes in a conversational style, often using specific events from his life as jumping-off points to talk about weighty scientific ideas. At the beginning of the novel, Diamond describes meeting a charismatic New Guinean politician named Yali, who asked him, "Why is it that you white people developed so much cargo … but we black people had little cargo of our own?" Yali's question arguably symbolizes the basic problem that Diamond's book tries to solve: how certain societies, particularly Western, European societies, came to be so technologically and economically powerful while other societies did not.

QUOTES

Note: all page numbers for the quotes below refer to the W. W. Norton & Company edition of *Guns, Germs, and Steel* published in 1999.

Prologue Quotes

"Why is it that you white people developed so much cargo and brought it to New Guinea, but we black people had little cargo of our own?"

Related Characters: Yali (speaker)

Related Themes:

Page Number: 14

Explanation and Analysis

This is the crucial question of *Guns, Germs, and Steel*—why, in a nutshell, certain civilizations of the world, such as those of the European states, become so powerful and wealthy, while other civilizations, like that of Yali, the New Guinean politican who asks the question, never developed comparable technologies and never colonized the rest of the world.

One of the basic premises of the book is that all humans are capable of essentially the same things, regardless of race or ethnicity. Diamond will seek to explain the differences between cultures not by talking about genetic differences between Europeans and New Guineans (which would be empirically wrong, as well as racist) but rather by analyzing the differences between the geographies of New Guinea and Europe. He will conclude that, even with the exact same human beings, two civilizations will develop differently in response to such geographic qualities as soil fertility, availability of crops and large mammals, climate, etc. Posing the basic question of the book through an intelligent, sympathetic figure like Yali is a way for Diamond to remind readers that the differences between cultures have little to do with individual people and everything to do with getting lucky in the "geographic lottery."

Chapter 1 Quotes

Thus, an observer transported back in time to 11,000 B.C. could not have predicted on which continent human societies would develop most quickly, but could have made a strong case for any of the continents. With hindsight, of course, we know that Eurasia was the one.

Related Themes:

Page Number: 51

Explanation and Analysis

11,000 B.C. is an important date in *Guns, Germs, and Steel*,

because it marks the period just before human beings began to develop agriculture. With the development of agriculture, a progression that marked humans' response to their environments, certain groups of humans became healthier, more secure, and more technologically advanced than others. And yet, as the passage points out, there were few discernible differences between different human societies 13,000 years ago.

The quote emphasizes the relative unimportance of individual human beings in determining the path of human civilization. Any explanation of why Europeans succeeded in colonizing the rest of the world while New Guineans "failed" to do so that hinges on the innate superiority of Europeans to New Guineans isn't just racist—it's factually wrong. Only 13,000 years ago, there were no obviously "superior" human beings on the planet. So it stands to reason that the differences between cultures that arose in the succeeding years don't have much to do with genetics or human talent, but rather to geographic determinism, as we'll see.

Chapter 2 Quotes

❝ In short, Polynesia furnishes us with a convincing example of environmentally related diversification of human societies in operation. But we thereby learn only that it can happen, because it happened in Polynesia.

Related Themes:

Page Number: 64

Explanation and Analysis

In this chapter, Diamond studies the societies of Polynesia. There are many small, insular societies on the Polynesian islands. Crucially, these societies are interesting for environmental anthropologists to study, because it's possible to link differences in Polynesian societies to environmental differences between different Polynesian islands. The peoples of Polynesia first arrived in Polynesia at the same time, having come in boats from neighboring regions of Asia. So, in a nutshell, the current Polynesians are descended from people who, it seems pretty likely, had highly similar genes and talents—the differences between Polynesian societies, then, cannot be attributed to either genetics or any other innate human abilities. Rather, they can be explained by studying the environmental differences between the islands. Diamond then shows that certain Polynesian societies became more centralized and organized due to the availability of agricultural crops.

The challenge for Diamond is to generalize his findings for Polynesia to the rest of the world. It's been pointed out that in a way, Diamond's work resembles that of Charles Darwin, the brilliant English scientist who developed the theory of evolution. Just as Darwin began by studying animals' adaptations to their environments in the Galapagos Islands, then generalized his findings to all life forms, Diamond begins by studying environmental adaptation on the Polynesian islands and then generalizes accordingly.

Chapter 3 Quotes

❝ Atahuallpa's capture was decisive for the European conquest of the Inca Empire. Although the Spaniards' superior weapons would have assured an ultimate Spanish victory in any case, the capture made the conquest quicker and infinitely easier. Atahuallpa was revered by the Incas as a sun-god and exercised absolute authority over his subjects, who obeyed even the orders he issued from captivity. The months until his death gave Pizarro time to dispatch exploring parties unmolested to other parts of the Inca Empire, and to send for reinforcements from Panama. When fighting between Spaniards and Incas finally did commence after Atahuallpa's execution, the Spanish forces were more formidable.

Related Characters: Francisco Pizarro, Atahuallpa

Related Themes:

Page Number: 66

Explanation and Analysis

In this chapter, we're introduced to one of the most representative examples of the differences that arise between civilizations over time. Francisco Pizarro led a Spanish expedition to the New World in the early 16th century, eventually capturing the King of the Inca Empire, Atahuallpa. Pizarro's defeat of Atahuallpa was relatively easy—with his superior firepower, his horses, his armor, and his (unintentional) arsenal of diseases, he was able to wipe out the Inca in just a few years. Furthermore, by kidnapping Atahuallpa, Pizarro was able to ransom him for lots of gold, further speeding up the defeat of the empire.

While Yali's question is the defining question of the book, one could also say that Pizarro's defeat of Atahaullpa is the key mystery that Diamond tries to solve. There's little to no psychological detail in this chapter—we don't hear anything about what "kind of men" Pizarro and Atahuallpa were. And this is deliberate on Diamond's part—his concern isn't with individual personalities or talents, but rather with the advantages that societies' geographies gave them. Pizarro,

as a European, was born into a world with metallurgy, writing, and dozens of other critical technologies that he used to defeat the Inca Empire.

Chapter 4 Quotes

❝ As we'll see, food production was indirectly a prerequisite for the development of guns, germs, and steel. Hence geographic variation in whether, or when, the peoples of different continents became farmers and herders explains to a large extent their subsequent contrasting fates.

Related Themes:

Page Number: 82

Explanation and Analysis

This is a partial thesis statement for the book: Diamond will demonstrate that the fundamental explanation for why some societies develop guns and steel and build immunities to diseases, while other societies don't, is that geographic variations predispose some parts of the world to develop more "successful" societies.

As the passage hints, agriculture is one of the key milestones of human history. Societies that turned to farming and herding built up immunities to diseases, learned to specialize in different skills, and developed political structures based around one powerful leader or body of leaders. On the other hand, societies that did not farm did not gain such advantages. At the most fundamental level, a group of people will turn to agriculture not because of its intelligence or sophistication, but because agriculture is the most rational, available option in their region of the world. So it is geography, not innate ability, which determines the "fate of civilizations."

❝ That higher birthrate of food producers, together with their ability to feed more people per acre, lets them achieve much higher population densities than hunter-gatherers.

Related Themes:

Page Number: 85

Explanation and Analysis

One of the most important measures of a society is its population density. Population density, as Diamond will go on to show, helps a society on many different levels. Societies with a high population density tend to have more social specialization, giving people an opportunity to perfect their abilities at one particular job. Also, dense societies build immunities to diseases, giving them a huge advantage over smaller societies without any such immunities. Finally, population density increases the velocity of information and exchange of ideas—important metrics for any militarized, expanding society.

In short, population density is a good predictor of a society's ultimate power and technological capability. And as Diamond argues here, agricultural societies tend to have the highest population densities—certainly higher than hunter-gatherer societies (since people in the latter kind of society need to move around in search of food). The second part of Diamond's book is about why certain societies develop agriculture and others don't. The third part is mostly about how population density leads to the establishment of large, centralized, technologically advanced states. So this passage is a kind of transition statement, showing how advances in agriculture tend to lead to the other kinds of advances that Diamond will proceed to explain.

Chapter 5 Quotes

❝ The same pattern of an abrupt start of food production dependent on domesticates from elsewhere, and an abrupt and massive population replacement, seems to have repeated itself in many areas in the prehistoric era. In the absence of written records, the evidence of those prehistoric replacements must be sought in the archaeological record or inferred from linguistic evidence.

Related Themes:

Page Number: 98

Explanation and Analysis

This passage brings up a few important points. First, it talks about how agricultural societies arose in many parts of the world, independently. Diamond has already shown how the environmental qualities of several distinct regions led humans to establish agricultural societies there. The passage also alludes to a large "population replacement" in many of the places where humans developed agriculture. Indeed, agriculture gave its practitioners such a large comparative advantage over hunter-gatherers that many hunter-gatherer societies either died out or became agriculturalists, too. Finally, the passage brings up a key

caveat of archaeology, and of Diamond's book itself. Diamond bases much of his evidence on archaeological records that, by necessity, are incomplete and spotty. Therefore, there will be points when Diamond is forced to speculate—there's no evidence for him to cite. Diamond follows the evidence, and extrapolates from it where he must.

Chapter 7 Quotes

Early farmers surely didn't use molecular genetic techniques to arrive at their results. The first farmers didn't even have any existing crop as a model to inspire them to develop new ones. Hence they couldn't have known that, whatever they were doing, they would enjoy a tasty treat as a result.

Related Themes:

Page Number: 110

Explanation and Analysis

Here Diamond clarifies that the earliest agriculturalists weren't innately different from the hunter-gatherers who dominated the world's population at the time. In other words, agriculturalists didn't *choose* to become agriculturalists—they were just experimenting with seeds when they discovered agricultural practices.

There are two important conclusions to draw from the passage. First, it's a reminder that the differences between human societies didn't really hinge on innate differences between people—rather, the people who discovered agriculture stumbled upon it because they happened to live close to fertile soil. Second, the passage emphasizes that societies made the transition from hunter-gatherer to agricultural very slowly—there was never one point when an entire society decided to be agricultural; rather, the process was slow and gradual. The same could be said for many of the processes Diamond studies in the book—for example, the transition from chiefdom to state.

Chapter 8 Quotes

Plant domestication is not a matter of hunter-gatherers domesticating a single plant and otherwise carrying on unchanged with their nomadic lifestyle. Suppose that North American wild apples really would have evolved into a terrific crop if only Indian hunter-gatherers had settled down and cultivated them. But nomadic hunter-gatherers would not throw over their traditional way of life, settle in villages, and start tending apple orchards unless many other domesticable wild plants and animals were available to make a sedentary food-producing existence competitive with a hunting-gathering existence.

Related Themes:

Page Number: 129

Explanation and Analysis

In this passage, Diamond explains why more hunter-gatherers didn't become agriculturalists even when they had access to fertile soil and large hearty seeds. Many hunter-gatherers knew what agriculture was through limited experience, but couldn't make agriculture the cornerstone of their food gathering practices—there weren't *enough* available seeds and crops to make the transition.

Diamond's points bring up an important question—how do we judge which hunter-gatherer cultures refused to transition to agriculture because of the lack of available crops, and which hunter-gatherer cultures refused to transition in spite of an adequate number of available crops? It is this question that Diamond will spend the rest of Chapter 8 trying to answer.

Chapter 9 Quotes

Domesticable animals are all alike; every undomesticable animal is undomesticable in its own way.

Related Themes:

Page Number: 151

Explanation and Analysis

Here Diamond makes one of the few literary allusions in his book—to the opening sentence of Leo Tolstoy's famous novel, *Anna Karenina*. (Diamond doesn't go on to expound on Tolstoy at all, however). The point of the sentence is that there's no elegant division between what makes an animal

easy or hard for humans to domesticate—most of the "rules" of domestication are positive. In other words, there's a small number of animals (about 14) that are suitable for domestication by agriculturalists, but there's a far greater number of animals that don't fit the bill, and this for a seemingly numberless variety of reasons.

When Diamond speaks of "domestication," he means animals (specifically large mammals) that can be bred to be docile and obedient to human masters. The dog was once just a breed of a wild, dangerous creature, the wolf. But by breeding only the most docile, obedient wolves, humans gradually evolved dogs to the point where they were loyal to their human masters. Diamond will go on to list out the qualifications for domestication, and explain some of the reasons that certain animals do and don't qualify. But the first sentence of the chapter, quoted above, is important because it lays out the basic rubric for domestication: a laundry list of "domesticable qualities," such that most mammals don't qualify for domestication.

Chapter 10 Quotes

❝ Why was the spread of crops from the Fertile Crescent so rapid? The answer depends partly on that east-west axis of Eurasia with which I opened this chapter. Localities distributed east and west of each other at the same latitude share exactly the same day length and its seasonal variations. To a lesser degree, they also tend to share similar diseases, regimes of temperature and rainfall, and habitats or biomes (types of vegetation).

Related Themes:

Page Number: 176

Explanation and Analysis

In this chapter, Diamond lays out his theory of east-west diffusion. Because the Earth spins on its axis, areas of the planet that share a latitude tend to have very similar climates and, to a lesser extent, similar geographies. Portugal and Japan are on opposite sides of the world, but because of their similar latitudes they have remarkably similar weather.

Regions of the planet with similar latitudes will thus often be able to adapt each other's crops for cultivation more easily. For example, Europe, because it shares a similar latitude with Mesopotamia, was able to adopt Mesopotamian crops like wheat very easily. On the other hand, agriculture didn't reach Scandinavia for a long time, because Scandinavia is too far north (different latitude). The passage will be important later in the book when Diamond talks more about the diffusion of ideas and technologies. For now, it's important to understand that societies can communicate and trade easily when they have the same geography.

❝ The earliest wheels were parts of ox-drawn carts used to transport agricultural produce. Early writing was restricted to elites supported by food-producing peasants, and it served purposes of economically and socially complex food-producing societies (such as royal propaganda, goods inventories, and bureaucratic record keeping). In general, societies that engaged in intense exchanges of crops, livestock, and technologies related to food production were more likely to become involved in other exchanges as well.

Related Themes:

Page Number: 183

Explanation and Analysis

In this passage, Diamond shows how agriculture eventually leads to 1) trade and 2) technological innovation. To begin with, agricultural societies will often develop a surplus of a certain crop, so they have an incentive to seek out new customers for that crop, in the hopes that can exchange their crops for a crop or resource that they might need more of. Over time, then, agricultural societies will begin trading with one another.

Furthermore, agricultural societies will often have a strong incentive to develop new technologies to improve transportation and trade. Inventions like the wheel and writing served a definite purpose: they enabled trade between societies. The passage is important because it suggests that trade and communication are self-catalyzing—which is to say, trade encourages more trade (including exchanges that neither society may be aware of, such as "exchanges" of germs and diseases, which Diamond will explore in later chapters).

Chapter 11 Quotes

There is no doubt that Europeans developed a big advantage in weaponry, technology and political organization over most of the non-European peoples that they conquered. But that advantage alone doesn't fully explain how initially so few European immigrants came to supplant so much of the native population of the Americas and some other parts of the world. That might not have happened without Europe's sinister gift to other continents—the germs evolving from Eurasians' long intimacy with domestic animals.

Related Themes:

Page Number: 205

Explanation and Analysis

In part, the Europeans were able to annihilate the Native Americans they encountered in the New World because of their superior technology—they'd brought weaponry with them with the goal of defeating their opponents. But for the most part, the Europeans were able to conquer the New World for reasons that they barely understood—the presence of diseases like smallpox. While the Europeans killed many Native Americans intentionally, smallpox and other diseases claimed far more Native American lives (and later on in the colonizing process, some Europeans even *purposefully* weaponized these germs, as when they gave "smallpox blankets" to the Native Americans to spread the disease).

The role of diseases in wiping out Native American populations renders the hypothesis that Europeans were innately smarter or more powerful than Native Americans absurd. The Europeans prevailed in the New World for reasons they barely understood—it would be hundreds of years before they knew about the germ theory of disease. Rather, the Europeans prevailed in the New World because they were the lucky beneficiaries of an agricultural society and all its advantages, including the advantage of disease immunity.

Chapter 12 Quotes

Given enough time, the societies lacking writing might also have eventually developed it on their own. Had they been located nearer to Sumer, Mexico, and China, they might instead have acquired writing or the idea of writing from those centers, just as did India, the Maya, and most other societies with writing. But they were too far from the first centers of writing to have acquired it before modern times.

Related Themes:

Page Number: 227

Explanation and Analysis

In this passage, Diamond suggests that diffusion is often a more powerful force than creativity. Certain societies in the ancient world developed writing independently of each other. But for the most part, the societies that began using a written language acquired it from neighboring societies. For the reasons that Diamond has already explained (see quotes above), societies that shared a latitude with societies that had a written language were more likely to acquire a written language of their own than societies to the north or the south (because of previously established agricultural trade routes).

Diamond cannot explain perfectly why Mexico, Sumer, and China were the first societies to develop writing independently. But what is arguably more important for a study of history, he argues, is that knowledge of writing *diffused* to societies that neighbored Mexico, Sumer, and China—especially when they neighbored to the east or the west.

Chapter 13 Quotes

In fact, many or most inventions were developed by people driven by curiosity or by a love of tinkering, in the absence of any initial demand for the product they had in mind. Once a device had been invented, the inventor then had to find an application for it. Only after it had been in use for a considerable time did consumers come to feel that they "needed" it.

Related Themes:

Page Number: 232

Explanation and Analysis

One of Diamond's difficulties in talking about the history of technology is explaining why people invent things in the first place. Too often when talking about the history of technology, historians create the impression that inventors *knew* exactly what they were inventing—they knew what object they wanted to build and, crucially, what uses they imagined for it. One sees this historians' bias in the idea that "necessity is the mother of invention," as well as the idea that technology is invented by "great minds"—in a way, both points of view give individual inventors too much credit;

often, inventors have no idea what uses their inventions will have eventually.

The result of these difficulties in talking about the history of technology is that it's hard to explain why certain parts of the world developed a certain technology before other parts of the world did the same. To answer such a question fully, one would have to talk about individual scientists and inventors with a degree of specificity that Diamond—who, after all, is writing about the history of the whole *world*—isn't equipped for. Diamond will focus largely on the history of how technology is *diffused* around the world, not how it's invented in the first place.

> The New Guineans whom I know include potential Edisons. But they directed their ingenuity toward technological problems appropriate to their situations: the problems of surviving without any imported items in the New Guinea jungle, rather than the problem of inventing phonographs.

Related Themes:

Page Number: 253

Explanation and Analysis

It's unfortunately common for racists and bigots throughout history to point to their civilizations' technological breakthroughs and use them as proof of their own racial superiority. Pizarro, armed with guns and sabers, believed Europeans to be racially superior to the Inca people.

Diamond's goal in this chapter is to show how, no less than with agriculture and domestication of animals, the development of technology results from environmental stimuli, not innate genetic or racial advantages. The New Guineans have the intellectual potential to be brilliant—but their culture has little need for the kinds of inventions that Western people respect, such as phonographs. Because there isn't a huge demand for technological innovation in New Guinea, New Guineans don't provide it—instead their inventions have more to do with surviving and making use of the resources they do have.

Chapter 14 Quotes

> The remaining way for kleptocrats to gain public support is to construct an ideology or religion justifying kleptocracy.

Related Themes:

Page Number: 266

Explanation and Analysis

As societies become larger and denser, the tools of organization change enormously. In a small society of a couple dozen, or even a couple hundred people, societies tend to organize around the structures of the family. In a society with hundreds of thousands of people, however, a family structure would be of no use. Instead, the leaders of large societies rely on religion and other ideologies to control their people.

The passage mentions kleptocracy—the structure of government management in which the leadership persuades people to part with their property in order to keep the government in power (taxation is a classic example of a method of kleptocracy—the government "persuades" people into giving up a portion of their income). The inherent oddness of giving up one's hard-earned property to a stranger (even if it is the leader of the community) often has to be mitigated and balanced out with religion—religions can persuade people that it's "right" to give up one's property for the sake of the state or the chief. For that reason, many of the earliest religions connected the head of the state to the head of the religion—most of the earliest kings and chiefs were also their people's priests or god-figures.

The passage is a good example of Diamond's reserved, dispassionate writing style. One *could* interpret Diamond to be saying that societies invent religions in order to persuade (or even con) their people into surrendering what is rightfully theirs. But in the end, Diamond is simply describing a process, not judging it.

> In all the accounts that my New Guinea friends have given me of their former tribal wars, there has been not a single hint of tribal patriotism, of a suicidal charge, or of any other military conduct carrying an accepted risk of being killed.

Related Themes:

Page Number: 270

Explanation and Analysis

This passage is another great example of Diamond's dispassionate, lightly humorous writing style. Diamond has been talking about the importance of religion and

patriotism in the modern state. Without love for one's country and one's society, soldiers could never be persuaded to go out and die in battle in order defend that society. Moreover, patriotism, one could argue, is a distinctly modern, state-centric invention—in a small tribe or clan, patriotism simply doesn't exist, and people would never sacrifice their own lives for the love of their group (at least according to Diamond).

Is Diamond attacking patriotism? Yes and no. Perhaps it's fairer to say that he's describing patriotism as being somehow artificial or arbitrary. Instead of assuming, as some people do, that patriotism is an ultimate, transcendental good, Diamond gives some of the history of patriotism and describes why it does and doesn't pop up in certain types of society. Even if Diamond is just describing patriotism instead of judging it, his dispassionate tone relativizes patriotism and causes it to lose some of its luster.

Chapter 15 Quotes

❝ This cultural barrier at Torres Strait is astonishing only because we may mislead ourselves into picturing a full-fledged New Guinea society with intensive agriculture and pigs 10 miles off the Australian coast. In reality, Cape York Aborigines never saw a mainland New Guinean. Instead, there was trade between New Guinea and the islands nearest New Guinea, then between those islands and Mabuiag Island halfway down the strait, then between Mabuiag Island and Badu Island farther down the strait, then between Badu Island and Muralug Island, and finally between Muralug and Cape York.

Related Themes:

Page Number: 302

Explanation and Analysis

In this chapter, Diamond examines the islands near Australia, comparing and contrasting them with New Guinea. New Guinea, he argues, developed some agriculture and centralized society, in the process making the island harder for Europeans to colonize. In Australia, however, the aborigine people's isolation prevented them from picking up the means of agriculture from their New Guinean neighbors.

In all, the passage emphasizes the importance of geographic barriers in human history. Australians, through no fault or action of their own, were isolated from the rest of the world—even islanders who were only a few hundred miles away. Every idea and crop had to be "filtered" from one island to the next, so that by the time the original "package" migrated from New Guinea to the aborigines, it was either nonexistent or greatly distorted. So geography and geographic isolation, more than anything else, explain why the aborigines never took to agriculture.

❝ Europeans have never learned to survive in Australia or New Guinea without their inherited Eurasian technology. Robert Burke and William Wills were smart enough to write, but not smart enough to survive in Australian desert regions where Aborigines were living.

Related Themes:

Page Number: 307

Explanation and Analysis

Diamond closes his chapter with a concise reminder of the nonsensical nature of arguments for racial superiority. It's been unfortunately common, over the course of history, for Europeans to argue that they are superior to the other people of the world, especially the people in the places they colonized in the 120th century (India, Australia, etc.) And yet, at the end of the day, their claims are groundless. Europeans may have colonized Australia, rather than the Australians colonizing Europe, but this doesn't prove the Europeans to be innately superior—it just proves that they benefited from a long legacy of technological innovation that's ultimately grounded in geographic, not genetic, advantage. The basic *equality* of the European colonists and the aborigines they colonized can be grasped by considering how Europeans would have survived in Australia *without* their technology—they could never have summoned the talent or intelligence to brave the Australian deserts. The aborigines and Europeans, as people, are very much the same. It's just as easy to argue that the aborigines fail at things Europeans take for granted (like reading a book) as it is to argue that the *Europeans* fail at things that aborigines take for granted (like surviving in a desert).

Chapter 18 Quotes

❝ The Americas' population now consists of a mixture of peoples originating from all continents except Australia. That demographic shift of the last 500 years—the most massive shift on any continent except Australia—has its ultimate roots in developments between about 11,000 B.C. and A.D. 1.

Related Themes:

Page Number: 360

Explanation and Analysis

In Chapter 18, Diamond studies why agriculture didn't become more important to the lifestyle of Native Americans before 1492 A.D. Native Americans developed *some* limited agriculture, but agriculture never diffused across the country as quickly and evenly as it did in Europe and the Middle East. The reason why, as readers can probably predict by now, is geographic: the presence of large geographic barriers like mountains and deserts prevented Native Americans from trading with one another and from passing agriculture from one coast of North America to the other.

The consequences of the Native Americans' "geographic inability" to take on agriculture have been enormous—when the Europeans came to the New World in 1492, their agriculturally-nurtured immunities to deadly diseases allowed them to spread smallpox to the Native Americans and colonize the continent very quickly. Had the Native Americans been lucky enough to live in a landmass was easier and where the soil was more uniformly fertile (as in Europe), they would have developed immunities of their own, and the Europeans may not have been able to colonize the New World so easily.

Chapter 19 Quotes

❝ Many readers may already be protesting: don't stereotype people by classifying them into arbitrary "races"! Yes, I acknowledge that each of these so-called major groups is very diverse. To lump people as different as Zulus, Somalis, and Ibos under the single heading of "blacks" ignores the differences between them. We ignore equally big differences when we lump Africa's Egyptians and Berbers with each other and with Europe's Swedes under the single heading of "whites." In addition, the divisions between blacks, whites, and the other major groups are arbitrary, because each such group shades into others: all human groups on Earth have mated with humans of every other group that they encountered.

Related Themes:

Page Number: 363

Explanation and Analysis

In the final chapter of Diamond's book, Diamond turns to a topic that many readers would describe as problematic—the dynamics of race in Africa. In order to talk about how the tribes and peoples of Africa interacted with one another, Diamond will use race as a kind of "shorthand"—he will break down the peoples of Africa into five highly arbitrary categories. Diamond is well-aware of the arbitrariness of his categories. Nevertheless, he insists that using such categories as a rough benchmark of which people banded with each other will be useful.

The passage is reminiscent of an earlier passage in which Diamond breaks down all human societies into four arbitrary categories. There, as here, Diamond admits that his categories aren't "real" in any profound sense—they're just tools for helping historians and scientists understand the world. So even if it seems problematic to break human beings up into arbitrary races, Diamond argues that doing so will be useful for understanding African history—and, at the same time, refuting many of the racist myths of white superiority that motivated European colonization (and, it must be said, atrocity) in Africa.

Epilogue Quotes

❝ I would say to Yali: the striking differences between the long-term histories of peoples of the different continents have been due not to innate differences in the peoples themselves but to differences in their environments.

Related Characters: Yali

Related Themes:

Page Number: 389

Explanation and Analysis

This is something of a thesis statement for Diamond's entire book: the answer to the question Yali posed in the prologue. Certain human societies have major advantages over other societies—in their technology, their organization, their resources, and their immunity to disease—due not to their innate superiority but to their homelands' geographies. Over the course of the book, Diamond has used archaeology, anthropology, epidemiology, and dozens of other fields to show how certain aspects of geography change the structures of human society. So the passage brings the book "full circle" in an almost literary or cinematic way: we've "taken a journey" around the world in order to answer Yali's question, and now that we know the full answer, we can return to where we started.

But China's connectedness eventually became a disadvantage, because a decision by one despot could and repeatedly did halt innovation. In contrast, Europe's geographic balkanization resulted in dozens or hundreds of independent, competing statelets and centers of innovation. If one state did not pursue some particular innovation, another did, forcing neighboring states to do likewise or else be conquered or left economically behind. Europe's barriers were sufficient to prevent political unification, but insufficient to halt the spread of technology and ideas. There has never been one despot who could turn off the tap for all of Europe, as of China.

Related Themes:

Page Number: 398

Explanation and Analysis

In the epilogue of his book, Diamond answers some big caveats and potential objections to his argument. One of the biggest objections to the idea that geography determines a society's supremacy is Chinese history. China had successful agriculture, geographic homogeneity, a written language, immunities to diseases, etc.—and yet China didn't rise up to dominate the world after 1492 A.D.; on the contrary, Europe did. Doesn't the fact that Europe, not China, became primary global power in modern times illustrate that human history, while somewhat influenced by geography, has a strong element of randomness?

Diamond argues that, in fact, China's failure to surpass Europe as a world power *can* be linked back to geography. Because of China's geographic homogeneity and large rivers, one dynasty ruled over the entire country. Furthermore, when one dynastic leader ruled that China was to abandon exploration of the world, the decision was permanent—therefore, China never explored America and never took advantage of the world's resources. So geography in China (the homogeneity of the country's geography, that is) *did* play a role in Chinese history. Diamond acknowledges that his argument is a little more tenuous-seeming than some of the other arguments he's made in the book (one of the major reasons why he leaves it until the epilogue), but he perhaps wants readers of *Guns, Germs, and Steel* to investigate his idea further.

It remains an open question how wide and lasting the effects of idiosyncratic individuals on history really are.

Related Themes:

Page Number: 404

Explanation and Analysis

Another important caveat that Diamond gets to in his epilogue is the role of individual people in history. Diamond has been arguing that human history is, in a counter-intuitive sense, not really the result of individual human behavior—it is, primarily and fundamentally, caused by geographic idiosyncrasies that led to the development of agriculture, technology, etc.

Diamond acknowledges, however, that sometimes, individual human beings *do* exert a great influence over history. Can one really explain Socrates, or Shakespeare, or Rosa Parks, or even Lee Harvey Oswald, by talking about geography? Perhaps geography is a necessary but insufficient condition for human history—at the end of the day there will always be individual humans whose personalities and idiosyncrasies shape society. Diamond will leave the problem of how individuals shape history for another book.

SUMMARY AND ANALYSIS

The color-coded icons under each analysis entry make it easy to track where the themes occur most prominently throughout the work. Each icon corresponds to one of the themes explained in the Themes section of this LitChart.

PROLOGUE: YALI'S QUESTION

In the last 13,000 years or so, human history has proceeded in many different directions. Jared Diamond, the author of the book, has spent most of his career trying to understand why different human civilizations developed in different ways.

The book will try to determine why certain societies became powerful and dominant on the global stage, while others did not.

Diamond once met a New Guinean politician named Yali. Yali was a smart, charismatic man, and he was very interested in the expansion of the western world into his own country. He wanted to know all about Diamond's culture, and he wanted to know the history of how white people colonized New Guinea 200 years ago.

Yali is one of the few individuals mentioned in the novel. Diamond emphasizes Yali's intelligence and talent as a politician, suggesting that the technological and economic superiority of one civilization over another (most relevantly, the technological and economic superiority of Europe and the U.S. over New Guinea) has little to do with the intelligence or talent of individual people.

Diamond describes the vast differences between New Guineans and the white colonists who came to New Guinea in the 1800s. New Guineans are just as intelligent as Europeans, even if they had to deal with colonists' racism. Yali's **question** for Diamond is: "Why is it that you white people developed so much cargo … but we black people had little cargo of our own?" The book we're about to read is, at its core, Diamond's attempt to answer Yali's question.

This is one of the most important passages in the book, because it sets up the "mystery" that Diamond will proceed to solve in the next 500 pages. Certain societies have, by almost any material measure, been more successful than other societies: healthier, wealthier, more powerful, etc. And yet individual people across societies are very much alike in terms of nature and intelligence. Why, then, do some societies flourish while others do not?

Yali's **question** references the inequalities between different civilizations. Some civilizations, such as those in Europe and Eastern Asia, have developed great power and wealth and used it to dominate the inhabitants of Australia and the Americas. Why did the Europeans conquer the Native Americans, Diamond asks, and not the other way around? In general, "why did human development proceed at such different rates on different continents?"

This passage explicitly states the question that the book will try to solve. Another important thing to notice here is that Diamond illustrates the problem he's attempting to solve with a "case study": the colonization of the New World by European societies after 1492 A.D. Diamond will often rely on case studies—that is, individual, somewhat isolated, examples—before generalizing his findings to all of human history (the fourth part of the book is made up almost entirely of case studies of specific regions).

Diamond takes a moment to clarify what his book is and isn't, and to respond to some potential objections to his book. First, Diamond could be misinterpreted to be saying that he celebrates the Europeans for their conquests. On the contrary, Diamond isn't glorifying anyone or anything—he's just describing what happened, and why. Diamond will study many different cultures around the word, not just European culture.

This is an important passage because Diamond clarifies that he's describing, not judging. There are several points in the book in which Diamond's own point of view about human history becomes very clear (in particularly, he seems disgusted with the European colonists' racism). But for the most part, Diamond's tone will be scientific and dispassionate.

One could also misinterpret Diamond to be arguing that hunter-gatherer culture (for example, Native Americans and aborigines) is inferior to agricultural or industrial civilization (the civilizations that conquered the Native Americans and the aborigines). Diamond doesn't say that any kind of society is better than another. In many ways, hunter-gatherers are actually better off than people in a country like the U.S.

Diamond will show how humans learned to replace their hunter-gatherer practices with agricultural and industrial practices. But he's not saying that agriculture is superior to hunting and gathering. On the contrary, agriculture is just the most efficient way to extract food for certain times and places in the world—just as hunting and gathering has been the most efficient way in other places and at other times.

There have been many attempts to answer Yali's **question** before Diamond. For centuries, people believed that Europeans conquered the rest of the world because Europeans were naturally superior. After Darwin's theory of evolution in the 1800s, people tried to argue that Europeans were more evolutionally advanced than Native Americans or aborigines. Such ideas aren't just racist and horrible—they're dead wrong. There is absolutely no scientific evidence to support the idea that people in hunter-gatherer cultures are less talented or intelligent than their counterparts in an industrialized country.

In no small part, Diamond writes his book in order to refute persistent, but ultimately unscientific, claims that whites, Europeans, and Westerners are superior to people from other parts of the world. Racists often attempt to twist science—most notoriously, Darwin's theory of evolution –in order to justify their beliefs, and even to justify their brutality while colonizing places outside Europe. But, Diamond insists, scientifically there's no link between race/culture and intelligence.

Diamond describes his experiences as an anthropologist in New Guinea. There, he met all sorts of brilliant New Guinean people. It could even be that New Guineans are as a whole smarter than Westerners. In Western society, survival was largely a product of being healthy and lucky—i.e., not killed by infectious diseases like the black plague or smallpox. In New Guinea, on the other hand, survival was more often a product of talent and intelligence: being able to hunt food, avoid accidents, etc. Furthermore, New Guineans spend more time exploring the world than average Westerners (who watch lots of TV).

Diamond continues the previous passage to argue from his own experience that people from non-European societies aren't less intelligent than Europeans. Despite the fact that Darwin's theory of evolution has often been twisted to claim Europeans' superiority to indigenous non-Western peoples, one could just as easily use Darwin to argue the reverse. In an industrialized society, intelligence and talent aren't necessarily prerequisites for producing offspring, but in New Guinea, they are. Therefore, one might even think that natural selection has made New Guineans smarter than Europeans (though Diamond doesn't explicitly argue so).

Diamond relates another popular explanation for human inequalities across culture: climate stimulates the mind. In cold climates, it's been argued, humans have to work harder to survive; they have to build more sophisticated houses, plan ahead for the winter, and do other things that make them more industrious. But this idea doesn't hold up to close inspection either. Europeans who lived in cold climates received many of their most important ideas and technologies (writing, the wheel, etc.) from Eurasia, where the climate was actually warmer.

Many of the most famous European philosophers of the early modern era, such as John Locke and Jean-Jacques Rousseau, believed that humans responded to their environment in a limited sense: cold weather influenced them to be harder working. While these thinkers may have been on the right track to argue that environment can shape society, their particular interpretation of such an idea has turned out to be factually wrong.

Another famous answer to Yali's **question**: civilizations that arose near rivers become more successful over time. Many of the earliest civilizations did emerge near big rivers (Egypt, Mesopotamia, etc.), and it's been suggested that the development of irrigation systems led to the development of complex bureaucracies, the basis for government and society. But studies have shown that early civilizations developed irrigation systems *after* they'd already developed centralized bureaucracies.

One of the most popular answers to the question of why certain regions became more powerful than others is that the powerful, successful regions were located near rivers. Again, such an explanation is getting at an important truth—environment can shape society—but still relying on factually incorrect data.

Another explanation is that civilizations with access to weaponry, immunity to infectious diseases, and proximity to metal were most successful. This explanation is on the right track, Diamond claims, but it doesn't go in-depth about why certain civilizations ended up with the guns, the germs, and the steel. (There are many civilizations with access to metal, for example, that never developed serious metallurgy).

It's clear enough that civilizations with access to metal and immunity to disease have a big advantage over civilizations that don't. But this doesn't get to the core of the question; it doesn't explain why *certain civilizations do and don't develop such advantages.*

Many specialists have studied specific aspects of why certain civilizations succeeded. People have written a lot about civilizations' responses to infectious diseases, metallurgy, etc. What Diamond will provide is a "synthesis" of these specialists' work: he will give a big, overarching answer to Yali's **question**. Diamond then gives a thesis statement for his book: "History followed different courses for different peoples because of differences among people's environments, not because of biological differences among people themselves."

Diamond doesn't claim to be presenting any truly "new" ideas—indeed, almost all of the ideas he presents have been discussed elsewhere in the literature on archaeology, anthropology, or history. Diamond's aim in his book isn't to make new points but to put together other thinkers' points to make a single, organized thesis about why societies do and don't prosper. (In real life Diamond is a polymath with many eclectic interests, perhaps explaining why he feels comfortable synthesizing many different fields of knowledge; many other people in those fields would feel uncomfortable making big, ambitious claims of the kind that Diamond routinely makes. At the same time, some have criticized Diamond for what they see as his vague, overly general knowledge of history, archaeology, and anthropology.)

Diamond gives a brief outline of his book's structure. Part I studies the history of human evolution. Part 2 focuses on food production and livestock cultivation and how it led to the eventual rise of the European powers. Part 3 studies the role of bacteria and microbes in Western military supremacy, while also studying the history of writing and other technologies. Part 4 looks at case studies for Diamond's ideas—in Australia, Asia, Africa, and the Americas.

Here Diamond sketches out the structure of the book. He'll begin with the history of agriculture, followed by a discussion of how agricultural developments "snowballed" over time to lead to major advances in technology. Finally, he'll examine some specific examples of his idea.

CHAPTER 1: UP TO THE STARTING LINE

To begin, Diamond will give a "whirlwind tour" of human evolution. Humans' closest evolutionary relatives are apes and primates. The earliest humanoid species, such as *Homo habilis* and then *Homo erectus*, emerged about seven million years ago in Africa. One million years ago, *Homo erectus* began to migrate, out of Africa and around the world—to Europe, Australia, Asia, etc. It is usually argued that humans—that is, *Homo sapiens*—first emerged from the evolutionary tree half a million years ago, having evolved independently from *Homo erectus* around the world. There is no perfect definition of *Homo sapiens*, and therefore no perfect "cutoff point" for when *Homo sapiens* first appeared. Nevertheless, scientists and anthropologists generally agree that *Homo sapiens* are distinguished from some of their ancestors by their larger skulls and their ability to make fire.

First, notice that there is no precise way to measure when Homo sapiens *first emerged from the evolutionary tree—as is often the case in the book, scientists have to approximate and make educated guesses. Second, notice that* Homo sapiens, *the species to which modern human beings belong, are distinguished by their ability to make fire—in a sense, their ability to interact with their environments and make use of available resources. Making use of resources, as we'll see, is one of the key human traits driving history.*

Human history arguably began approximately 50,000 years ago with the "Great Leap": the development of complex tools, such as needles, awls, etc., as well as the construction of large houses and buildings and the creation of art (cave paintings). Scientists aren't sure where on the planet such cultural behaviors first appeared. They could have arisen simultaneously in many different parts of the world, or spread from one part to other parts. But in either case, the Great Leap was crucial to human history.

Echoing the themes of the previous passage, human history is presented as a record of how human beings have shaped their environments and used certain resources to make useful tools. Evidently, Diamond doesn't have enough data to argue that humans began shaping tools in response to certain geographical stimuli—scientists don't even know where the earliest tools and cave paintings emerged.

After the "Great Leap," humans developed watercraft and began traveling to new, remote places, such as New Guinea. In New Guinea, there is archaeological evidence that humans exterminated many animals soon after arriving. Other scientists argue that many species in New Guinea went extinct because of unrelated changes in the environment, such as drought.

As with much of this first chapter, the data available to scientists is so sparse that it's difficult to draw any definitive conclusions. Nevertheless, the possibility that early human beings wiped out entire animal populations arguably anticipates the way that later societies wiped out populations in the regions they colonized, suggesting that aggression is a fundamental part of human nature.

By 40,000 B.C.E., human beings lived in Eurasia and Australia, but the Americas had not yet been colonized—this probably began to happen between 35,000 and 14,000 years ago. Hunter-gatherer cultures entered the Americas through Asia, probably across the Bering land bridge, and quickly migrated south to Patagonia. There is a lot of disagreement over which peoples were the first to come through America. Some scientists think that a people called the Clovis came through America about 15,000 years ago and exterminated many of the large animals in the region (much like what may have happened in New Guinea). Evidence of Clovis settlements have been found in the western United States, and farther south, but there is also evidence of earlier settlements from other peoples.

Again, scientists know very little about the progress of human beings around the world beyond a few thousand years ago—invalidating any pseudo-scientific explanations of how certain races or groups have "always" been superior to others. Also, notice that the Clovis may have wiped out most of the large mammals in the Americas—echoing the possible exterminations of large animals in New Guinea. The possibility that the earliest humans around the world massacred animals and other humans suggests that humans have always drastically altered their environments, often in destructive ways.

Humans settled many different parts of the world after the Great Leap. Many parts of the world weren't settled with human beings until surprisingly recently; for example, there were no human beings in Iceland until the 9th century A.D. This all leads to the question: why didn't Africa become the most powerful region in the world? Africa had a "head start" in producing human beings, since thousands of years ago, there were more *Homo erectus* and later *Homo sapiens* in Africa than anywhere else. Effectively, Africa has "5 million more years of proto-human existence than any other continent."

Intuitively, one would think that Africa should have been the most powerful continent in the world, given that the earliest human beings emerged there. One could argue that Africa had a big comparative advantage over other parts of the world because the groups who lived there had a "head start" (since humans only migrated to other parts of the world later on in history).

To answer his own questions, Diamond tries to be precise about the idea of a "head start." Africa had more "protohumans" (evolutionary ancestors to *Homo sapiens*) than any other country. And even today, there is more genetic diversity in Africa than anywhere else on the planet, reflecting the large numbers of protohumans in Africa millions of years ago. And yet, 11,000 years ago, one could have made different, fairly convincing arguments that each colonized continent was going to become the dominant one. Africa had the most people and the most genetic diversity. But people in Australia had already developed sophisticated boats and other technologies, beyond what people in Africa had built. In Eurasia, there was more geographic diversity than anywhere else on the planet, suggesting that people who lived in Eurasia would adapt to many different environments and therefore colonize many different parts of the world.

There are too many different explanations of why certain regions of the world flourish and why others do not. No single one of these explanations, at least as offered in this section, is entirely convincing. Furthermore, one could argue that the lack of a clear, cogent explanation for why a certain region becomes more advanced than other regions leads to the persistence of bias—in the absence of one good explanation, different people will simply choose the explanation that supports the region they're from. (For example, European pseudo-scientists might argue—and have argued—that their people are superior because they had to respond to the cold climate.)

In short, Diamond says, you could have made an argument that any region of the globe where there were humans 11,000 years ago was going to become the most powerful and dominant one. Diamond will go on to discuss why the Eurasian region went on to become the most powerful.

Diamond aims to offer a thorough, comprehensive explanation of why humans from certain parts of the world became the most dominant. In doing so, he hopes to eliminate all bias—historical, racial, and otherwise.

CHAPTER 2: A NATURAL EXPERIMENT OF HISTORY

In 1835, the Chatham Islands, near New Zealand, were invaded by the Maori tribe, armed with guns and axes. The Maori murdered the Moriori, who lived on the Chatham Island. Although the Maori and the Moriori peoples had lived close beside one another for thousands of years, their societies had clearly branched off in different directions. The Moriori were hunter-gatherers, while the Maori turned to farming. Diamond will try to understand why the Maori pursued farming.

The chapter begins with another example of a clash between civilizations (similar to the descriptions of how Europeans brutally colonized the New World after 1492). Of course, civilizations interact with one another in many different ways, some of them peaceful. But military clashes are a particularly clear illustration of one civilizations' real-world "superiority" to another.

In Polynesia (the part of the world that includes the Chatham Islands), there are thousands of islands, each with a different climate and elevation. Flora and fauna on these islands are incredibly diverse, reflecting the environment differences between islands. Yet the islands were colonized at approximately the same time by a group of nomadic hunter-gatherers who looked alike and spoke the same language. Therefore, Polynesia is a good "case study" for why environmental factors lead societies to branch off in different directions.

By analyzing the data, Diamond conducts something like an "experiment." As in any experiment, Diamond isolates a "dependent variable"—the people who came to Polynesia—and sets it equal for each of his case studies (i.e., the people who colonized the different Polynesian islands had the same culture and almost identical genetic makeup, at least to begin with). In this way, Diamond can study the influence of an independent variable—geography—on the dependent variable—the people and societies of Polynesia.

The Moriori embraced a hunter-gatherer culture on their island because their island couldn't support crops of any kind—the climate was too cold. Also, the Chatham Islands, where the Moriori lived, were tiny, capable of supporting only a few thousand people. The Moriori renounced warfare and agreed to cooperate. There were no strong government structures, and only the simplest of weapons. In the Maori islands of Polynesia, however, there was a warm, moist climate, good for growing crops. There were about 100,000 Maori on the islands, and they fought amongst themselves for control of crops. The result was that when the Maori met the Moriori, the Maori slaughtered the Moriori in a few days.

In the simplest terms, the passage illustrates a connection between society and geography. Certain climates and the presence of certain resources predispose a group of people to set up a certain kind of society—here, for example, the climate and size of the Maori islands predispose the Maori people to be more violent and have more agriculture.

The nomads who came to Polynesia thousands of years ago had the same culture and language, but they all adapted to the environments of the various islands where they settled. Diamond then breaks "environment" up into categories: climate, geological activity, "marina" (i.e., the flora, fauna, and geographic structures found around an island's coast), area, terrain fragmentation, and isolation (i.e., proximity to other environments). For each category, environmental differences between islands cause societal differences. For example, moist, warm climates favor agriculture, since crops grow easily. Volcanic activity in Polynesia (i.e., a form of geological activity) produces hard, shiny stones that can be used to make tools. Certain Polynesian islands have rocky coasts, meaning that people who lived there had no way of obtaining fish (marina).

The nomadic people who Polynesians were once virtually identical—with the same culture and language. But geography is such an important determinant of society that it changed this homogenous culture into many extremely diverse peoples. Polynesians adapted to their surroundings, just as their Homo sapiens *ancestors did, by making use of available resources, such as soil, rock, fish, etc. As we saw with the Maori, certain of these resources lend themselves to warfare and military supremacy.*

Environmental differences between Polynesian islands partly explain differences in subsistence. The nomads who came to Polynesia brought pigs, dogs, and chickens with them to their islands. The people of Easter Island brought only chickens. Because they didn't have access to coral reefs or shallow waters, they had no ways of fishing, and therefore, they built big chicken houses for poultry farming. The Easter Islanders adapted to their environments. Meanwhile, other islanders, such as the people of Tonga and Anuta, adapted to their warm environments by developing agricultural techniques for the cultivation of taro, a hearty crop.

One important way to classify the different Polynesian societies is by their methods of food production. Here, very clearly, the Polynesians adapt to their surroundings—making use of livestock, fruits, game, etc. Agriculture is a particularly significant form of food production, as we'll see, but for now it's important to note that agriculture is only available to certain Polynesian societies—other societies couldn't establish agriculture even if they wanted to do so, because of the geography of their surroundings.

Another way to classify the different civilizations in Polynesia is by population density. The Chatham peoples, who were hunter-gatherers, only had about 5 people per square mile, while on the other end, the agriculturalists of Anuta had about 1,100 people per square mile. Dense agricultural societies tended to have much more diverse societies, with many different professions, more complex technologies, and elaborate political organizations. The Hawaiian Islands are a textbook example of a dense, agricultural society: before Europeans colonized Hawaii, Hawaiian society had extensive agriculture and eight distinct levels of society.

There seems to be a direct correlation between population density and extensiveness of agriculture—the communities with large-scale, complex agricultural practice tend to be dense and large, reflecting, perhaps, the greater food yield per square mile of agricultural societies (when compared with the food yield for hunter-gatherer communities).

Political structures in Polynesia became more complex as society became denser and resources became more plentiful. On the Chatham Islands, where the population was small and there were few plentiful resources, decisions were reached by a simple group consensus. But in Hawaii or Tonga, there were hereditary chiefs who decided how land and food would be divided up and who gave messages that had to be passed down the chain of command.

At this point, Diamond deals with correlation, not causation—i.e., he notes that agricultural production and population density seem to have some positive relationship with the establishment of complex social structures, but he doesn't yet explain what this relationship consists of—or which factor causes which.

The Polynesians also made different kinds of artifacts, based on the resources available. On the Chathams, houses were very small and simple, and the people used few tools, reflecting the absence of resources like volcanic rock or metal. In Tonga or the Marquesas, where the population density was higher and more natural resources were available, there were more elaborate, even monumental buildings, and complex tools.

Diamond notes a correlation between agriculture, organization, and technology, but does not yet break down what this correlation consists of. Nevertheless, it's clear that certain societies in Polynesia were, in a word, "lucky" to have access to metal and rock—their access to these resources gave them a military advantage.

Polynesia, Diamond concludes, is a good example of how huge societal differences arise from environmental differences. The question becomes—can we generalize our findings from Polynesia to the rest of the world?

Diamond will try to generalize his findings in Polynesia to the rest of the world. (It's worth noting that Diamond's project bears a striking resemblance to that of the scientist Charles Darwin—who began by studying natural selection on the tiny, isolated Galapagos Islands, and later generalized his findings about environmental adaptation to all life forms.)

CHAPTER 3: COLLISION AT CAJAMARCA

Diamond describes the biggest population shift in modern times: the movement of Europeans to the New World. Europeans probably ventured to the Americas, though only to cold northern regions, as early as 900 A.D. More elaborate expeditions commenced in the early 1500s. Perhaps the quintessential "image" of the Europeans' conquest of the New World arose when Francisco Pizarro, the Spanish explorer, met Atahuallpa, the king of the Incas, who lived in present-day Peru. Pizarro was leading less than 200 soldiers through Peru on an expedition, while Atahuallpa was surrounded by tens of thousands of soldiers and on his "home turf." And yet Pizarro managed to kidnap Atahuallpa almost immediately and then ransom him for huge sums of gold. How?

In this chapter, Diamond will analyze another important case study for the clashes between cultures—and like its predecessors, the case is militaristic in nature. Pizarro's victory over the Inca was a clear demonstration of European society's "dominance" over the New World—Pizarro was badly outnumbered, and yet prevailed anyway. Understanding how this happened will be an important step toward understanding Diamond's thesis.

Pizarro traveled across Peru, using torture to extract information from Inca people his soldiers captured. This information led the expedition to the center of the Inca kingdom, where Atahuallpa lived. Atahuallpa received Pizarro as a visitor and willingly walked into Pizarro's camp without armed soldiers to protect him. But when Atahuallpa refused to open a copy of the Bible, Pizarro gave the order for his soldiers to capture Atahaullpa and, outside the camp, fire their guns and attack the Incas with their swords. Having captured the king and slaughtered many Incas, Pizarro soon rose to control the entire kingdom.

This passage is notable for two reasons. First, and most obviously, it shows how Pizarro defeated the Incas—he used his horses, his deception, and his weapons to do so. Second, and more subtly, the passage is a good example of Diamond's scientific point of view; one could argue that Pizarro's actions are cruel, evil, or genocidal—but Diamond doesn't stop to pass moral judgment on Pizarro. His job is just to explain how *these events happened.*

Diamond goes back to discuss the history of weapons. While some historians have tried to argue that the Spanish conquistadors prevailed in the New World because they were seen as intimidating, or even gods, the frank reality is that they won because they had better weapons than the Native Americans. Horses were also a huge advantage for the conquistadors: they could outrun their opponents, who had no horses of their own.

Step by step, Diamond breaks down the arsenal that Pizarro brought with him to the Inca Empire, beginning with his literal arsenal. Pizarro prevailed because he had horses, swords, and, to a much smaller extent, guns—the explanation for his victory is more material (his literal weaponry) than psychological (the awe he inspired in the Incas).

Guns didn't play a huge role in Pizarro's victory: he only had about a dozen of them, and they were difficult to load. His biggest advantage was steel: the steel swords and lances that his soldiers used to slaughter the Incas, and the steel armor that protected his expedition from the Incas' clubs. The combination of horses, steel, and, to a much smaller extent, guns, helps us understand how Pizarro defeated the Incas.

Pizarro's victory boiled down to a small number of literal, material advantages: his weapons, his horses, etc. Notice that the passage offers no commentary on Pizarro's brilliance as a general or his commitment to his cause: here, as with most of the book, the emphasis is placed on material, environmental conditions, not on individual human beings' abilities.

Atahuallpa and his kingdom were based out of an area that Pizarro would later call Cajamarca. Atahuallpa had moved to Cajamarca because of an epidemic of smallpox to the north. Historians now know that earlier European explorers caused this epidemic. In all, European-borne diseases might have killed as many of 95 percent of pre-Columbian Native Americans. On the reverse side, diseases from the Americas, such as yellow fever, malaria, etc., were huge killers among the Europeans.

Arguably the single largest component of Pizarro's eventual victory over the Inca Empire was his expedition's "arsenal" of diseases—something Pizarro didn't even know about. The importance of disease (it wiped out a huge chunk of the Native American population) emphasizes that history often has little to do with individual human beings' abilities or decisions.

Why had Pizarro come to the Americas? Diamond asks. Why didn't Atahuallpa sail to Europe? Pizarro's voyage, Diamond explains, was the result of European maritime technology, as well as the complex political organizations that financed his travels. Pizarro's voyage was also possible because of the existence of writing, which was used to spread information about travel and navigation. The Incas lacked all three essential precursors for maritime exploration (writing, centralization, and naval technology), or only had them in simplified versions.

On a literal level, the "causes" of Pizarro's victory over Atahuallpa were his access to maritime technology, his access to weaponry, and Atahuallpa's corresponding lack of access to technology and, more subtly, an extensive written language.

Why did Atahuallpa fall for Pizarro's trap? Why didn't he come accompanied by soldiers? To begin with, Atahuallpa didn't have any information about the Spanish. No writing about the Spanish had been passed to him. (There were some forms of writing in the New World, but they were simplified and not commonplace.) More importantly, Atahuallpa's lack of a written language meant that he didn't have a great breadth of knowledge of human behavior or history, and hadn't heard or read about any other devious invaders.

The role of written language in Pizarro's victory of Atahuallpa cannot be ignored. Atahuallpa fell for Pizarro's trap because he didn't know what to expect—his education in human nature was limited to the people he interacted with directly, that is, people who treated him with great respect and honesty. Notice that Atahuallpa's willingness to fall for Pizarro's trick doesn't prove that Atahaullpa was foolish—it just shows how important literacy can be.

Pizarro conquered the Inca Empire because of his superior technology, his horses, Europe's diseases, and, less overtly, his knowledge of writing. But we still haven't tackled the more fundamental question of why Europeans had such advantages while the Native Americans did not. Diamond will answer this question in the next two parts of the book.

Even if it's clear that some societies prevail militarily because of their superior technology, language, and transportation, it's not yet clear what factors lead to the emergence *of such advantages (beyond a vague correlation with agriculture, as seen in Polynesia).*

CHAPTER 4: FARMER POWER

As a teenager, Diamond worked on a farm in Montana. There, he worked alongside many white people, but also a Blackfoot Indian named Levi. Once, Levi cried out to a white farmer, "Damn the ship that brought you from Switzerland!" How, Diamond wonders, did Europeans conquer the New World and steal it from Native Americans like Levi's ancestors?

Diamond describes European colonization from Levi's point of view (an understandably angry, critical point of view), reinforcing the idea that European colonization wiped out entirely Native American societies and devastated others. Diamond is fond of beginning chapters with personal asides like this.

This chapter will focus on the role of food production in civilization. Agriculture, one of the most efficient forms of food production, was first discovered about 11,000 years ago, and it's a prerequisite for the development of guns, germs, and steel, as we will see later on.

The first important step that separates certain kinds of societies from others is the establishment of agriculture—many of a society's military advantages only arise because that society is descended from an agricultural society.

Agriculture is a highly efficient form of food production, much more so than hunter-gatherer foraging (in the sense that it can feed more people per square mile). By domesticating animals and keeping them in a small area, humans don't have to expend energy chasing after their food. And by similarly concentrating the density of plant matter in an enclosed area (i.e., a plot of farmland) humans can grow crops quickly instead of looking for berries and fruits across a wide area.

One of the major advantages of agriculture is its efficiency: agriculture can feed more people per square mile than hunter-gatherer techniques can. Agriculture also doesn't require humans to expend large amounts of energy running after game or climbing to pick fruits and berries (even if agriculture does still require plenty of work).

Agriculture is also important in human history because it leads to social specialization. In a hunter-gatherer culture, humans might be hunters or gatherers, but beyond that, there's little to no work specialization. In an agricultural society, on the other hand, food is stockpiled and stored for long periods of time. This leads to social specialization in two main ways. First, a political elite gains control over the food, and has to decide how much food different people get. Second, the increase in leisure time caused by storing food for long periods gives people more time to experiment with resources and develop specializations in jobs other than food production.

Another impact of agricultural technique on society is the specialization of the population. In an agricultural society, a leader decides who gets the extra food. In a hunter-gatherer society, there is almost never a surplus, or if there is, the surplus only lasts a few days, since meat and fruit couldn't really be stored thousands of years ago. And while agricultural societies still require their people to work hard, the efficiency of agriculture results in more leisure time during which people can learn other skills.

Agricultural societies are better at sustaining wars than are hunter-gatherer societies: in an agricultural society where people pay a tax to the state, the state can support an army. And agricultural societies learn how to domesticate animals instead of simply killing them. Agricultural societies domesticated horses, donkeys, etc.—all animals that allowed humans to travel long distances (and win battles, as we saw with Pizarro). Also, domesticated animals slowly train humans to survive germ epidemics, as Diamond will demonstrate. In short, the development of agriculture was crucial to the rise of a powerful military state.

Diamond will go into more detail about the issues he brings up in this section, but here he offers a general outline of his argument for the importance of agriculture in human history. Agriculture allows for organization and specialization in society. It also encourages people to domesticate wild animals and survive more germ epidemics. Considering how Pizarro defeated the Incas, it would seem that an early history of agriculture plays a major role in creating the kind of society that's powerful enough to defeat other societies.

CHAPTER 5: HISTORY'S HAVES AND HAVE-NOTS

It's a mystery why humans didn't learn to produce food in areas of the globe that are, in theory, very suitable for food production. Indigenous people in California, Argentina, and Australia never developed agriculture even though the land has been put to good agricultural use later on.

One major obstacle to the theory of geographic determinism is the question of why societies that theoretically could *have established agriculture did not—although Diamond will address this question somewhat later on.*

Diamond briefly explains how archaeologists get information about the past. Archaeologists can identify ancient civilizations that had agriculture by carbon dating the ruins of these civilizations and determining their ages. Communities that once had farms and domesticated animals will have the remains of plant and animal matter from the same periods when those communities were thriving, often in the form of charcoal from a fire. One problem with tracing agriculture through ancient civilizations is that it's sometimes hard to tell if certain plants and animals were actually domesticated in the area, or only brought in from other places through trade.

This is an important passage because it shows where Diamond gets his data from—and what the limits of his data are. Evidence of agricultural practices is spotty, since much of the evidence is thousands and thousands of years old, and the evidence that does survive is often unclear and fragmented (for example, remains of animal life in a fire).

Using carbon dating, archaeologists have identified areas where agriculture and the domestication of animals arose thousands of years ago: Mesopotamia, China, Mesoamerica, the Andes, and the Eastern United States. Of these, Mesopotamia has the earliest records of both agriculture and animal domestication, about 8500 B.C. There are also regions where agriculture arose somewhat later, perhaps between 6000 and 3500 B.C., including the Indus River Valley in present-day Pakistan and India. It is likely that these regions adopted agriculture after a single agricultural product entered the region through trade. Then there are regions like California and Australia where agriculture began abruptly with the arrival (or invasion) of European explorers.

The "original" centers of agriculture in the world were in Mesopotamia, China, and Central America. But the majority of societies in which agriculture flourishes did not discover agriculture independently; they acquired it from communication or trade with neighboring societies. Often, when colonists and explorers explored new regions, they brought agriculture with them, perhaps suggesting their awareness of agriculture's importance in establishing an organized society.

In short, only a few areas of the world really developed agriculture independently—the other regions adopted it after communicating and trading with neighboring regions. The regions that developed agriculture earliest then had a head start toward guns, germs, and steel.

As the book goes on, Diamond clarifies what a "head start" truly means for a society. The societies that developed agriculture earliest (rather than acquiring it through trade) experimented with crop techniques before other societies did, meaning that they made important advances in technology first.

CHAPTER 6: TO FARM OR NOT TO FARM

Why did humans develop agriculture around 8500 B.C. and not before? One thing to keep in mind while answering such a question is that agriculture didn't "spring up" fully formed. Humans slowly developed agriculture through a process of trial and error. Furthermore, there were periods when humans used aspects of both hunter-gatherer and agricultural society. Sometimes, hunter-gatherers adopted agriculture for a few centuries and then returned to their old practices.

In attempting to answer the question of why agriculture first emerged around 8500 B.C., the chapter makes an important qualification: agriculture did not emerge fully formed: rather, societies only experimented with some *agriculture. It would be some time after 8500 B.C. before any society's food sources were entirely agricultural.*

In the last 10,000 years, it's become increasingly difficult to be a hunter-gatherer, for a number of reasons. Wild foods have become considerably less available in that time, and most of the world's large mammal species have gone extinct. Another theory about why humans turned toward agriculture is that agriculture can support larger populations; humans were motivated to experiment with agriculture because it promised to feed them enough to survive. Agriculture also depended upon the existence of technologies like the hoe and the awl that didn't exist before about 10,000 years ago. So gradually, environmental changes and the rise of human technology and population density incentivized the use of agriculture.

The decision to pursue agriculture instead of hunter-gatherer practices was motivated by practicality more than anything else—humans came to recognize that their best chance of feeding themselves involved growing crops, not killing large (wild) mammals.

CHAPTER 7: HOW TO MAKE AN ALMOND

Nature is full of inedible and even poisonous foods. And yet all edible crops arose from wild species that humans learned to domesticate. Who came up with the idea to domesticate a crop?

One of the most important aspects of agriculture is the domestication of crops. This chapter will give a history of how domestication practices arose.

To begin with, there are thousands of living creatures that "domesticate" plants, of which humans are one. Animals eat plants and defecate the seeds, often traveling thousands of miles before doing so. Thus, animals select the kinds of plants they want to eat (by eating them), spread them to other places (by walking or flying) and then plant them in the earth again (by defecating). Indeed, most plants have evolved to the point where they can survive being digested by most animals.

Many living creatures inadvertently breed plants by choosing which plants are most appetizing, eating them, walking around, and excreting the plant seeds. In this way, humans and animals alike have inadvertently planted and "domesticated" their favorite crops across the world. Because of this, natural selection has caused many plant species to have seeds that can survive being digested.

The earliest farmers didn't understand genetics. But they did know that seeds could be planted to produce new crops, and they knew that if they planted the seeds of crops that they particularly liked, those seeds would grow into crops that shared their "parents'" useful qualities.

Farmers didn't know the full explanation for their domestication practices—they just understood that if they planted certain seeds, they would get certain kinds of crops.

The almond is a great example of how plants have become domesticated over the centuries. Wild almonds are bitter and even poisonous—some of them contain cyanide. But some almonds have a mutation that makes them non-bitter. Eventually, humans would have discovered the non-bitter almonds. The seeds of those particular almonds must have been harvested and replanted, resulting in a new generation of non-bitter almonds. Much the same is true of thousands of foods: strawberries, mustard, poppies, lentils, etc.

The almond, like many other edible plants, was once dangerous to eat. But domestication practices rendered the almond edible and tasty—humans chose "mutant" almond crops without poisonous seeds and planted them, until domesticated almonds outnumbered wild almonds. This is the essence of natural selection.

The agricultural revolution began in the Fertile Crescent of Mesopotamia, when humans noticed that certain seeds, such as barley, did not "pop" out of their protective stalks. Previously, mutant seeds that didn't emerge from their stalks were biologically useless; they just disintegrated. But humans used these otherwise useless seeds to plant crops and create a new generation of barley crops. Over millennia, humans' preference for mutant grains that grew quickly and could be harvested easily resulted in domesticated barley and wheat that were very unlike wild barley and wheat.

In the wild, seeds that remain in their stalks are evolutionarily useless—they just die out without yielding a new generation of plants. However, these "useless" seeds became useful for human agriculturalists, who removed them from their stalks and planted them in the group. The result, after many thousands of years, is that domesticated plants have evolved to the point where they only produce seeds that remain in the stalk.

Other crops, such as bananas, oranges, and grapes, developed reproductive mutations that allowed them to self-fertilize; i.e., bear fruit without interbreeding with another plant. The grapes and bananas that humans consume today are hermaphroditic and self-reproducing. But thousands of years ago, they were just mutants, selected by early farmers because they were convenient to grow and breed. Early farmers didn't understand biology or genetics, but they knew what was most convenient to farm; a cherry tree that bore fruit without any pollination was easier for a farmer to care for.

Another important way that crops have developed over thousands of years of domestication is self-fertilization. Self-fertilization, like any genetic mutation, was once the minority case; just a handful of bananas, grapes, etc., could self-fertilize. But because self-fertilization has such a large evolutionary advantage over ordinary plant fertilization, the minority of self-fertilizing crops eventually outstripped the "normal" crops. Again, ancient farmers didn't fully understand this concept; they just planted the crops they liked.

Many of the crops that humans grow and eat have evolved to the point where they bear little to no resemblance to their wild counterparts. Some plants were domesticated earlier than others, and some plants still haven't been domesticated, even though humans have been trying for a long time. The original domesticated crops were wheat and barley, probably because they were fast-growing, easy to harvest, and self-pollinating. Later, humans learned to domesticate figs and olives—crops that grew more slowly. Then, humans learned to domesticate fruit trees, which can only be domesticated with grafting. In short, humans learned to domesticate different plants at different times: by and large, and across civilizations, humans learned to domesticate fast-growing, easy-to-harvest crops first, and slow-growing crops later on (if at all). By the time of the ancient Romans, most of the world's leading crops were being cultivated somewhere in the world.

Many of the crops that human beings take for granted today were once wild—they had to be domesticated over the course of thousands of years of farming. Domesticated crops, because they're tastier and easier to grow than wild crops, spread across the world—any agricultural society would want them. Therefore, by the time of the ancient Romans, humans had access to "modern" equivalents of wheat, corn, etc.

Some plants we never figured out how to domesticate. Consider acorns, the seeds that produce oak trees. Acorns are highly nutritious, but they're also too bitter for most people to enjoy. Acorns were never domesticated because 1) they're slow-growing, 2) squirrels eat too many acorns, and 3) it's hard to "breed out" bitterness in an acorn. With a crop like an almond, on the other hand, a single gene (that can be bred out quickly) controls bitterness.

There are certain qualities that make plants easy or hard to domesticate. For instance, acorns—due to the genetic complexity of their flavor and the huge amount of time it takes to grow an oak tree—have never been domesticated. The fact that thousands of years later acorns still haven't been domesticated points to the thoroughness of ancient agriculture.

The most obvious example of evolution is the food we eat today. Over centuries, crops have evolved, with humanity's guiding hand, to be sweeter, bigger, and faster growing. Even Charles Darwin begins *On the Origin of Species* by discussing how farmers have cultivated gooseberries over the centuries.

Domestication of crops is a great example of evolution in action: agriculturalists prefer crops with certain characteristics (taste, ease of harvest, etc.), so that eventually, these crops are the "fittest" for their environment and come to outnumber other kinds.

CHAPTER 8: APPLES OR INDIANS

Given what we've learned about domesticated plants, there are two major obstacles to the development of agriculture: 1) humans are unwilling to experiment with domestication practices, and 2) there aren't enough wild plants to experiment with. Diamond will focus largely on the second obstacle.

As we'll see, the most important obstacle to the rise of agriculture is the lack of domesticable wild crops (and animals).

While there are millions of plants around the world, a surprisingly small number of them are suitable for domestication: most plants produce no fruit, and their leaves or roots are inedible. In modern times, humans haven't succeeded in domesticating a single new plant: our ancestors worked out which crops were edible and which weren't. Even so, crops have been domesticated in some places but not others. Some African peoples domesticated the plant sorghum, but others did not. Some peoples have access to figs and olives and domesticated both, and others had the same access, but did not domesticate them.

There is no better example of the randomness of geographic determinism than crop availability. Due to the environmental differences on the Earth's surface, certain regions have lots of available seeds and crops and others don't. One of Diamond's central arguments is that the peoples with access to certain seeds and crops have formed societies that have gone on to be more powerful than societies formed by people without such resources.

The problem is that hunter-gatherer societies gradually became agricultural societies if and only if there were *many* available crops that could be domesticated, not just two or three. How, then, do archaeologists assess which areas of the ancient world were "suitable" for domestication, and which areas had too few crops to make agriculture practical? Diamond will try to answer his own question by examining three different regions: Mesopotamia, New Guinea, and the eastern U.S.

The question of this chapter is: have there been societies that could *have formed agricultural systems but did not, and if not, why didn't they? As in previous chapters, Diamond will take a few case studies and then generalize his findings.*

Mesopotamia, or the Fertile Crescent, had some important environmental advantages for early agriculturalists. The climate favored annuals, i.e., crops that sprout once a year. Annuals tend to be "mostly" edible:, a large percentage of their total mass can be consumed safely (whereas, say, a cherry tree, is almost entirely inedible—only the cherries themselves can be eaten). Mesopotamia also contained many hermaphroditic self-pollinating crops; i.e., crops that could reproduce on their own and didn't require farmers to carefully cross-pollinate seeds every year. These crops were also protein-heavy, meaning that they could nourish human beings.

The area of Mesopotamia (which was less dry and hot thousands of years ago than it is today) had conditions that were highly favorable to the emergence of agriculture: a wide range of nutritious crops that humans could eat, enjoy, and plant easily. These conditions helped to make agriculture the most efficient and widespread form of food production in Mesopotamia, leading (Diamond suggests) to its role as the "birthplace of civilization."

A large chunk of the world's annual hermaphroditic crops—the crops that are easiest for farmers to domesticate and grow—are from the Fertile Crescent. Australia has a similar climate to the Fertile Crescent, but not many seeds; the same is true of Chile, California, and Southern Africa. The Fertile Crescent was the site of the earliest human agriculture because it held the greatest number of different species of plants that could be domesticated and farmed efficiently.

One of the most important advantages that Mesopotamia had as a site for agriculture was its wide range of hermaphroditic crops. Hermaphroditic crops are considerably easier to plant because they can pollinate with all other plants of the same species. So in the long run, Mesopotamia became the most important agricultural site in the world because of the availability of these species.

In early Mesopotamian civilization, people could rely on many different sources of nutrition: carbohydrates from wheat and other cereal grains, fiber and oil from flax, and protein and dairy from domesticated animals like sheep and cows (see the next chapter). With the tools of agriculture, the Fertile Crescent could produce enough nutrition to support human life.

Mesopotamian agriculture yielded a good, nutritious diet that benefited the health of the Mesopotamian agriculturalists.

Diamond notes that so far, he's talked about why agriculture succeeded first in Mesopotamia without ever once alluding to any superiorities in Mesopotamian *people*. His subject is the environment, and its influence on human beings. Nevertheless, Diamond's ideas rest upon an assumption: the ancient societies of the world had near-perfect knowledge of their environments' plants and animals. Millennia ago, nearly all human beings had a vast knowledge of plants—which ones were poisonous, which could be planted easily, etc. Therefore, it is highly unlikely that early farmers could have ignored a wild species with potential value to them.

This section emphasizes one of the main points of Diamond's theory of geographic determinism: that it is geographical and environmental idiosyncrasies, rather than human talent or ability, which determine the path of history. Diamond holds that all ancient peoples had essentially similar abilities—the same talent for recognizing useful crops, for example. Therefore, the real difference between Mesopotamia and, say, Australia wasn't peoples' intelligence or resourcefulness but rather which seeds and climate were available.

Now Diamond will contrast Mesopotamia with the eastern U.S. and New Guinea. In New Guinea, there were many reasons to pursue agriculture—there was almost no big game to hunt, for example. Agriculture developed in New Guinea around 7000 B.C., with farmers cultivating sugarcane, bananas, taro, and yams. While such crops nourished the New Guineans, there were no grains available. Also, there were no large mammals available for domestication to help with the farming (as there were in Mesopotamia). So while agriculture in New Guinea provided nutrition, it didn't provide *all* the necessary nutrients.

Mesopotamian agriculture was perhaps the most successful because of the diversity of both crops and large mammals in the region—other parts of the world could sustain some agriculture, but not with the same nutritional yield as the agriculture of Mesopotamia. Agriculture became the sole source of food production in Mesopotamia sooner than it did in other regions because, nutritionally speaking, there was no need for Mesopotamians to supplement their crops with wild animals or berries.

In the eastern United States, agriculture arose around 2000 B.C.: farmers domesticated squash, sunflowers, sumpweed, and goosefoot (similar to spinach), and later knotweed, maygrass, and "little barley." Native American crops were extremely nutritious, high in protein and oil. And yet there were major problems with the Native Americans' diet. Sumpweed causes hay fever and skin irritation. Also, goosefoot and little barley have tiny seeds, which make them unreliable as crops—a storm could destroy them. So even though the eastern U.S. had a good climate for agriculture, it wasn't enough: the absence of resilient crops with big seeds, annuals, and hermaphroditic self-pollinators resulted in limited agriculture.

Agriculture in the eastern United States provided considerable nutrition, but not as much nutrition as Mesopotamian agriculture (which provided protein, carbohydrates, oils, etc.). This means that the agriculturalists of the U.S. took longer to transition from hunting and gathering to agriculture, because agriculture had a slimmer comparative advantage over hunting and gathering.

The chapter ends with some caveats. First, people don't necessarily accept better crops and livestock just because they're more nutritious. Just because Mesopotamia had lots of useful crops available doesn't automatically mean that it was going to foster agriculture. Still, in the long run, Mesopotamia was far more likely to develop sophisticated agriculture than either New Guinea or the eastern U.S.—and it did, sooner. Also, the "stages" of domestication that Diamond outlines (first easy annual crops like wheat, then figs and olives, etc.) aren't set in stone. Still, civilizations will tend to go about domestication of crops in such an order (essentially, easy to difficult).

As with many other parts of his book, Diamond simplifies the history of agriculture somewhat in order to make his points, condensing the different stages of agriculture and the motives humans might have for pursuing agriculture. As with many economists, Diamond assumes a "rational market" of human agriculturalists—that is, he assumes that humans will always choose the best, healthiest, most nutritious food source—even though humans sometimes prefer food that isn't particularly nutritious.

CHAPTER 9: ZEBRAS, UNHAPPY MARRIAGES, AND THE ANNA KARENINA PRINCIPLE

The chapter begins: "Domesticable animals are all alike; every undomesticable animal is undomesticable in its own way." The sentence is a parody of the first sentence of Leo Tolstoy's novel *Anna Karenina*, but Diamond is talking about the ways that we define success and failure in general. Call it the Anna Karenina principle: the definition of success tends to consist of a narrow, specific list of events, and failure is, in a word, "everything else."

The opening sentence here lays out the structure of the chapter: Diamond will go through the many strict qualifications for an animal's domesticability—qualifications that the vast majority of large mammals don't fit.

Animals do all sorts of things to help human beings. They provide wool to keep humans warm, and milk, meat, and eggs to nourish them. Dogs—that is, domesticated wolves—protect humans while they sleep. A domesticated animal is defined as an animal that is bred in captivity and over time, modified from its wild ancestors. And yet human beings domesticated a mere 14 species before the 20th century, of which the 5 most important by far are the cow, pig, goat, sheep, and horse.

Diamond has talked about domesticating plants; now he's moved on to discuss domesticating animals. Domesticable animals are often bred to be docile around human beings, like the dog. Strangely, though, humans have domesticated relatively few animals, in contrast to hundreds of plants.

The wild ancestors of domesticated animals can be found all over the world, but not equally—for example, in South America, there was only one large mammal, from which the alpaca and the llama are descended. Today there are no large, domesticated mammals in Africa—strange, considering how many people travel to Africa every year to see the large mammals like lions and elephants.

As with the availability of crops, the availability of large, domesticable mammals can be attributed to the geographic "luck of the draw" more than to individual human beings' abilities. The absence of large domesticable mammals in Africa resulted in limited agriculture there.

Yet another reason why Eurasian civilizations thrived is that they had an abundance of large domesticable mammals. Some basic qualifications for being domesticated: herbivorous or omnivorous, and weighing over 100 pounds. By such a definition, Eurasia had about 70 species that *could* have been domesticated. So why did Europeans succeed in domesticating the horse while Africans never domesticated the zebra?

Domesticated animals can be crucial to the success of agriculture—large animals like horses and oxen can help with pulling blows, while also providing food and clothing for their human owners. Diamond seeks to explain why Eurasians domesticated animals but Africans didn't, without resorting to a discussion of the talents and abilities of Eurasians versus Africans. (It's also worth noting that Diamond's definition of "domesticable animals" here only refers to large mammals that can help with agricultural work—not smaller animals like chickens or rabbits that could be bred for food.)

One potential answer to Diamond's own question is that culture made it easier for Europeans to interact with large wild mammals. But Diamond rejects such an answer. The hypothesis that culture barred Africans (and Australians, North Americans, etc.) from trying to domesticate wild animals is refuted by many pieces of evidence: 1) the fact that today, Africans readily adopt domesticated pets; 2) human beings' universal fascination with animals; 3) the fact that Africans in modern times have continued to try to domesticate animals and failed. The final piece of evidence is especially strong: in modern times, there have been attempts to domesticate elk, zebras, bison, etc.—and almost all such attempts have failed. There must be a biological (in the animals, not the people) or environmental reason for Africans' inability to domesticate large mammals.

As Diamond will discuss in his Epilogue, culture is the all-too common explanation for the differences between societies. When a material difference between two societies can't be explained easily, historians, anthropologists, and social scientists have a tendency to attribute the difference to alleged "cultural differences." Diamond will try to adopt a more detached, scientific point of view, showing that there are *material causes for the differences in African and Eurasian society, even if these causes aren't immediately apparent.*


Why only 14 domesticable species? We return to the Anna Karenina principle: there's a short, specific list of qualities that make animals domesticable, and the vast majority of animals, even large mammals, don't make the cut. Diamond goes over some of the qualities: 1) The animal cannot be carnivorous. To raise a carnivorous animal in captivity, you would have to track down smaller animals to feed it, and you'd have to feed those smaller animals, too. It's more efficient to raise an herbivore or omnivore. 2) The animal must grow quickly. 3) The animal must be comfortable breeding in captivity. 4) The animal must not have a "nasty" disposition (as zebras do). 5) The animal must not have a tendency to panic in danger. 6) The animal must be used to herding (i.e., being controlled by a pack leader) in the wild. Put together, Diamond's qualifications result in a small list of animals that are efficient to maintain in captivity (1, 2, 3), and easy for humans to control (4, 5, 6). There are only about 14 animals on the planet that meet such qualifications—the 14 animals that have been domesticated since ancient times.

This important passage lists out the six basic qualifications for domesticability that apply to wild mammals (again, only large ones that can help with agricultural work, not small mammals or birds that can be bred for food or companionship) on the Earth. In essence, wild mammals must be docile and responsive to human control—otherwise, they'll never be captured and domesticated. Because there are six distinct qualifications for domesticability, the total list of domesticated animals on Earth is surprisingly small. Furthermore, the fact that the same 14 animals have been domesticated since ancient times, with no changes in modern times, reinforces the idea that, if given enough time, human beings take full advantage of all available resources—one of the basic assumptions of Diamond's theory of geographic determinism.


CHAPTER 10: SPACIOUS SKIES AND TILTED AXES

The continents of Earth have some important physical differences: most of them are wider from north to south than they are from east to west, so one could say that their "major axis" is the north-south axis. The differences in the shapes of the continents result in some big differences between civilizations.

Chapter 10 is largely about one of the most basic and obvious differences between the regions of the world—their length from east to west. As such, it's a particularly lucid (and also perhaps over-simplified) illustration of how geography influences society.

In world history, agriculture arose in certain areas (Mesopotamia, the Americas, China) and then spread to other areas. The ease with which agriculture could spread around the world varied greatly. It's estimated that agriculture spread east and west far quicker than it spread north and south. For example, agriculture spread from Mesopotamia to the Indus Valley at a rate of almost a mile a year (but in the Americas, it spread north from Mexico at a rate of only 0.3 miles a year). In general, innovations in food production, from agriculture to the domestication of large mammals, spread more slowly through the Americas than through Eurasia. Why?

We begin with the raw data: the rate at which agriculture has spread around the world, both to the east and west, and then to the north and the south. Diamond will offer a theory for why there's a measurable difference between the rates of diffusion of agriculture for the two different sets of directions.

Consider how agriculture spread from Mesopotamia to Europe. While it's been argued that Europeans simply learned how to domesticate wild plants that grew in their regions by imitating their neighbors to the east, the truth is that Mesopotamian agriculture transplanted specific crops, not just farming techniques. Europeans began to grow wheat and barley because they acquired Mesopotamian wheat and barley seeds through trade and travel.

Just as Mesopotamia was the first region of the world to foster human agriculture, it was also the first (known) region of the world to spread agriculture to its neighbors. Mesopotamian agriculturalists spread their techniques and their literal crops, diffusing (spreading) wheat and barley to Europe.

The key point is that latitude (the measure of how far a location is from the equator) is a better determinant of climate than longitude (the measure of how far east or west a location is). This is because Earth rotates on a north-south axis, meaning that the sun's heat warms places with the same latitude equally. Two areas that share the same latitude will tend to have very similar climates, even if they're on opposite sides of the world, whereas two areas with the same longitude often have very different climates.

The reason that agriculture, which is dependent on climate, diffuses east and west faster than it diffuses north and south, is that regions with a similar latitude (i.e., either to the east or the west) generally have a more similar climate than regions with the same longitude (i.e., to the north or the south). A person whose homeland's climate is similar to that of a farmer's is more likely to adopt techniques from the farmer.

Eurasia is unique among the continents in that it's longer from west to east than it is from north to south. Therefore, there were by definition more regions in Eurasia that shared latitude than there were in Africa or the Americas. Mesopotamian agriculture spread quickly to the many areas that shared Mesopotamia's climate, benefitting many different peoples. By contrast, Mesopotamian agriculture never spread very far south into Africa because of "climate barriers" like the Sahara Desert. Similarly, the Incas never transported their domesticated animals north into Mexico—again, changes in climate made such travel difficult.

In this section, Diamond explains why he prefers talking about "Eurasia" to talking about Europe and Asia. Eurasia should be considered as one solid landmass, not two continents, because the modern boundary between Europe and Asia didn't exist thousands of years ago—instead, agriculture diffused from the Middle East into Europe and Asia. Similarly, agriculture doesn't diffuse if there's a geographic barrier in the way. Because of this, longitude isn't the only barrier to diffusion, and latitude doesn't always mean consistent diffusion.

Some caveats: although latitude is an important determinant of similar climate, it's not necessarily true that areas with identical latitude have identical climate. Crop innovations in the American southwest never reached the American southeast, even though the two regions had the same latitude—this is because most of the area in between (i.e., present-day Texas and the Great Plains) couldn't support agriculture.

Obviously, agriculture can never emerge in a region where the soil can't support agriculture. But, somewhat more subtly, agriculture rarely spreads through *such a region and moves on to others. Thus, even though both coasts of the U.S. share a similar, fertile climate, agriculture didn't spread from one side to the other because of the deserts in between.*

Diamond hypothesizes that one could study "latitudinal diffusion" of ideas in general, not just crops or domesticated animals. For example, writing was developed in Mesopotamia and "diffused" (spread) to Rome and India (same latitude), whereas writing developed in Mesoamerica never diffused to the Andes (same longitude).

Diamond will study the diffusion of other things—not just literal crops, but ideas and inventions—later on in the book. By and large, he argues, ideas and inventions "travel" east and west more effectively than they travel north and south, suggesting that ideas and inventions are passed along the same trade networks that arose though agriculture in the first place.

CHAPTER 11: LETHAL GIFT OF LIVESTOCK

So far, Diamond has addressed how differences in environment led to differences in food production, which spread around the world at different rates. Diamond will now show how agricultural differences between civilizations led to vast differences in literacy, health, technology, and government.

The differences between agricultural societies and hunter-gatherer societies are the most basic differences that arise between human beings because of the influence of geography. Yet according to Diamond, these original differences could then be said to "snowball" into larger differences, as we will see in the chapters to come.

Diamond remembers meeting a farmer who attempted to have sex with a sheep and contracted a horrible disease from the animal. While there are few people who would try to imitate the farmer, the fact remains that people live in close proximity to animals, and catch diseases from their animals.

The point of this rather disgusting anecdote is that if given enough time in close contact with animals, people catch diseases from them in all kinds of ways, sexual and otherwise.

Germs and viruses have been some of the leading causes of death in human history. Many of the key plagues and epidemics of history—the Black Death, the Spanish Flu—have involved diseases that spread from animals to human beings. Consider this from the microbes' point of view. The most "successful' microbes, which have evolved over millions of years, are those which can pass from host to host quickly and efficiently. Microbes have evolved to move through saliva and other bodily fluids, and to provoke reactions like bleeding, vomiting, open sores, etc.—anything that passes on the microbes to other hosts (even if it kills them).

The first major point of this chapter is that diseases survive within "hosts" (many of which are human bodies). Furthermore, the most successful diseases reproduce themselves quickly inside their hosts, so that they never entirely die out. The symptoms of a disease tend to spread the disease—coughing, sneezing, etc.—because, according to the process of natural selection, the most successful viruses and germs have been those that provoke such responses in their hosts so that they (the viruses and germs) can reproduce.

Humans have a few different defenses against germs, such as coughing, sneezing, running a fever, etc. Another important "defense" against disease is evolution itself: over the centuries, human beings with weak immune systems are more likely to die off without having children, eliminating themselves from the gene pool. So over time, humans have evolved to be immune to diseases—which leads diseases to evolve to become more infectious, and so on.

Over time, populations die out or else develop immunities to diseases. This means that the diseases themselves either die out or mutate into new, more dangerous diseases. As with any other aspect of natural selection and the "food chain," the diseases and their hosts are constantly evolving to outdo one another.

A small human community, such as a community of hunter-gatherers, might suffer from any number of lethal diseases. But because of its small size, the community would either 1) die off quickly, or 2) survive, with everyone in the community developing immunity to the disease, in which case the disease would die off. There are certain diseases that could only survive in a group of many people—for example, measles can only survive in a population of at least half a million people. In such "crowd diseases," the microbe needs many human hosts to survive: it needs humans to infect, plus a perpetual "crop" of children to infect after it's killed off everyone else in the community (or after everyone else has caught the disease, survived, and developed an immunity to it).

One of the most important factors in determining whether or not a community will die of an epidemic is population size. A small community (i.e., a hunter-gatherer community) can easily be wiped out altogether by disease. Larger communities, however, will contain some people with immunities to the disease, ensuring that the community as a whole survives, even if a majority of it dies—and those who do survive will usually pass on their immunity to their offspring. On the other hand, there are some diseases that only *exist in large communities—meaning that those large communities are the only groups that develop immunities to the diseases (so that both the disease and its host—the community itself—survives). This in turn means that when a large community interacts with a smaller community, a greater portion of the small community than of the (partially immune) large community will die of the disease.*

The rise of agriculture coincided with the rise of crowd diseases. Farming communities were bigger, denser, and more sedentary, and everyone shared resources like food and water. The rise of cities was also important for the spread of crowd disease, because cities allowed for sufficient numbers of people living close to one another.

Agriculture leads to the emergence of more widespread deadly diseases because people are close together, and also close to animals—recall the relationship Diamond discussed between agriculture and population density in Part Two.

Another key reason that crowd diseases first appeared among agriculturalists was the presence of domesticated animals. Animals carry huge numbers of microbes, and most deadly human diseases began as diseases of animals. For example, the AIDS virus was once a disease of monkeys. So agriculturalists will be more likely to suffer from infectious diseases—but because of their large populations, their communities will also be more likely to survive the diseases.

Many animals spread disease, meaning that agricultural societies in which people are often around animals will tend to have more diseases—but also develop more immunities.

The European explorers who came to the New World brought diseases like smallpox with them: these diseases killed huge numbers of Native Americans, whose immune systems had no defenses against them. One reason the Native Americans had no natural defenses against smallpox and other diseases was that they hadn't interacted with domesticated animals. On the other hand, Europeans hadn't interacted with certain diseases of the New World, such as yellow fever and malaria, and many European explorers died from such diseases. Nevertheless, infectious diseases acted as a net benefit to the Europeans when they colonized the New World, because, by and large, the Europeans had stronger immune systems.

When a large, agricultural society like early modern Spain encounters a small, hunter-gatherer society like the 16th century Native Americans, the latter society will die of the larger society's diseases. By and large, the Europeans who colonized the New World had immunities to the same diseases that proved so lethal to the Native Americans—a result, Diamond argues, of their historical membership in dense, agricultural societies.

CHAPTER 12: BLUEPRINTS AND BORROWED LETTERS

The key agents of colonization, Diamond argues, are writing, weaponry, microbes, and centralized government. In Chapter 12, he'll discuss the history of writing, and see why some civilizations developed writing while others did not.

We've already seen, via the history of Cortez and Atahuallpa, how writing can be a major advantage in combat. Now we'll see why certain societies develop writing and others don't.

All writing systems tend to fall into one of three different camps (with a certain amount of overlap between all three): alphabet, logogram, and syllabaric. An alphabetic system uses a combination of signs (letters) to approximate the sounds of words (English is an alphabetic language). A logogramic system, like Chinese, uses single signs to represent whole words. Finally, syllabaric languages use signs to represent different syllables—these languages are now very rare, but used to be common.

There's a lot of useful background information in this chapter about the different types of writing. As with many of the categories in the book, these three categories aren't entirely distinct—most languages incorporate some aspects of all three categories, and Diamond necessarily simplifies things to make his point in a succinct way.

It's known that the Sumerians, Mesoamericans, Chinese, and Egyptians developed writing independently, with the Sumerians being the first to do so (around 3000 B.C.). Sumerian cuneiform, the first language, combined aspects of alphabetic, logogramic, and syllabaric language. Individual syllables of Sumerian words were modeled with simplified pictorial images; images that could *also* stand on their own as words. To read Sumerian would be like an English speaker seeing a picture of a bee, followed by a picture of a leaf, and pronouncing the word, "belief."

Cuneiform, the first known language, is a good example of how Diamond's three stated categories of writing aren't absolute—cuneiform mixes elements of all three. As is typical of his writing, then, Diamond over-simplifies things but also generally admits that he is over-simplifying.

How does writing spread from civilization to civilization? There are two basic ways for ideas to spread: blueprint diffusion (replicating a specific idea) and idea diffusion (trying to imitate a more general idea). Often, languages spread through blueprint diffusion. For example, the Roman alphabet (A, B, C, etc.) arose because of blueprint copying of the Semitic alphabet. However, all new languages have modified previous languages in some way: the blueprint diffusion is never perfect. For example, the Romans modified the Semitic alphabet by replacing the third letter of the Semitic alphabet, "g," or "gimel," with the letter "c."

In his discussion of the diffusion of agriculture, Diamond distinguished between the diffusion of ideas about farming and the diffusion of literal crops. He makes a similar distinction here between the diffusion of a specific invention (a writing system) and the basic idea of an invention—that is, copying literal symbols or letters from another society's writing system, or simply copying the idea of a writing system based on symbols or letters.

There are also many cases of idea diffusion in the history of language. In the 19th century, the Cherokee developed a method for writing down their language based on their partial knowledge of the existence of a written English language. After experimenting with a pictorial language, they settled on a syllabaric language, using about 85 signs (each sign representing one syllable) to represent all spoken Cherokee words. There are many other examples of how civilizations have created languages inspired by the general idea of another civilization's language.

This passage contains a good example of idea diffusion—the general, vague idea of a written language preceded the Cherokee knowledge of any specific alphabet.

The question remains, however: why did some civilizations develop languages while others did not? It's important to recognize that the earliest languages, like cuneiform, were cumbersome and ambiguous by modern standards. Many of the words in cuneiform had multiple meanings, and were much more dependent on context than words written in modern languages. But cuneiform did not *need* to be more precise. Cuneiform was a tool for a small class of scribes and scholars, used to keep track of taxes and debts: which people owed what goods to people in power.

To begin with, it appears that languages emerge in response to very specific needs and requirements of a society. Thus, the Sumerian use of cuneiform reflected a demand (based in its agricultural history) for record keeping, tax collection, etc.—the potential usefulness of a written language, one could say, preceded the written language itself.

As we can see from the history of cuneiform, writing was largely invented in order to keep track of the "flow" of economic transactions in a large agricultural society. But while having a large agricultural society is a necessary condition for the invention or adoption of writing, it's not a sufficient condition. There were plenty of large agricultural societies that lacked writing.

In this passage, Diamond makes an important distinction between necessary and sufficient. When we say that X is "necessary" for Y, it just means that you couldn't have Y without first having X. When we say that X is "necessary but insufficient" for Y, it means that you can't have Y without first having X, but also that having X doesn't necessarily mean you must have Y, too.

The vast majority of human societies acquired writing by interacting with other civilizations, not by developing it independently. Therefore, one major reason why certain civilizations had a written language while others did not is that they were close to other civilizations that already had one. Writing spread in an east-west direction faster than it spread north and south. North Africa acquired writing from Mesopotamia sooner than West Africa did, largely because West Africa is farther south and isolated by the Sahara Desert.

As the chapter ends, Diamond hasn't really answered the question of why writing emerges in certain societies, and perhaps there is no complete answer to the question. Diamond can only show how certain conditions favor *the invention of writing. Instead of focusing on the exact reasons why writing emerges in societies, he will now focus on how writing spreads across the world.*

CHAPTER 13: NECESSITY'S MOTHER

Diamond describes the Phaistos disk, an ancient clay disc decorated with signs that date back to ancient Minoan times. The signs on the disc appear to be words, but historians have been unable to understand the Minoan language. It's not clear if the language was an indigenous Minoan invention or a transplant from a neighboring region. One of the most amazing things about the disk is that the words aren't written or carved; they're stamped with what appear to be blocks coated with ink. Printing is one of the key human inventions: it allows for quick, efficient communication. The Phaistos disk seems to represent the difficult of "proving" why certain technologies appeared in certain places at certain times. Inventions are unpredictable and idiosyncratic—so why was the printing press first invented by the Minoans, not the Egyptians or the Mayans?

The Phaistos disc is, above all, idiosyncratic—it's striking and surprising that the ancient Minoans would have developed a technology that wouldn't get a foothold in Europe for the next two thousand years. As such, it's a good lead-in for Diamond's discussion of why certain civilizations develop certain technologies, and why certain technologies do and don't catch on and spread.

There are a few different theories about the history of technology. One theory is that technological breakthroughs are unpredictable because they always come from single, "heroic" figures, like Archimedes or the Wright Brothers. But the idea that heroic figures invent important things neglects the fact many different people are involved in inventing any one object (for example, there were at least a dozen figures who partially invented the steam engine). Technology develops cumulatively.

The idea that heroic individuals dictate the course of technological history is, we know by now, questionable for Diamond, because he generally favors geographical and social explanations of why civilizations flourish—explanations that don't deal in individual human talent. Even when an invention can be traced to specific people, it's usually the case than many different people were involved in the invention (or its popularity and cultural impact), weakening the claims of the "heroic school" of technological history.

Another theory of the history of technology is the old saying, "Necessity is the mother of invention"—in other words, if a society needs something, somebody will find a way to build it. The problem with this idea is that often, inventors don't realize how their own inventions will be used. The car engine, the phonograph, and hundreds of other important inventions were developed for purposes entirely different from the purposes with which we now associate them. So in a way, invention is the mother of necessity; technology "finds" a use after it's invented, instead of being invented for a specific purpose.

In the previous chapter, Diamond had suggested that the need for agricultural record-keeping caused *the development of writing in Sumer. While there may be some truth to such an idea, it's untrue that necessity always dictates which inventions emerge. Successful inventors often have little to no idea how their inventions will ultimately be used. An invention like the laser, to name one example, could be said to "create" its own uses, rather than being created to solve specific problems.*

The real driving force behind discovering a new technology, Diamond posits, is trial and error. There were certain raw materials available to ancient peoples—stone, wood, bone, clay, etc. People experimented with such materials, developing technologies like glass. Gunpowder was first discovered through experimental mixings of sulfur, charcoal, and saltpeter.

Diamond's theory of technology focuses on the importance of trial and error—a much more abstract stimulus for creativity than either individual heroism or even social necessity. Diamond's point seems to be that, given enough time and resources, a group of people—it doesn't matter which individuals—will use their resources to create certain inventions. Diamond has met with some criticism for his theory of technology. As he admits in his Epilogue, such an idea needs some qualification—Diamond can't entirely account for the genius of individual, far-thinking scientists and inventors.

The next step, after discovering a new technology, is to popularize it. There are four major factors that influence the popularization and acceptance of a new technology: 1) the technology's economic benefits, 2) its social prestige, 3) the ease with which people can grasp the technology's advantages, and 4) the technology's compatibility with vested interests. With regard to 4: there are many cases of superior technologies being suppressed because they clash with a society's vested interests. For example, British cities still used gaslights in the 1920s because the British municipal government had already invested heavily in gas lighting, and would have been bankrupted by electrical lighting.

Once a technology or invention has been created, it needs to be popularized and replicated (in a process that's somewhat analogous to the process of natural selection, as the scientist Richard Dawkins has argued). The demands of society don't necessarily stimulate invention (as the saying, "Necessity is the mother of invention" would suggest)—on the contrary, social demands can often inhibit the spread of an invention, like the light bulb in Britain (or the Phaistos disk in Minoa).

Historians of technology long before Diamond have listed some of the social factors that encourage the reception of new technologies. Societies that protect patent rights and intellectual property are supposedly more receptive to new technologies. Also, there are cultural factors like risk-taking and religious tolerance that supposedly encourage civilizations to accept new technologies. The problem with such a list of factors is that they don't get to the heart of the matter: it might be true that societies that protect intellectual property or tolerate many different religions are better at receiving new technologies—but why? Diamond will try to get to the underlying cause of such cultural differences in the reception of technology.

Diamond doesn't go into great detail about the lists of social factors that encourage technological reception—more important to this chapter are the underlying causes of technological diffusion. Furthermore, a list of cultural factors that encourage or inhibit invention runs the risk of cultural bias—precisely what Diamond is trying to avoid with his study of why certain societies do and don't succeed.

In general, technology arises from "the handling of natural raw materials." The problem with such an idea is that there are many technologies and inventions, like writing, that don't seem to arise from interaction with any raw materials at all. And there are many inventions that arose in certain civilizations but not other civilizations with the same resources (such as the compass or the windmill).

Writing represents a further caveat to Diamond's stated theory of how technology arises from the availability of raw materials. Furthermore, inventions like the windmill would seem to suggest that there are some *factors leading to the emergence of technology that cannot be explained by the presence of raw materials or by fundamentally geographic causes.*

How do societies exchange technologies? As with language, technological diffusion can involve a specific blueprint, or a general idea. Diamond argues, "Depending on their geographic location, societies differ in how readily they can receive technology by diffusion from other societies." On one hand, medieval Islam, positioned in the middle of Eurasia, acquired many technologies from Asia and spread them to Europe. The aborigines in Australia, however, were isolated from Asia by geographic barriers like the ocean.

While there are some factors, such as culture and individual human talent, that can seemingly cause the emergence and reception of technology, the primary differences between societies' receptions of technology are geographical (Diamond argues). Geographic barriers prevent certain civilizations from receiving technologies from neighboring areas.

Also, geographically isolated societies are more likely to permanently abandon technologies after receiving them. For example, Japan abandoned foreign imports like guns after the 1600s due to the government's strong xenophobia (fear or hatred of foreign cultures). Many civilizations abandon certain technologies for cultural reasons. The difference is that a geographically connected region like the Middle East could reacquire the technology later on, while a more geographically isolated country like Japan did not have the option to reacquire guns for many years after the 1600s.

Japan represents a good example of how geography and culture together can be more important determinants of technological reception than culture by itself. Japan's decision to reject gun technology—a decision that seems to reflect a distinctly Japanese culture—was "magnified" by the fact that Japan is geographically isolated from neighboring parts of Asia. One cultural decision barred guns from entering Japan in the 1600s, and geography then prevented them from reentering for centuries afterwards.

Another important point about technology: it is self-catalyzing. That is, the discovery of one technology encourages the discovery of other technologies. For example, the discovery of pottery made possible the manipulation of copper and iron ore, leading to the development of metallurgy. One technology led to another.

The self-catalyzing nature of technology helps us understand how seemingly minor differences between the technological potentials of hunter-gatherer societies and agricultural societies can magnify over time. Often, the existence of one technology in a society enables the emergence another, which enables another. If a second society lacks that first technology, then, it won't stumble upon the others.

Diamond returns to the Phaistos disk. Now that he's looked at the reasons for technological diffusion, it's possible to understand why the Minoans didn't succeed in popularizing the printing press in Europe, while medieval Germans like Johannes Gutenberg (often credited with "discovering" the printing press) did. The Phaistos disk was made from clay and had to be punched by hand instead of with a metal press—therefore, the printing technology was slow and clumsy, and its marginal superiority to writing by hand was small. Furthermore, the Phaistos disk was developed at a time when writing was used only by a small number of temple scribes, where the Gutenberg printing press arose when there were many more people in Europe who could read.

The Phaistos Disc is an example of an extremely important invention that didn't catch on in its own time. As such, it's a good example of the importance of environment, diffusion, and practicality in the history of human creativity. In history, humans have ideas that don't catch on in their own time, but would have been important in another time; in other words, geography and time often trump individual human creativity. So perhaps the question of why individual human beings discover specific inventions at a given time is ultimately less important than the question of why individual inventions and ideas do and don't survive over time—a question that can, in large part, be answered by studying a society's environment and geographic position.

There are two major "jumps" in the history of technology. One occurred about 100,00 years ago: the development of bone and stone tools. The second occurred about 13,000 years ago: the adoption of agriculture and crop production. The agricultural revolution required a sedentary lifestyle, at least compared to the hunter-gatherer lifestyle. It also produced centralized societies with large populations.

The idea that the history of technology can be organized around two major "jumps" reinforces the self-catalyzing nature of technology—for example, a small handful of agricultural innovations catalyzed the discovery of further agricultural innovations.

Three major factors, "time of onset of food production, barriers to diffusion, and human population size," have led to the differences in the development of technology. Eurasia contains more people than any other landmass, includes two important centers of food production (China and the Fertile Crescent), has relatively few geographic barriers to diffusion, and is longest from east to west, not north to south. As a result of all these important environmental advantages, technology arose earlier in Eurasia than it did in other continents, and spread fastest. Because technology is self-catalyzing, Eurasia's early technological advantages help to explain how it maintained technological supremacy over other continents even centuries later.

Diamond argues that ultimately, the history of technology can be analyzed in geographic terms. Societies that develop agriculture have denser populations, and those that enjoy easy travel with neighboring regions are most likely to develop and—crucially—preserve useful technologies. Societies with these three material features will be most likely to 1) have citizens with the free time to experiment with raw materials and stumble upon new technology, 2) preserve new technology once it appears, and 3) acquire important new technology from neighbors. While, as we've seen, it would be difficult for a historian to explain the history of technology purely in terms of the features listed above, Diamond argues that societies with those features are at least most likely to develop technologies.

CHAPTER 14: FROM EGALITARIANISM TO KLEPTOCRACY

In New Guinea, there is a group of nomadic people called the Fayu. The Fayu are a "group," but they have little interaction with one another. They live in small families, and only gather together once or twice a year. They're often violent to one another—one reason why they don't interact in large groups frequently. Until the end of the last Ice Age, most of the human beings in the world lived in tiny, isolated societies like that of the Fayu. So what factors led humans to develop centralized forms of government and religion?

In this chapter, Diamond will study the formation of the modern state, attempting to answer why humans first began to form large, complex societies a few thousand years ago.

Diamond will use four categories to discuss the formation of government: band, tribe, chiefdom, and state. His categories are necessarily imprecise: many kinds of government don't fit perfectly into any of his categories. Still, they'll be useful for approximating different "stages" in the history of government. Finally, Diamond defines a state as a government with over 50,000 followers, divided between many cities or villages, with centralized bureaucracy, and a system of written laws used to solve problems.

These four categories are approximations of the many different kinds of societies in human history. As with the other arbitrary categories Diamond uses, they're chosen to give a sense for the large-scale changes in government over time; i.e., the factors that might have led a society to slowly transition from a recognizable chiefdom to a recognizable state.

A "band" consists merely of dozens of nomadic people and has no complex bureaucracy. People don't specialize in any single activity or job; everybody hunts or forages for food. There are no true classes; to the extent that bands have leaders, they are just people who distinguish themselves with their strength and intelligence. Examples of bands include the Fayu Jive of New Guinea.

Bands, which are never truly agricultural, offer little to no specialization for their members (everybody has one job, getting food, which they perform with varying degrees of competence)—reinforcing the historical importance of agriculture in stimulating social specialization.

A tribe has hundreds of members, who reside in one fixed place. All members of a tribe tend to know one another closely, and as a result, any conflicts in the tribe are resolved personally (whereas in a country like the U.S., conflict resolutions involve going to court and speaking to a judge). Tribes do not need police or written laws, because everyone knows everyone else; the social pressure of family and kin maintains order. Examples of bands include the New Guinea highlanders.

Tribes are distinguished by the supremacy of family and family structures. Notice that Diamond classifies societies largely based on how order is preserved. While there are leaders and rulers in a tribe, the true source of order isn't the leader himself, but rather an omnipresent family or community structure that connects everyone.

A chiefdom consists of many thousands of people, meaning that the structures of conflict resolution that dominated bands and tribes no longer work. Because people don't necessarily know one another personally, they rely on the chief—the only one in the chiefdom who's permitted to use violence—to settle all disputes. Chiefs usually rule by hereditary right. Beneath the chief, there are many different classes in society: artisans, hunters, etc. In return for the chiefdom's leadership and help in settling disputes, the people in a chiefdom honor the chief with gifts, food, and other luxuries—the "tribute."

One of the most important aspects of the chiefdom is the chief's monopoly on violence. (Interestingly, the social scientist Max Weber, who lived more than a century before Diamond, defined the state *as the form of government that monopolizes violence). At their best, chiefs provide a service—they moderate disputes and lead the people to military victory—and therefore demand payment in the form of a tangible tribute.*

The important thing to notice in a chiefdom is that the chief receives money from his followers, which he can use either for his own selfish gain or for the betterment of the chiefdom as a whole. One could argue that a chiefdom is a kleptocracy (a society in which the people are deprived of their wealth for the benefit of the leader). But at the same time, a chief could use his people's wealth to help them—not unlike the way a benevolent American president like George Washington used taxes to build public works that benefited most people in America.

The notion of the kleptocracy is useful for understanding the chiefdom and the state, because the leaders of these forms of government couldn't maintain their power unless they persuaded their people to part with their own possessions. While the classification of kleptocracy might seem harsh, Diamond points out that it need not be—a leader can either squander his people's wealth or use the wealth to help everyone.


The challenge for a kleptocratic leader, Diamond argues, is controlling the people while also depriving them of their wealth. Some kleptocrats throughout history have tried to disarm the populace to prevent them from rebelling, or make the populace happy by spending the wealth in popular ways. Kleptocrats also try to convince their people to obey them by maintaining order: thus, the people are paying a tribute in return for a useful service.

One could argue that it's human nature to want to keep one's belongings—therefore, the kleptocrats have their work cut out for them in persuading their people to pay a tribute. Kleptocrats, one could say, use "sticks and carrots" to persuade their subjects—they threaten to hurt the people who don't pay, or else try to convince the people that it's in their own best interest to pay.

The final way that a kleptocrat can encourage the people to obey him is to create a religion that justifies his own power. Many chiefs are also religious leaders in their chiefdoms, and spend much of the tribute on large religious structures. By popularizing religion, chiefs not only encourage their followers to respect and worship them; they also convince their followers to sacrifice their lives for their chiefdom in times of war.

Diamond's observations about religion could be regarded as cynical, but, as before, he's just describing social history as he sees it. Here, he argues that religions, regardless of their objective "truthfulness," historically play a useful role in maintaining order in society.

The final kind of government that Diamond will discuss is a state—the government likely to be most familiar to a 21st century person. The earliest states were governed by hereditary leaders—for the most part, kings. Today, there are state democracies with elected officials. Yet even here, the elected officials have a near-monopoly on information and power. States have more complex and wide-ranging programs of economic redistribution than chiefdoms—people pay a kind of "tribute" called taxes. And in a state, people are specialized to the point where almost no one is self-sufficient; citizens of a state rely on one another.

The major difference between the state and the chiefdom, apart from the state's greater size, is the greater complexity of society. Citizens of a state generally lack true self-sufficiency; they've become so specialized that they only know one small portion of what it takes to survive. Furthermore, states have extensive hierarchies of power, such that the central leadership can pass orders down to local leaders, who in turn enact these orders in society.

Early states had greater social hierarchy and specialization than chiefdoms: people who served the state government had different levels of power. Also, early state governments had different departments: someone who served the government could focus on law, taxes, the military, etc. Early states also had strong religious traditions, with the king often considered a divine being.

States, like chiefdoms, rely on specialization, kleptocracy, and religion. Religion is arguably even more important in a state than in a chiefdom, because states encompass a larger number of people who need to be united together around the same system of ideas.

In the last 10,000 years or so, the overarching trend of human history has involved the formation of more states and the dissolution or annihilation of tribes, chiefdoms, and bands. States are more powerful than other forms of government because of their size, their citizens with a military specialization, and their strong patriotic fervor, which convinces citizens to fight to the death for their rulers. Patriotism is almost inconceivable among tribes or bands: among the New Guinean Fayu, for example, the notion of dying for one's state or king would be jeered. Diamond hypothesizes that the religious fervor that has driven some Christians and Muslims to die for God or Allah did not exist before the rise of chiefdoms and states 6,000 years ago.

Perhaps even more important than religion in the maintenance of a state is patriotism. Patriotism could be considered a religion in which the "ultimate" is the good of one's state itself, rather than a god. (In many of the earliest states, religion and patriotism were one and the same, since the religious leader of the state was also the government leader.) Without patriotism, states would fall apart—such large, diverse groups of people would see no reason to protect one another or sacrifice their interests for the sake of the group.

For a long time, people have tried to understand how states arise. The Greek philosopher Aristotle argued that "man is a social animal," meaning that it's inevitable for people to gather together and form a state. The 18th century French philosopher Jean-Jacques Rousseau argued instead that people agree to form states in a process called the social contract: people sacrifice some of their freedoms in order to gain the protection of the state. Both Rousseau and Aristotle have been disproven over the years: human beings form all sorts of communities that *aren't* the state, and there are no known cases of humans literally agreeing to form a social contract, either.

For a long time, the people who theorized about the emergence of the state weren't really scientists in the modern sense—they didn't examine the data and draw appropriate conclusions from it. As a result, many of their ideas have since been disproven with evidence—there's no empirical reason to believe that humans sit down and agree to a social contract, for example.

There's a lot of data suggesting that regional population size and density correlates with the rise of a complex state. But it's not clear why dense populations decide to form a state, or whether dense population is a cause or an effect of state formation.

As with many of the other variables discussed in the book, Diamond will have to determine whether state formation and population density is the dependent or independent variable.

One thing that stimulates the growth of a complex society is intensified food production—the agricultural innovations discussed in Part 2. Agriculture and social complexity stimulate each other. Agriculture stimulates social complexity in several ways: 1) because agriculture involves storing food for long periods, it gives farmers the free time to work for a centralized political leader, 2) agriculture can create food surpluses, which can then be used to compensate scribes, craftspeople, and other elites for their (technically nonessential) work, and 3) agriculture allows people to live more sedentary lives, which gives them the ability to accumulate possessions and therefore experiment with technology and crafts.

Diamond finds that agriculture and social complexity reinforce one another, for the reasons he discusses in this passage. As Diamond will discuss at the end of his Epilogue, social science of the kind he practices here can be more challenging than other forms of science precisely because so many of the variables reinforce one another—i.e., they're both dependent and independent.

The state is by far the most successful and efficient form of government for a society of more than a few hundred people. There are at least four reasons why: 1) in a large society, people don't necessarily know each other; therefore the kinship structures used to mitigate conflicts in a tribe or band break down, 2) in a large society, communal decision making becomes impractical—there isn't enough time for everyone in the society to weigh in on what to do, as in a band, 3) in a large society, it's inefficient to trade goods directly with another person, as in a band or tribe. It's more convenient to transfer goods through a centralized authority of some kind, and 4) large groups of people have access to less space per person than do people in bands or tribes. Therefore, they have to depend on other people who may have better access to certain resources. For example, in a band of 20 people roaming around within five square miles, everyone would have essentially the same access to the same resources within that space. With a state of 100,000 people living sedentarily within the same space, certain people would have better access to certain resources, and people would have to trade resources, leading to specialization. In all, large societies cannot function as bands—they work best as kleptocracies (chiefdoms or states).

In this long section, Diamond discuss the different reasons why the state is the ideal form of government for a large group of people. With a small group of people, local forms of organization like family and face-to-face trading can survive. But in a large group with hundreds of thousands of people, there will inevitably be some exchanges and interactions between different families, people from different communities, and people with different jobs and backgrounds. Here, family and direct trade are no longer so efficient or successful—there needs to be a strong, central form of leadership to ensure that trades are fair, people treat each other with respect, etc.—a service for which the leaders are compensated with a tribute or tax. Again Diamond goes back to his original arguments, contrasting denser agricultural societies with smaller groups of hunter-gatherers.

How do small societies actually change into large states? Largely, the process is a matter of natural selection. The most stable, organized bands and tribes survive over the years while the weaker ones (those run with poor leadership or disloyal people) collapse and die out. Moreover, stable, organized bands stand a better chance of defeating other bands, leading to larger and larger societies. In essence, tribes tend to either die out or conquer other tribes and grow. There are also occasions when tribes merge voluntarily—for instance, in 19th century America, Native American tribes merged to form the Cherokee state.

As we've already seen, there is no perfect distinction between a state and a chiefdom, and therefore, no single moment when a society stops being a chiefdom and starts to be a state. However, structures of statecraft tend to emerge as tribes group together, until there are hundreds of thousands of people present in the same society.

Now Diamond raises a question: if people have always fought one another, why didn't bands merge into large tribes *before* 13,000 years ago? The answer has to do with the fate of tribes after they've lost a war. In general, defeated tribes 1) run away to new territory, if population densities are low, 2) are murdered, if population densities are moderate, or 3) are enslaved and put to work, if population densities are high. The three options hold true for most of recorded history. Therefore, it wasn't until the agricultural revolution, when population densities became higher, that tribes began to merge into large states.

Smaller groups of people will tend to merge with one another, either voluntarily or through military conquest. With the rise of the agriculture, it finally became feasible for societies to enslave or assimilate conquered peoples instead of just killing them—thus, by conquering others, societies became much larger and more stratified.

To conclude: "food production, and competition and diffusion between societies" led to vast differences in civilizations' "germs, writing, technology, and centralized political organization."

We've now seen how early differences in agricultural production can lead to large, apparent differences in the size, technological capability, and political organization of a society.

CHAPTER 15: YALI'S PEOPLE

In Menindee, Australia, it's so hot and dry that it seems impossible for humans to survive. Australia as a whole is the hottest, driest, and most "biologically impoverished" continent. And yet aborigines managed to survive there. Indeed, they survived in Australia, finding food and water, developing stone tools, and even creating some of the world's oldest cave paintings, 40,000 years ago (well before almost any other group of humans around the world developed stone tools or painting). When the Europeans explored Australia in the 19th century, they found that the aborigines were still using stone tools and making cave paintings. Why did the aborigines remain "frozen" in the Stone Age, instead of taking advantage of their "head start" over the rest of the world? Furthermore, why did the New Guineans near Australia develop agriculture and elaborate technologies while the aborigines did not?

In the final quarter of the book, Diamond will look at some specific case studies for the process of his theory of geographic determinism. The first example concerns the Australians and New Guineans leading up to the modern era.

To begin with, consider the origins of the aborigines. It's believed that humans came to Australia and New Guinea at least 40,000 years ago by island hopping from Asia. At the time, Australia and New Guinea were probably one large landmass, "Greater Australia." With changes in sea level, Australia and New Guinea separated into two distinct landmasses, with distinct geographies. Australians and New Guineans diverged genetically and physically, reflecting the process of natural selection in response to different environments.

The comparison between the aborigines and the New Guineans is instructive because, much like the Polynesians discussed in Part One of the book, the New Guineans and the aborigines are descended from the same group of nomadic peoples. Therefore, studying these two societies will be an especially clear illustration of how geography (rather than genetics) influences society.

The earliest food production regions of Greater Australia arose in New Guinea about 9,000 years ago. The peoples of New Guinea used farming to domesticate grass stems and sugarcane. New Guineans also acquired foreign exports, including animals like pigs and chickens, from Asia, probably about 4,000 years ago. The agricultural boom in New Guinea fostered a growth in population and population density. A larger, denser population fostered social specialization—for example, ancient New Guinean artisans crafted stunning wooden statues and masks.

The New Guineans have some limited agriculture, domesticated crops and animals, and the societal changes that accompany those innovations (as discussed in Parts Two and Three), including social specialization.

So the contrast between the New Guineans and the aborigines is plain. Nevertheless, the New Guineans had one thing in common with the aborigines: they continued using stone tools even after they developed sophisticated agriculture, had no written language, and never organized into chiefdoms or states. There are several reasons why: 1) New Guineans had domesticated animals, but not big animals like oxen and horses, which could pull plows. Therefore, they had less leisure time and less time for specialization; 2) New Guinea had limited space for population growth; 3) New Guinean agriculture could only flourish within a specific high altitude. Therefore, all agriculturalists produced more or less the same crops; there was no agricultural specialization, no exchange between different communities specializing in different crops, and therefore less need for a chiefdom or state (see previous chapter).

While the New Guineans developed some forms of agriculture, their agriculture was never as extensive as that seen in Mesopotamia. We can measure this in many different senses: there was less space and worse conditions for farmland in New Guinea (i.e., geographic barriers), and there were fewer domesticable animals available. Perhaps this helps explain why New Guinean society developed some of the features associated with agriculture, but not others (writing, a chiefdom, etc.).

New Guinea had limited agriculture—but Australia had none. To begin with, Australia had no domesticable large mammals. It also had no agricultural potential—its soil was dry and infertile. Furthermore, Australia has one of the most irregular climates on the planet—droughts are frequent yet unpredictable. Finally, Australia has a surprisingly small number of domesticable wild plants. So hunter-gatherer culture in Australia—i.e., the culture of the aborigines—was the rational adaptation to life in a region without agricultural potential.

Aborigines in Australia lacked most of the preconditions for agriculture, meaning that they never developed agriculture, or experienced the societal changes associated with agriculture. The point here is that the aborigines' lack of agriculture doesn't prove their lack of talent or intelligence, as racist English colonists later claimed—it just proves that Australia itself wasn't fit for agriculture.

Many of the aborigines lived in the southeast, where the climate was relatively moist. In the rivers in southeast Australia, the aborigines fished for eels and fish. They even harvested millet seeds—a seed that, in China, was an agricultural staple. Without suitable soil in which to plant it, though, the aborigines harvested wild millet and ground it up into meal.

Aborigines adapted to their surroundings, using all available natural resources. In this sense, they're no different than the Mesopotamians—the difference is that the Mesopotamians had different natural resources.

The main reason the aborigines did not develop metal tools, writing, or politically complex societies is that they had no agriculture. There is some evidence of 5,000 year-old arrowheads in Australia—suggesting that the aborigines at one time *did* have complex technologies, but abandoned and forgot about these technologies, a process aided by their isolation from other regions (similar to the way the Japanese "forgot" about guns). Archaeological digs in Tasmania have turned up awls, needles, and other bone tools, which, like the arrowheads, may have been common at one time and later discarded and forgotten.

Aborigines never developed real agriculture, meaning that they never developed states or social specialization. As far as technology is concerned, the aborigines did *develop some sophisticated tools like awls and needles. But because their society was loosely organized, had no writing system, and didn't trade with other societies, the knowledge of this technology was eventually lost. The case of the aborigines, then, seems to prove Diamond's point about how social structure (determined by geography) is a stronger determinant of technological sophistication than the intelligence of individual human beings—clearly, the aborigines were intelligent enough to create new technology; their society just didn't preserve and diffuse their accomplishments.*

Why didn't Australia acquire advanced technologies from Indonesia or New Guinea? Diamond asks. New Guinea was linked to Australia via the Torres Strait, and there is evidence that the New Guineans interacted with the aborigines in some ways: they traded objects like pipes, masks, and painted shells. However, only a small portion of Australia was connected to New Guinea via the Torres Strait, and that portion was isolated from the rest of the continent by desert and mountains. As a result, geography prevented major cultural diffusions from New Guinea from trickling into Australia as a whole.

The geographic barriers between Australia and New Guinea prevented most technology from diffusing in to Australia—and as Diamond has previously argued, diffusion is potentially more useful than individual invention.

In the 1500s, Portuguese explorers "discovered" New Guinea, and over the course of the next 300 years, European colonists explored it. Strangely, the Europeans did not wipe out the indigenous New Guinean population—whereas they largely did so in Australia, and did to some extent in North America and South Africa. Why the difference?

The final difference between the New Guineans and the aborigines that the chapter will explore is their relatively strong resistance to diseases.

One of the biggest factors that kept Europeans from settling in New Guinea until 1880 was disease: the New Guineans spread malaria to the colonists, decimating their populations. On the other hand, European-borne diseases like smallpox did *not* kill large amounts of New Guineans, largely because the New Guineans had already been exposed to smallpox epidemics due to their contact with Indonesians and Southeast Asians. Also, the terrain of New Guinea was rugged and hard to navigate, and familiar European crops didn't grow well in the New Guinean climate. Therefore, Europeans didn't succeed in settling New Guinea for a very long time.

The New Guineans developed some immunities to deadly diseases due to their experiences around domesticated animals. The aborigines, without access to any large mammals or domesticable animals, never developed these immunities, meaning that when European colonists came to their land, European-borne diseases caused large numbers of aborigines to die, not the other way around.

The Europeans settled Australia much more easily than they did New Guinea. The land was much flatter and easier to navigate than New Guinea land, and Australians were not carriers for as many deadly diseases like malaria and yellow fever, which could have slowed the colonists' progress. And even if Australia's soil was infertile for the aborigines, Australia *did* have soil suitable for European crops like wheat and barley. So the Europeans had the incentive to colonize Australia and few biological or geographic barriers to doing so.

The Europeans colonized Australia easily, assuming that the aborigines were somehow sub-human. As Diamond has shown, however, the aborigines had the same intelligence and capabilities as Europeans—they just didn't have access to livestock or crops that could grow in Australia soil. In simplest terms, they were geographically unlucky.

To conclude: all-too often, people have looked at the history of Australia and New Guinea and come to the racist conclusion that white settlers were simply "better" than the native peoples they murdered. But in fact, the Europeans who settled the rest of the world weren't inherently better at all—they just had some crucial geographic advantages that multiplied over time, to the point where the Europeans had advanced technology and the Australians did not.

A thorough examination of the data in New Guinea and Australia proves without a doubt that the racist hypothesis of European superiority is wrong. The New Guineans had access to some agriculture, but not much, the aborigines had none, and the Europeans had a long agricultural history. As a result, the Europeans colonized the aborigines successfully and the New Guineans with limited success.

CHAPTER 16: HOW CHINA BECAME CHINESE

China is often considered one of the most politically, culturally, and linguistically monolithic countries in the world. Since 221 B.C., China has been united under one government. Also, the vast majority of Chinese people speak Mandarin, and most of those who do not speak one of a relatively small number of other languages (6 or 7) that are closely related to Mandarin. But how, exactly, did China become "Chinese"—or rather, how did China *stay* Chinese for so many centuries?

In this chapter, Diamond will apply the theory of geographic determinism to Chinese history in an attempt to explain one of the biggest anomalies in history—how China has remained so linguistically, culturally, and politically similar over the course of the last 2,000 years (while so many other countries have gone through revolutions and paradigm shifts in the same amount of time).

China's culturally monolithic nature is especially surprising because of the geographic differences in the country. Northern China's climate is much drier and colder than Southern China's—if environment is such an important determinant of culture, why is China *China*, instead of half a dozen different states, each with a different culture and language?

The first step in trying to explain Chinese history is to study Chinese geography. Yet the diversity of Chinese geography (particularly in its longitude) seemingly supports the existence of many small, culturally diverse states—why, then, the existence of one powerful state?

Let's look at the Chinese language more closely. There are eight "big" languages spoken in China, all closely related to Mandarin. But there are also hundreds of "little languages," spoken by thousands, or tens of thousands, of people. Many of these languages are structurally linked to languages more commonly spoken in modern-day Thailand, or Cambodia, or Laos, or Myanmar. Further linguistic history indicates that the earliest speakers of Mandarin Chinese lived in Northern and Southern China. Often, a new language "replaces" another in a region because the new language is spoken by powerful warriors or colonists. In this case, the colonists drive out many of their enemies into other regions, spreading the defeated groups' languages. So really, the question is, what allowed the Mandarin-speaking Chinese peoples to drive many other ethnicities into surrounding Southeast Asia, thereby uniting all of China under one authority?

By tracing the history of languages in China, one can begin to understand the patterns of cultural diffusion between the different regions of the country. If two regions of China share some of the same languages (or at least words), then it's likely that the two regions interacted with one another at some point in the past. In the case of China, however, one can draw further conclusions. The resemblances between "little languages" in China and major languages in Cambodia and Thailand suggest that the populations of many Southeast Asian countries are descended from peoples who were driven out of their homeland by the ethnic Chinese.

In ancient times, ethnic Chinese people living in both Northern and Southern China were hunter-gatherers. But the ethnic Chinese were some of the earliest peoples to experiment with agriculture and domesticated animals. Rice and millet grew easily throughout China, thanks to the temperate climate, and there were many large mammals to be domesticated. In the manner Diamond has discussed earlier on, China's access to large mammals and agriculture led to the discovery of metallurgy and other sophisticated technologies, as well as rigorous social hierarchies. Unusually, though, China may have been the site of independent agricultural centers in both the north and the south.

In this brief section, we're offered a simplified overview of Chinese history, beginning with the discovery of agriculture and leading up to the development of metallurgy and complex technologies. Diamond has already explained the basic principles of such a historical process in Part Two, so he doesn't go into tremendous detail about that process here. However, it is important to note that the Northern and Southern Chinese may have developed agriculture independently, due to the climate and the availability of crops.

How did the different parts of China interact with one another? Chinese people in both the north and the south had access to agriculture. Thanks to China's unique network of large rivers, they could also travel north and south fairly easily—far more easily than could peoples in the Americans or Africa. As a result, many technologies diffused throughout China, including rice cultivation, writing, and ironwork. Most of these technologies diffused from north to south (writing, for example), but a few diffused from south to north (smelting). The result was that the ethnic Chinese were culturally and politically unified from north to south.

The rivers connecting between north and south China are anomalous because they seem to represent an exception to Diamond's rule that diffusion is easier from east to west than from north to south. In spite of some climate differences between the north and the south, rivers connected most of China, explaining why many technologies spread throughout the Chinese region. Notably, Diamond does not *fully explain why technology diffused mostly from north to south, or why the Northern Chinese seemed to develop more important technologies than the Southern Chinese.*

The formation of a Chinese dynasty began in 221 B.C. in Northern China. Chinese states in the north, with their powerful weaponry and sophisticated agriculture, united with the ethnic Chinese in the south. One reason for the unification of China under one state was cultural: the Chinese peoples in the north and the south shared many of the same technologies, thanks to cultural diffusion in the preceding centuries.

Notice that Diamond doesn't offer an explanation for why the Northern Chinese took control over all of China, instead of the Southern Chinese (who also had agriculture and complex technology). Critics have pointed out that Diamond is better at explaining why agricultural societies triumphed over non-agricultural societies than he is at explaining why some agricultural societies triumphed over others.

The unified ethnic Chinese drove out non-ethnic Chinese peoples living in China, and eradicated non-ethnic Chinese culture, which they regarded as "barbaric." For instance, many early Chinese emperors burned books in non-Chinese languages, making the culture of the newly united China increasingly monolithic. In spite of the geographic differences between the different regions of China, one important geographic feature—the presence of easily navigable rivers—allowed the ethnic Chinese in the north and south to unify, use their superior technology and organization expel other cultures, and make Chinese culture unusually monolithic.

Just as the Northern and Southern Chinese united because of their similar cultures and their long history of exchanging crops and technologies, the other peoples of China were either driven out or culturally eradicated. While Diamond doesn't fully address why state formation began in Northern Chinese agricultural centers instead of Southern China agricultural centers, he does show why agricultural centers of China were able to force many hunter-gatherer cultures out of China.

CHAPTER 17: SPEEDBOAT TO POLYNESIA

In New Guinea, ethnic tensions remain high. Javans, highlanders (people from the center of New Guinea), lowlanders (coastal people), and Chinese make up sizeable chunks of the population, and each group has strong stereotypes about the other three (the highlanders are supposedly arrogant and violent, the lowlanders are effete and weak, etc.).

In contrast to the high degree of ethnic and cultural unity in China, New Guinea exhibits a large amount of diversity, with different ethnicities and cultures shown to be hostile to one another, as evidenced by the popularity of insulting stereotypes about different ethnic groups.

About 6,000 years ago, there was a demographic shift called the Austronesia expansion. ("Austronesia" refers to an area encompassing Taiwan, the Philippines, Indonesia, and many of the Pacific Islands). Ancient peoples in China and Southeast Asia migrated farther south to explore the islands of present-day Java, New Guinea, and Indonesia. Why, we should ask, did Asians colonize indigenous Javans and New Guineans instead of the other way around?

The chapter will attempt to answer the question laid out here: what enabled Southeast Asians to expand into Austronesia?

It's important to note that the populations of Indonesia and the Philippines look a lot like the South Chinese, far more than they resemble the indigenous peoples of Australia or New Guinea. Also, archaeologists have uncovered evidence in various Austronesian areas that suggests that, until 4000 B.C., the indigenous Austronesian peoples were hunter-gatherers. Archeological evidence indicates that the earliest agriculture in Austronesia came from Taiwan. There is further evidence that agriculturalists in Taiwan spread throughout Austronesia, bringing relics of Taiwanese agriculture with them: agricultural techniques, but also domesticated animals, pottery, etc. The Austronesian explorers of 6,000 years ago, it's hypothesized, traveled through Austronesian islands using small boats and canoes. So the present-day Austronesians (people in Java or New Guinea, for example) are probably descendants of agriculturalists who spread through Austronesia 6,000 years ago.

This section proposes an answer to the question the Diamond has just posed: the peoples of Southeast Asia expanded into Austronesia because of their knowledge of agriculture. Agriculture, for reasons we've already studied, encouraged the Southeast Asians to organize and discover new technologies, such as maritime transportation, which they used to colonize Austronesia. There is plentiful evidence for such a hypothesis, since the same crops, pottery, and domesticated animals can be found in Austronesia and Southeast Asia.

By studying languages, linguists have been able to hypothesize which "cultural baggage" the Austronesians spread. By analyzing similarities between the same words in many languages, one can guess that the people that speak such languages were connected through cultural diffusion. For example, the fact that the word for "sheep" in Spanish, Russian, Greek, and Lithuanian is remarkably similar would suggest that the ancient peoples of these cultures traded sheep with one another. By studying the similarities between ancient Polynesian languages and ancient Taiwanese languages, linguists have hypothesized that agriculturalists spread their crops and technologies through Austronesia from Taiwan, established agriculture throughout Polynesia and other Pacific islands, and added tropical crops to their "agricultural repertoire" along the way.

As in the previous chapter, one can study the demographic history of Austronesia by studying linguistic patterns. Thus, when linguists study the grammars and vocabularies of ancient Southeast Asian languages and compare them with those of ancient Austronesian languages, they find many similarities. This would suggest that Southeast Asian agriculturalists spread through Austronesia and spread their "cultural baggage" with them—not just agriculture and technology, but also the language they used to describe their agriculture and technology.

Southeast Asian agriculturalists expanded from Taiwan into the Philippines and Indonesia. By about 1500 B.C., these agriculturalists reached New Guinea. Yet they did not "overrun" New Guinea, as they'd done in Borneo, Java, and Sumatra—to this day, the New Guineans are noticeably physically different from the Javans, reflecting the differences in the two islands' relationships with ancient agricultural colonists. The modern-day New Guinean population speaks languages not found in Java and Sumatra—languages that aren't closely tied to ancient Austronesian languages. Why?

The cultural and linguistic differences between New Guinea and Java help to clarify the chapter's argument and give it some nuance: the geographic and therefore agricultural differences between New Guinea and Java (as discussed in Chapter 15) will underscore the importance of agriculture in the process of cultural diffusion throughout Austronesia.

Diamond hypothesizes that the fact that the New Guineans already had established some agriculture meant that the Austronesians couldn't colonize the New Guineans as completely as they did the people of Java or Borneo. The New Guineans already used polished stone tools, and were resistant to tropical diseases like malaria. So the Austronesian expansion destroyed much of the native population of Java but reached a standstill in New Guinea.

Much as New Guineans' advances in agriculture protected them from European colonization in the modern era, earlier advances in agriculture insulated the New Guineans from the ancient Austronesian expansion.

Over the course of history, certain civilizations based out of temperate climates that favor agriculture develop the technology and organization that allows them to expand and colonize other parts of the world. Notably, the parts of the world that ancient Southeast Asian societies (and modern European societies) were slow, or unsuccessful, in colonizing, such as Hawaii, Caledonia, and New Guinea, had tropical diseases, some forms of agriculture, or both. To this day, "East Asia and the Pacific Islands remain occupied by East Asian and Pacific peoples," rather than European colonists.

The differences in the colonization of different Austronesian islands clarify the importance of agriculture in a society's ability to colonize other regions. Agriculture is a huge advantage for colonists because it gives them a vast "arsenal" of technology, organization, and germs. Therefore, it makes sense that the Austronesian islands where colonization largely failed had their own forms of agriculture.

CHAPTER 18: HEMISPHERES COLLIDING

Diamond now returns to discussing the clash between Europe and the New World that began after 1492 A.D. In that year, the Western European civilization that sent Christopher Columbus to the New World was markedly different from the Native American societies that Columbus encountered in the New World.

Diamond has spent a lot of time talking about the cultural clash between Europe and the New World after 1492 A.D.—in this chapter, we'll see why the New World didn't develop more sophisticated technology or societal centralization in the pre-Columbian era.

To begin with, Native American societies lacked domesticated large mammals, with the notable exception of the llama in present-day Peru. As a result, Columbus and Pizarro's expeditions weren't wiped out by Native American diseases; on the contrary, European-borne diseases like smallpox decimated the Native Americans.

The absence of large domesticable mammals prevented Native American societies from building up genetic defenses against germs, meaning that European settlement (and with it, the spread of disease) proved lethal for them.

Secondly, agriculture wasn't as common in the New World as it was in Western Europe, due in large part to the geography of the New World. The majority of Native Americans were hunter-gatherers because of the absence of reliable sources of grain, fertile soil, and various geological barriers (like mountains and deserts) that kept agricultural advances from diffusing. As a result, Europe had a big advantage over the New World in specialization of society, centralization of government, development of writing, and the discovery of new technology (metallurgy, the wheel, armor, guns, sails, etc.)—all major factors that led European explorers to journey to the New World.

As we've seen in earlier chapters, agriculture leads a society to develop specialized professions, complex technologies, and centralized states. But agriculture can never take hold in a society without the proper geographic prerequisites—prerequisites that were almost nowhere to be found in the New World. To the extent that there was *agriculture in the New World (and there was in Mesoamerica, for example), it remained local instead of diffusing—again, due to geographic barriers, rather than any conscious choice on the part of the Native American people.*

Archaeological evidence indicates that Eurasia enjoyed an advantage over the New World in achieving many of the milestones of civilization. In Eurasia, civilizations mastered plant and animal domestication, metallurgy, the foundation of a centralized state, and writing before civilizations in the New World. In Eurasia, the civilizations that mastered such processes earliest were based out of the Fertile Crescent; in Native America, they were based out of the Andes. Diamond acknowledges that there is a lot of conflicted archaeological evidence, and he's simplifying it greatly; nevertheless, the bulk of the archaeological evidence would support his conclusions.

Without going into many specifics, it seems clear from the archaeological evidence that the societies of Europe had tremendous advantages over those of the New World: access to horses, metallurgical knowledge, centralized state systems, etc.

In the New World, the diffusion of agriculture, technology, and writing was delayed by a number of geographic factors, including mountains, deserts, and oceans. For example, the llamas that were domesticated in Peru couldn't have reached Mexico—that would have involved llamas traveling north hundreds of miles through dangerous deserts. In Eurasia, there were relatively few barriers to diffusion. Eurasia is longest from east to west, whereas the New World is longest from north to south—therefore, by definition, there were a greater number of people living in Eurasia who shared a similar climate.

The east-west orientation of Eurasia helped to ensure that once a technology was discovered somewhere in the continent, it diffused to other parts of the continent relatively quickly. The north-south orientation of the New World, however, helped ensure that when the same *technology arose, it usually remained isolated. For example, domesticated mammals were transported from Mesopotamia to Europe, but not from Peru to Mexico—the former involved latitudinal diffusion, while the latter involved longitudinal diffusion, which is often far more difficult.*

Eurasia's first large-scale attempt to colonize the New World occurred between the 10th and 15th centuries, and was spearheaded by the Vikings. Norse peoples journeyed to Newfoundland and Greenland, though they failed to travel farther west or south. The colonies the Norse established in these territories remain mysterious—they died off at some point before the 15th century, probably because Newfoundland and Greenland were too cold and desolate to support agriculture.

The chapter hypothesizes that the Europeans didn't colonize the New World even sooner (i.e., during the 10th century) because the areas of the New World they did *colonize were too geographically desolate to support full-scale agriculture—again reinforcing the influence of agriculture and environment on colonization.*

Eurasia's second large-scale attempt to colonize the New World occurred after 1492 A.D.—a time that allowed Europe's "potential advantages to be exerted effectively." The expeditions to the New World spread germs that killed off huge numbers of Native Americans. Since 1492, there has been a massive demographic shift in the population of the Americas—there remains only about a tenth of the Native American population that existed before 1492 (although the total population of the New World has grown considerably). For the environmental reasons Diamond has laid out, the massive demographic shift post-1492 "has its ultimate roots in developments between 11,000 B.C. and A.D. 1."

When European societies explored the New World after 1492 A.D., they were able to use their advantages (both consciously, in the case of guns and swords, and unconsciously, in the case of germs) to defeat the Native Americans. Their victory, following the argument outlined in Guns, Germs, and Steel, *is the result of geographic factors that led European societies to pursue agriculture sooner than New World societies.*

CHAPTER 19: HOW AFRICA BECAME BLACK

Africa is, in many different senses, the most diverse continent on the planet. A quarter of all the world's languages are spoken only in Africa. Also, Africa harbors "five of the world's six major divisions of humanity"—a concept that Diamond will explain throughout the rest of the chapter.

The diversity of life in Africa makes it a difficult continent to study from a historical perspective—again Diamond simplifies many different racial and ethnic groups into only a handful of "divisions."

The five "human groups," or races, found in Africa are: blacks, whites, African Pygmies, Khoisan, and Asians. It can be problematic to lump together so many different kinds of people together as one race—for example, it seems insufficient simply to call Zulus, Somalis, and Ibos "black," considering the great physical and cultural differences between these peoples. While racial categories are somewhat arbitrary, Diamond uses the five races as a useful way of grouping people throughout human history.

The chapter proposes breaking up Homo sapiens *into five different categories found in Africa. Diamond isn't arguing that these categories are "real," in the sense that they have any genetic or scientific basis in fact. Nevertheless, the categories are conceptually useful since, throughout African history, people organized themselves based on similar racial categories. Diamond's use of arbitrary yet useful categories recalls his 4-part analysis of government in Chapter 14.*

Diamond offers some physical definitions of the five races he'll discuss. Blacks and whites "are familiar to Americans and Europeans and need no physical description." Before 1492, blacks lived most in sub-Saharan Africa. Whites, as Diamond defines them, encompass people from North Africa with lighter skin and straighter hair. Pygmies and Khoisan largely hail from the sub-Saharan region. Pygmies are physically characterized by their small size, dark skin, and large eyes and foreheads. Khoisan are physically characterized by yellowish skin and tightly coiled hair. Most of the Khoisan were wiped out by disease or colonialist massacres before the beginning of the 20th century. The final racial group Diamond will discuss is Asian. The island of Madagascar is populated largely by the descendants of Southeast Asians—Austronesians. It's truly anomalous, Diamond says, that the descendants of Austronesians (i.e., people who live in Borneo, the Philippines, or Polynesia) have lived in Madagascar for thousands of years.

The passage analyzes the different racial groups found in Africa, reinforcing Africa's tremendous cultural diversity. Furthermore, the passage reinforces the importance of colonialism in African history—tragically, many of Africa's racial groups were attacked or wiped out by European colonists. Finally, the passage mentions the Austronesian expansion of 6,000 years ago, as discussed in the previous chapter. The mention of Austronesians both underscores how ambitious ancient Asian agriculturalists were in exploring the Indian Ocean and also shows how the different case studies in Part Four overlap.

By studying the languages spoken throughout Africa, linguists have come to a few surprising conclusions. Contrary to popular belief, Western culture did *not* originate primarily in the Near East and was not diffused to Europe through Biblical, Semitic languages. In actuality, Semitic languages originated in Africa, meaning that the Near Eastern Semitic tribes mentioned in the Bible were only a small branch of the Semitic groups in North Africa.

Archaeological and linguistic evidence refutes the common belief that Western culture is most directly related to Middle Eastern culture—a belief emphasized by the predominance of Middle Eastern culture in the Bible (one of the cornerstones of Western society). In reality, Western culture owes a far more direct debt to North African language and culture, as indicated by the African origins of Semitic culture.

Another surprising conclusion that linguists have brought up in studying language in Africa is that ancient African peoples who spoke the precursors of Bantu (a language, or, arguably, family of languages, still spoken in Africa) were more like to "engulf" their Khoisan and Pygmy neighbors than the other way around. (When Diamond uses the word "engulf," he means conquer, wipe out, unify with, or displace—anything that involves one culture gaining supremacy over another). The bulk of the black peoples in Africa are descended from ancient Bantu speakers who lived in North Africa. So why did the Bantu peoples engulf their neighbors, instead of the other way around?

This passage is important for two main reasons. First, it proposes a neutral word, "engulf," to describe how one culture comes to dominate another, whether peacefully or militarily. The word "engulf" is characteristic of the book's scientific, unbiased style—a stronger word like "massacre," while often accurate, might be too emotionally evocative (and sometimes incorrect) for the book's tone. Second, the passage establishes the central question of the chapter: what advantages did the ancient Bantu have over other African peoples, and how did they use these advantages to "engulf" their neighbors?

To answer this question, Diamond considers the different crops growing in Africa before the Europeans colonized sub-Saharan Africa in the 1400s. Every major crop grown in Africa at that time (bananas, millet, taro, yams) originated north of the equator. Similarly, the single animal species that we know was first domesticated in Africa before the 1400s was the guinea fowl, a small bird. There were some domesticated mammals in Africa before the 1400s, but these had all been imported from other regions—sheep, goats, chickens, horses, camels, etc. In general, Africa's food sources originated far away from Africa.

African agriculture (both domesticated crops and domesticated animals) has long been dependent on imports from other parts of the world. This important fact reinforces 1) the centrality of geography and climate in determining the development of a society over time, and 2) the importance of diffusion in human history—to the extent that African societies did develop agriculture, they often did so because of their interactions with neighboring societies.

The final step in solving the riddle of the Bantu involves some archaeology. It's a common misconception that African agriculture began in Egypt. In fact, as early as 9000 B.C., Africans were farming in the Sahara desert, which, at the time, was lush and full of flora and fauna. Archaeological evidence indicates that agriculturalists in the Sahara 11,000 years ago spoke four languages that are ancestral to modern African languages.

The passage establishes an important fact—there were agriculturalists in what would one day become the Sahara desert—but does not explain why this fact is so important. Diamond will return to Bantu history after a brief discussion of Madagascar.

Before tracing the relationship between the Bantu and the Khoisan any farther, let's look at the history of Madagascar. How could Austronesians travel all the way there? An ancient merchant text written in Egypt in 100 A.D. describes an enormous sea trade between India and Egypt. After the rise of Islam, the Indian Ocean trading network became one of the largest in the world. It's possible (though still unproven) that Austronesian colonists traveled to Madagascar along the Indian Ocean trading network, bringing with them artifacts of their Southeast Asian culture.

The passage hypothesizes that the Indian Ocean trading network allowed colonists from Austronesia to travel to Madagascar, underscoring the importance of trade and diffusion in human history. Asian societies were able to travel all the way to sub-Saharan Africa because of the strong economic incentive for trade in the societies between *Asia and Africa.*

The Bantu expansion was one of the largest demographic shifts in African history. Prior to the Bantu expansion the majority of Africans were probably not black peoples. After 1000 B.C., though, Bantu peoples, having mastered agriculture, grew to such large numbers that they expanded southeast, to East Africa's Rift Valley. There, the Bantu developed new farming techniques to incorporate new crops like millet into their agriculture. They also may have discovered iron metallurgy, giving them an unbeatable "military industrial package."

The Bantu expansion was predicated on the existence of a military industrial package, and therefore on agriculture and social centralization. Bantu societies enjoyed greater access to agriculture than their neighbors further south because of their region's climate. Thus, the history of the Bantu expansion is another confirmation of the importance of geography in history.

In the ensuing Bantu expansion, the Khoisan and Pygmy peoples of Africa were either massacred or forced out of their homes. It's not clear what role diseases played in the disappearance of the Khoisan populations, but it's certainly possible that malaria—to which the Bantu, but not the Khoisan were probably resistant—killed large numbers of Khoisan. It's important to notice that the Khoisan weren't annihilated; there are still Khoisan regions in southern Africa. Significantly, these regions are unsuitable for farming—the Bantu couldn't expand any farther south and continue their agricultural lifestyle.

The Bantu succeeded in driving out the Khoisan (or massacring them) because of their superior technology (including iron weapons) and possibly their immunities to certain deadly diseases—both advantages predicted upon the existence of consistent agriculture. Furthermore, the fact that the Bantu didn't continue expanding to the south (where agriculture was more difficult) suggests that agriculture was crucial to Bantu society.

Another important question: why did the Europeans colonize sub-Saharan Africa, rather than the sub-Saharan Africans colonizing Europe? Europeans had some major advantages over the sub-Saharan Africans—they had access to military technology, immunity to diseases, widespread literacy, centralized government—all factors that enabled them to explore the world and conquer the world's peoples. Europe developed these advantages rather than the sub-Saharan Africans for a variety of reasons. 1) Europeans had access to domesticable animals, whereas sub-Saharan Africans did not. 2) Europeans had access to a greater variety of domesticable plants, meaning that they developed agriculture sooner than the sub-Saharan Africans. 3) Europe shares latitude with many other centralized societies, meaning that it was able to acquire important technologies and innovations from its neighbors. Sub-Saharan Africans had no neighbors to the east or west (just water), and were barred from communicating with North Africa by the Sahara Desert.

In this passage, Diamond goes through the various factors that enable agriculture-based societies to colonize non-agricultural societies: immunities to diseases, written language, state centralization, specialized professions, technology, etc. Sub-Saharan African societies did badly in the geographic lottery, ensuring that they never developed the societal advantages that many European societies enjoyed.

In conclusion, Europe's colonization of Africa—which has been used by racists and bigots as proof that the Europeans are superior to the other races—actually had nothing to do with racial superiority. Due to a series of geographic coincidences, the Europeans became stronger and more mobile than the Africans, going off on their own "historical trajectory."

The chapter ends with a strong reminder of why Diamond claims he was inspired to write Guns, Germs, and Steel *in the first place: he wanted to correct, once and for all, the racist beliefs that have led people to conclude that Europeans are innately superior to Africans or Native Americans. There was, in fact, no innate superiority that led Europeans to "engulf" other cultures—just a complex combination of external factors.*

EPILOGUE: THE FUTURE OF HUMAN HISTORY AS SCIENCE

Diamond now returns to the **question** Yali asked (the question brought up at the beginning of the book): "Why is it that you white people developed so much cargo … but we black people had little cargo of our own?" the answer to Yali's question is this: "The differences between the long-term histories of peoples of the different continents have been due not to innate differences in the peoples themselves but to differences in their environments."

Diamond has now come full circle: after many chapters of intense analysis, we're now in a position to answer Yali's question. The book's answer emphasizes geographic differences between regions of the planet, emphatically not *innate differences in talent or intelligence between races.*

In particular, there are four underlying environment factors that determine the course of human history: 1) availability of wild plants and animals for domestication, 2) barriers to diffusion and migration within a continent, 3) barriers to diffusion and migration between continents, and 4) population size and density. Factor 1 is especially critical in determining a society's nutritional intake and health, its immunity to disease, and its amount of social specialization. Factors 2 and 3 are especially important in determining a society's "stockpile" of technology, including a written alphabet. Finally, Factor 4 is important in determining a society's level of political centralization, as well as its immunity to disease.

The four factors Diamond discusses here are geographic in nature, although factor 4, population size, is itself subject to the influences of factors 1, 2, and 3, as Diamond discusses in Chapter 14. Put together, the four factors play a large part in determining a society's technology, organization, and immunity to disease—in short, its capacity to colonize and "engulf" other societies.

There are some notable caveats to Diamond's conclusions. Most basically, Diamond's book is too short to account for *all* of human history—it's simply not possible for any one book to talk about 13,000 years of history.

Diamond has taken some criticism from academics who feel that his knowledge of his subject matter is sometimes superficial. But, to state the obvious, Guns, Germs, and Steel *isn't long enough to address all the (potentially infinite) data. While Diamond focused on a few notable cases of geographic determinism in Part Four, there are many others he has no time to address.*

Another important caveat to Diamond's conclusions is the supremacy of Europe over China and the Fertile Crescent. Why, exactly, did Europe overtake China and the Middle East as a world leader, given that all three regions had comparable advantages in the four geographic factors Diamond lists above? Specifically, why was it Europe, not China or the Middle East, that developed mercantile and capitalist economies, which allowed for world exploration and technological research?

One common criticism of Diamond's book is that, while he shows how agricultural societies have an advantage over hunter-gatherer societies, he doesn't show fully why some agricultural societies triumph over others. As he admits here, he hadn't shown fully why Europe overtook China and Mesopotamia in the early modern era.

A partial answer to this **question** is that the Fertile Crescent lost its geographic advantages over time. As it entered the modern era, Mesopotamia became drier, the soil became less fertile, and the region as a whole ceased to be a major producer of food. Most of northern and western Europe has continued to produce crops and livestock for thousands of years.

Diamond doesn't have time to answer the question he's just posed in full detail—however, the change in climate in the Middle East, which paralleled the Middle East's decline in global power, would suggest that geographic factors can explain why Europe overtook the Middle East after 1492.

Why was it Europe, not China, that became a world leader in the late 15th century? One would think that China's huge technological innovations (the compass, printing, gunpowder) and sophisticated navy would have made its global influence and domination inevitable. Yet China mostly gave up its maritime expeditions in the middle of the 15th century. China was a politically unified country at the time; the dynastic powers ruled that China would no longer explore the rest of the world with its ships. Because of the stability of Chinese society, one dynastic decision determined the course of Chinese foreign policy for the next 400 years, thereby allowing Europe to seize power in the New World without any Chinese competition.

Often, historians have pointed to a single, unusually straightforward reason for China's failure to overtake Europe in the early modern era: the dynastic powers mandated that there would be no more maritime exploration. Diamond's challenge is to show the geographic factors underlying this decision. He begins by arguing for the political unification of China that led one political decision to carry such weight for so long—a phenomenon that he already explained largely in geographic terms in Chapter 16.

In Europe, there was much less political unification than in China. One reason for this is that Europe itself is a more geographically fragmented region than China. China is one solid landmass with long rivers and a relatively few islands; Europe has large islands, mountains, and small rivers that don't connect together the entire continent. So it's possible that China, because of its geographic unity, became more politically unified than Europe. As a result, there were power squabbles in Europe, resulting in death and destruction, but also more competition between nation-states. Competition inspired Western European nation-states to invest large sums in exploring the New World—the states were worried that their rivals would overtake them. This analysis, perhaps, begins to explain why Europe, not China or the Fertile Crescent, came to dominate world exploration after the 15th century.

Diamond acknowledges that it would take an entire other book to explain why Europe overtook China after 1492 A.D. But he suggests that China's geographic unity—that is, its network of unusually long rivers connecting together different regions of the country—allowed for unusually strong political unification, which in turn allowed one dynasty's decision to forego maritime exploration to influence Chinese development for hundreds of years.

Another important caveat to Diamond's argument is the role of culture in history. By and large, the book avoids talking about cultural differences between different peoples of the world, preferring to frame its conclusions in terms of geography. Yet there are undeniable differences between different cultures, which may be the product of environmental factors. This is an important topic, but beyond the scope of Diamond's book.

Diamond does not deny that there are major differences between cultures—that is, major differences between different societies' values and behaviors. Diamond believes, however, that geographic causes explain many of these cultural differences—differences which, he admits, have been important to history. But, as with many of the questions raised in the Epilogue, culture will have to be a subject for another book.

Similarly, Diamond's conclusions don't account for individual people. Sometimes, a single, unpredictable person, like Lee Harvey Oswald (who assassinated President John F. Kennedy) can change the course of human history; Oswald's actions (or the actions of any other single, historically important person) don't seem reducible to geographic causes. Diamond concludes, "it remains an open question how wide and lasting the effects of idiosyncratic individuals on history really are."

Diamond has deliberately avoided discussions of influential individuals, because such discussions might imply that historical changes largely result from individual people's talent and intelligence—a hypothesis that Diamond has tried to replace with the theory of geographic determinism. Diamond doesn't deny that individual people can be important to history; nevertheless, he maintains that geography plays a far greater historical role.

During the book, Diamond has aimed for a scientific approach to the study of history, while respecting the basic differences between science and history. Science is a study of causes and effects; using experiments, scientists aim to isolate which causes are linked to certain effects. In history, it's often difficult to isolate the causes of historical events—there's no "experiment" that historians can use to identify an independent variable's effect on a dependent variable. Nevertheless, there are certain approaches that historians can take to studying their data that make their approach more scientific. For example, historians can compare civilizations that are environmentally similar, thereby doing a better job of isolating the relationship between causes and effects. (Diamond has spent most of his book trying to isolate the various causes of differences between civilizations.) In general, history is a complex field—in a way, much more complex than any of the sciences, because there are so many different causes to analyze. Nevertheless, it's important to study history scientifically so that we can understand how the modern world came to be the way it is.

Diamond contrasts the scientific approach to history with the more traditional, humanities-based approach. Essentially, Diamond defines "scientific" as the strategy of trying to isolate independent and dependent variables; that is, trying to determine the precise causes of different phenomena. It is extremely difficult to bring a scientific approach to history, because, unlike in most scientific fields, it's almost impossible to perform an experiment (there's no way to artificially isolate a historical event's causes, and everything being studied has already occurred). Because of the difficulty of the scientific approach, many historians have abandoned scientific methods altogether, but Diamond argues that it's still worthwhile to study history scientifically. He's attempted to show how certain specific causes, such as latitude, climate, presence of large mammals, etc., cause specific societal effects, such as immunity to disease and presence of complex technology.

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