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The biology of history

Jim Penman

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Forward

This is one of two companion books to *Birth-Rate Crisis*, aimed at readers who would like a deeper understanding of biohistory. My other book, *Lemming Cycles*, is also available as a free download from biohistory.org.

Readers of my previous books on biohistory will find a great deal that is familiar. However, there have been a number of significant changes, as a result of experiments and further research, that justify a new edition. As we continue researching, experimenting, and learning, we will update this book with the goal of a more final version being made available in 2027. To see updates and new findings that'll be in that version of the book, follow this website: https://biohistory.org/updates/.

Jim Penman, Melbourne 2026

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Finally, thanks to my editor, Andrea Pearson, who has done so much to make this book accessible to readers.

Introduction

"*The simplest explanation … is usually the best one*." — Occam's Razor (modern formulation)

My road to the ideas in this book began at the age of 14 when a friend gave me a copy of Thucydides' *The Peloponnesian War*.

Thucydides was an Athenian general who lived in the fifth century BCE. He took part in the early stages of the great war between Athens and Sparta—the Peloponnesian War (431–404 BCE)—but was exiled from Athens after a military failure. His exile gave him opportunities to observe the conflict from outside Athens and to devote himself to writing his great history of the war.[1]

In Thucydides' day, Athens contained an extraordinary collection of men of genius. Athenians, and outsiders drawn to the city, took giant strides in such areas as philosophy, architecture, drama, sculpture, science, political thought and, of course, history. And yet, within a few decades of his death, his city came under the heel of Macedon. It continued as an intellectual center, but never again achieved the same power and success.[2]

Thucydides loved his city but was fully aware of its faults, and his account was indescribably moving. From that moment I began to ask the question "why?" Why did Athens fall from such brilliance to defeat and relative insignificance?

I began asking other questions. Why, later, did the Roman Empire also collapse? Why did Chinese dynasties so regularly dissolve into anarchy? Why are powerful and wealthy civilizations so often overrun by crude barbarians?

So, as a nerdy and introverted teenager, I began searching for answers. None of those I found made sense. They seemed to focus mainly on institutional changes or the decisions of leaders. But how could imperial policy cause people to have fewer children, or to refuse to join the army, or to abandon the use of money?

Government made heroic efforts to reverse these changes, such as the attempt by Emperor Augustus to increase the birth rate of Roman elites.[3] But these efforts were futile, as similar attempts have proved futile in our own day. It seemed that *people* were changing, but I did not know how or why.

And the collapse of Rome showed disturbing parallels with current events in the West, such as concerns about declines in sexual morality and rising divorce during the late Republic.[4] Could we be travelling down the same route as ancient Rome? And if so, why?

It must also be remembered that in the 1960s, more than fifty years ago, the trends were less clear than today. Birth rates were falling but still above replacement level. Divorce was much less common, and many people still valued traditional standards of sexual morality.[5] Today, most

people are far more likely to approve of sex before marriage, countries have fertility rates well below replacement,[6] and marriage rates have plummeted.[7]

At university I began to read widely over the whole range of human history, looking for patterns of behavior linked to demographic changes, and especially to population decline. One clear finding was that the decline of Greece and Rome coincided with increased sexual freedom. This led me to the study of different cultures today, and then, finally, to studies of animal behavior.

I noticed that some species, such as the gibbons of Southeast Asia, had mating patterns similar to those of traditional human societies, with gibbons establishing durable pair bonds and territories. Others, such as baboons, started sexual relations early and with a variety of partners. The pair bonding behavior occurred in environments where food was scattered and limited, and the promiscuous behavior with food being normally abundant.[8]

The family patterns of large-scale societies, including Greece and Rome at their peak, seemed oddly similar to those of animals with limited food. And when these ancient societies were in decline, they acted more like animals with plentiful food.

Could the key to history be found not in economics or politics but *biology*?

All of this was not a good move, career-wise. I had been warned, more than once, that the key to a career in history was to become a specialist in one small field. Now my field had become so broad that it covered not only all of history but anthropology, psychology, and economics. And now I wasn't even prepared to stick to humans. Any academic position was out of the question.

But this was not the only problem. A research program that delved into neuroscience and genetics would require a great deal of money. At the time, I was flat broke and deeply in debt.

To achieve my goals, I set about turning my part-time student lawn-mowing business into what has become the Southern Hemisphere's largest franchise network, with five and a half thousand franchisees in three countries. That struggle is outlined in my book 'No Other Success'. But I never gave up my aim, and continued to research and write in odd days snatched from the business.

Finally, in early 2007, I approached Dr. Tony Paolini in the Psychology Department at La Trobe University, Melbourne, who had expertise in areas relevant to the theory. I offered funding to do some very specific experiments, mostly involving mild food restriction in rats.

The results confirmed certain aspects of the theory while also helping to develop it further. These findings, together with recent breakthroughs in the field of epigenetics, provided a biological explanation for the historical and demographic patterns observed.

The work continued at RMIT University and then transferred to a dedicated research company, Epigenes, which is currently conducting a major research program into the physiology and

epigenetics of food restriction at La Trobe University and in China. The results have already reshaped key aspects of the theory and will continue to refine it as new evidence emerges.

The current research program is detailed in the final chapter. Updates, based on the latest research findings, will be made available at www.biohistory.org/updates.

But what is biohistory?

History as a Science: Simplest Is Best

Biohistory suggests that the study of history, and of human society in general, should be treated as a science. One of the first principles of science is that, other things being equal, we prefer the simplest theory to explain the observable data. This is Occam's Razor, cited at the beginning of this chapter. William of Occam was a fourteenth century English philosopher who made the first clear statement of this principle.[9]

A prime example is the solar-centric idea, in which Copernicus proposed that the Earth and other planets circle the sun rather than vice versa. At that time, there was no direct evidence of this. The one great advantage of the Copernican system was that it explained the movement of the planets in one simple way, rather than the epicycles of the Ptolemaic system. It just needed the addition of Kepler's idea of elliptical orbits to become more accurate.[10]

It's important to understand that this was not a 'common sense' view. To people at the time, lacking any understanding of gravity, it seemed entirely obvious that the Earth was the center of the universe. If we were flying through space at a colossal speed, then why was there no sense of motion?

To apply this principle to history, historians have attributed the Second World War to a huge range of reasons including resentment of the Treaty of Versailles and its consequences, Hitler's ideology, the effects of the Great Depression, weakness of the League of Nations, appeasement by Britain and France, and much more.[11]

All of these undoubtedly played a part, but there may have been an even more basic underlying cause. I believe that people born at the end of a major war, and growing up in a time of peace, are more inclined to engage in aggression as a group when they come of age. Not for rational reasons, but because their early life exposure to stress changed them on an epigenetic level. In my belief, this change caused them to be hungrier for war.

Chinese history alone has many examples of this pattern. The Qin united China in a series of wars that ended in 221 BCE. In 209 BCE, revolts broke out that destroyed Qin rule. The Sui united China in 589 CE. In 613, revolts broke out that unseated them in turn. The Song and Qing dynasties

almost suffered the same fate. A generation after the wars that brought them to power, revolts broke out that seriously challenged them.[12]

Most recently, only 17 years after the end of the Chinese Civil War that gave Communism victory, fanatical teenagers ran riot across the country in the Cultural Revolution.[13] The leaders in each case were older, but the shock troops were those born around the end of the previous war.

In every instance there were plausible reasons for the outbreak of violence, but the potential effects of early life stress are common to all. It even explains the timing of the revolts. This is Occam's Razor, preferring the simplest theory to explain the data. If my theory is correct, it is a biological pattern that should equally well apply to animals.

History as a Science: Testing

Another important principle for a scientific theory is that it gives rise to novel hypotheses that can be tested. If the results are in line with the hypothesis, the theory is strengthened. If negative than it is weakened or discarded.[14]

Let us apply this principle to the theory given above—that people born at the end of a major war experience an epigenetic effect that makes them more likely to engage in group aggression when they mature. One way to test this would be to subject group-living animals, such as prairie dogs, to certain forms of stress in infancy and see whether they show evidence of group aggression when mature.

This is not easy to test because it requires animals that form close bonds to be exposed to other groups. Most laboratory studies measure aggression by allowing two individuals to interact.

Also, for reasons to be given later, the early stress must not be such as to damage the mother-infant bond. Maternal rejection and neglect have quite different effects.

A further test would be to work out the epigenetic and other changes in these animals, and then measure them in human populations. I predict that people born around the end of a major war, such as that which brought the Communists to control in China in 1949, should show the same physiological changes as our early stressed animals. While age cohorts born earlier or later would show less of these changes. This could also pin down an answer to the question of which age is the most crucial: pre-conception, gestation, or infancy? At present, we simply do not know.

Biohistory is not a final and definitive account, but simply a different way of looking at human history and the nature of society. I'd like to present this book as a hypothesis, inviting readers and especially scholars to consider the evidence for and against one notion: that history can best be explained as reflecting changes in character, and that these changes have a biological basis.

We will continue to gather more evidence and research as results come in, publishing them on my website mentioned above (biohistory.org/updates) and compiling them into future editions of *Biohistory*.

Why Does Biohistory Matter?

Biohistory has several clear implications for public policy.

The first is that the attitudes and temperament of ordinary people may matter far more than the actions of leaders. This is not to imply that leaders don't matter. It is easy to consider that a different leader than Winston Churchill might have made peace with Germany in 1940, after the fall of France. This would have had incalculable effects on world history. But in general, the decisions of leaders can be seen as mattering less than the actions of followers. For example, the British had to be willing to listen to Churchill, and to fight.

The same applies to the economy. Economic development requires that the people as whole have a certain kind of temperament. For example, South Koreans are hardworking and innovative, making their country one of the most prosperous on Earth. The government can stop the economy taking off, as it has done in North Korea, but it cannot create a work ethic that does not exist.

In Chapter Eleven I will describe changes in the temperament of English people, as described by the Economic Historian Greg Clark, leading up to the time of the Industrial Revolution. Among other changes, they were willing to work longer hours and were more prepared to sacrifice present consumption for future benefit.[15] Government policy might have prevented the Industrial Revolution from happening, but it could not have made it happen if the people lacked the right temperament.

This is a radically different approach from one common in the world today—that the right government policies can achieve almost any ends. But it explains why so many policies are so ineffective. One example, given in *Birth-Rate Crisis*, is the failure of attempts to increase birth rates through baby bonuses and the like. These efforts simply don't work because the decision to have children or not is driven by temperament. Even the Chinese government, which is far more powerful than ours, can't persuade people to have more children.

Another example of futile policies is a twenty-year campaign to change Afghanistan from an impoverished theocracy into a prosperous democracy. After all this effort by the most powerful military machine on Earth, Afghanistan is once more an impoverished theocracy.

This is what I predicted at the time. You can't impose a form of government that is too much at odds with the temperament of those it rules. The peoples of Afghanistan have attitudes and loyalties that are not compatible with our type of democracy, and I could not see the effort succeeding.

The Biology of History

The notion that temperament drives historical change is not new. Gregory Clark, as previously mentioned, explained the Industrial Revolution as the result of changes in behavior. Max Weber saw the Protestant ethic as giving rise to greater discipline, methodical conduct, and delayed gratification.[16] Norbert Ellis contended that State formation and growing social interdependence brought about increased self-restraint, inhibition of aggression, and emotional control.[17]

Roman writers including Sallust, Livy, Cicero and Tacitus also believed that changes in society reflect changes in attitude. Their concern was the crisis facing Roman society, which they attributed to wealth undermining the traditional Roman character.[18]

The key innovation from biohistory is that this change in character is seen as having roots in *biology*. Environmental influences, such as how much we eat and the way we treat our children, have epigenetic effects, meaning that they make certain genes more or less active. Further, these influences have roughly the same effect on animals as they do on us.

Consumption of high-calorie food, for example, produces a surge of dopamine in monkeys and rats, just as it does in humans. And continuous dopamine surges tend to reduce sensitivity to dopamine in all of these species, by making what would most likely be the same epigenetic changes. That is why scientists use rats, mice, and other animals as models for understanding these effects on humans.

Culture matters, but in a very distinct way. First, culture cannot be too different from temperament, but it can nudge behavior. Preaching hard work to a very lazy person will rarely make them a workaholic, but it might persuade a moderately industrious person to work harder.

The cultural influences that matter most are those that affect personal behavior, especially within the family. For example, limiting sexual activity, especially in the years immediately following puberty, tends to reduce dopamine surges and make brains more sensitive to dopamine. This means that the small trickle of dopamine from activities such as work, marriage, and children are more likely to satisfy. Such people tend to marry earlier and have more children, as detailed in *Birth-Rate Crisis*. They might also control their children more carefully, having effects on the next generation.

Larger changes in society, such as relating to economics or politics, reflect these biologically based differences in temperament.

In its way of looking at society, biohistory has much in common with the Roman writers referred to earlier. Sallust and Livy saw wealth as undermining character and thus the State. Biohistory also sees wealth as a key factor in cultural decline, but adds to this an understanding of how it happens.

Implications

This different approach to the understanding of society has one major implication. If we want to make changes for the better, then government policies are not enough. The right policies will bring out the best in people, such as in making South Korea more prosperous than the North. But by far the most effective way to bring about change is by altering temperament.

Biohistory proposes that this might help to reverse some of the more undesirable social changes in recent years. These include collapsing birth rates and the rise in loneliness and mental illness. As detailed in *Birth-Rate Crisis*, these changes can be best explained as the result of a change in temperament with epigenetic roots, which is a direct response to prosperity. In effect, excessive dopamine surges have made our brains less sensitive to dopamine, reducing the attractiveness of family and community.

Biohistory takes this further by suggesting that many of the economic disparities between social groups and nations reflect difference in temperament, which have been transferred from one generation to the next both by parental behavior and epigenetically, through sperm and ova. If this is correct, then resetting the epigenome could eliminate such gaps in a single generation.

This book goes more deeply into the science behind these ideas. While *Birth-Rate Crisis* considers a single trait, *Biohistory* looks at a total of four, and gives examples of how these have interacted to shape the course of history

The key aim of both books is to make the case for treatments that can help people change their temperament for the better. As described in *Birth-Rate Crisis*, there are two quite different ways to achieve this. The first is by helping people to alter their personal behavior so as to limit dopamine surges and thus re-sensitize their minds to dopamine.

The second is by medical treatments that will directly make the required epigenetic changes. The new weight-loss drugs, the GLP-agonists, seem to have some of these effects, though will obviously need a great deal of modification. We are currently in the process of testing some of them for the desired effects in my lab.

My head of research advises me that an investment of $100–200 million in neuroscience research would likely be enough to bring a treatment to the stage where it was ready for widespread testing.

This is an urgent problem because, if these trends continue, our current civilizations could be at risk. Within the lifetimes of many readers, we could see economic decline and the weakening or even the end of democracy. Ancient Rome followed a similar path, but for us, it is unfolding much faster.

The key difference is that we, unlike the Romans, might be able to do something about it. These are extreme claims, but I invite you to read the chapters that follow and decide for yourself.

1. Of Science and Temperament

> *"Most people say that it is the intellect which makes a great scientist. They are wrong: it is character."* — Albert Einstein

For 200 years, the developed world has experienced a golden age. Economies grew rapidly and real wages soared. Rapid advances in technology changed the lives of ordinary people. Life expectancy increased and populations grew. Democracy developed and matured.

But changes in recent decades, and especially since the turn of the century, give cause for concern. The rise in real wages has slowed greatly for ordinary workers.[19] Reported levels of depression and anxiety have increased, as have so called "deaths of despair," from suicide, alcohol abuse, and drug overdose.[20] Sperm counts and testosterone levels are falling.[21]

Most striking of all, as covered in *Birth-Rate Crisis: Reclaiming Family and Purpose in a Dopamine-Driven World,* the birth rate has fallen to well below replacement levels, to the extent that many countries face depopulation. The last time this happened was in the fourteenth century, when a third of Europeans died from the Black Death. But today, there is no epidemic. People are simply choosing to have fewer children. And even though they usually cite lack of money as the reason, extra money in the form of baby bonuses and the like seem to have very little effect.

In this book we will propose that the reason for these changes is a shift in the temperament of ordinary people. And that changes in temperament are the best way to understand human history.

The Biology of Temperament

The idea that economic and political systems reflect the prevailing temperament is not conventional wisdom, but it is not original either. What biohistory introduces is the idea that different temperaments have a *biological* basis. It is the study of history, as well as of economics, psychology, and anthropology, all seen as expressions of biology.

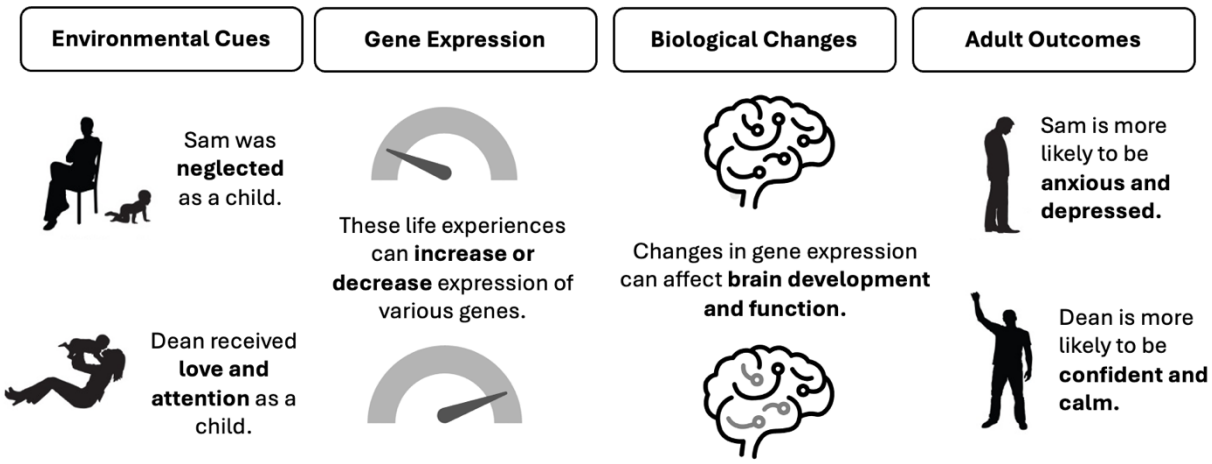
Biohistory rejects any idea that differences between peoples can be explained by genes. Two thousand years ago, civilized Greeks and Romans thought northern Europeans were inferior in character and ability. Not too long ago, the same was said of Africans compared to Europeans, and even of women compared to men. All of them were wrong.

In terms of genes, human beings are very much alike. There is more genetic diversity among chimpanzees from a few acres of rainforest, than in the entire human race.[22] And yet populations differ widely in wealth, creativity, political institutions, and much else that matters. They also change significantly over time. These variations are the result of differences in temperament and changes in that temperament.

The key to this is not genetics but epigenetics, the science which looks at the way in which genes are switched on or off by the environment. Thus, two people with similar genes can be remarkably different in their attitudes and behavior because different genes are more or less active. These epigenetic variations can make people more or less hard working, rigidly dogmatic or open to change, peaceful or violent, timid or forceful, honest or corrupt, accepting or rejecting of brutal authority, and much more.

What is more, these differences tend to pass from generation to generation, partly by the way children are treated as in Fig. 1.1 below.

Fig. 1.1. Example of an Epigenetic effect. A simplified overview of epigenetics, development, and behavior. Early experience influences attitudes and conduct.



Another method of transmission is through epigenetic inheritance, meaning that epigenetic markers are carried by sperm and ova.[23] One of our experiments showed that calorie-restricted male rats conceived offspring who acted as if calorie restricted, even though they and their mother had plentiful food. This happened even though the father had no further contact with the mother, and none with her offspring.[24]

Further evidence is that children adopted at birth tend to be more like their biological parents than their adoptive parents across certain traits, like cognitive abilities.[25] Some of this is for genetic reasons, of course, but inherited epigenetic effects may also play an important role.

However, we also see that socialization, which impacts direct epigenetic processes, plays an important role in other traits. Studies have demonstrated that genes, environment, and gene-environment interactions together explain variation in political behaviors,[26] religious attitudes,[27] and aggressive and antisocial behaviors.[28]

Through a historical lens, we can see the power of environments on humans because character varies so much over the generations, as we will see in future chapters. If character was determined only by genes, and childhood experience had only a minor effect, then people would change very little.

These epigenetic differences have profound effects on the political and economic make-up of societies. If people are epigenetically primed to accept only the most brutal forms of authority, then governments will tend to be brutal or unstable. When people are epigenetically primed to be innovative, to act with integrity, and are inclined to work hard, wealth grows. When men are epigenetically primed to be aggressive and proud, wars break out. Thus it is that epigenetics determines the nature of society.

Culture, the ideas and practices that define how people should think and behave, has a profound impact, but not in the way most people think. First, culture largely reflects the underlying character of the people. When people are aggressive by nature, the culture is warlike. War is glorified, and men are praised and valued for courage and pride. When people are pacific by nature, social norms value peace, and men are praised for being gentle and slow to take offense.

But culture also has an epigenetic influence on its own. Practices such as patriarchy, control of sexual behavior, religious rituals, and different ways of rearing children all have hormonal and thus epigenetic effects on character, which in turn influence culture in an ongoing cycle.

The Value of Animal Models

Humans differ greatly from other animals in the size and complexity of our cerebral cortex. This is the area of the brain that controls language, logic, and planning, the ability to operate in large social groups, and more.

But the area of the brain we will be considering is much older, in evolutionary terms, and one we share with (at the very least) other mammals. This is the limbic system, which controls behaviors such as aggression, territoriality, care of offspring, the forming of pair bonds, and much more.[29]

Put very simply, the limbic system of our non-human ancestors evolved so as to allow them to adjust to changes in food availability.[30] If food is unlimited, one kind of behavior will be ideal. If it is chronically short, then another. If it is generally plentiful but sometimes drastically short, then still another. Any population able to adjust rapidly to changes in food supply will have more offspring than one that cannot.

By a strange quirk of biology, some of these behaviors and attitudes are exactly what civilization requires. The story of human cultural evolution can be seen as a process by which societies that managed to trigger these mechanisms most effectively overcame those which could not.

The benefit of this approach is that these food adjustment mechanisms can be studied in animals under controlled conditions. Once we understand their physiology, including epigenetic effects, then we can work out how to reverse engineer them for humans.

The potential benefits are great. As suggested in *Birth-Rate Crisis*, we could solve many of the challenges facing the modern world, including collapsing birth rates and rising rates of loneliness and mental illness. Also, epigenetic treatments should be highly effective treatments for alcoholism and drug addiction.

This book goes further in proposing that the right epigenetic settings would help people to be more productive and honest, reducing poverty and strengthening democracy. They could, if people were so inclined, help struggling societies to catch up to and even surpass the current world leaders.

These are extreme claims but all of them are, in principle, testable. They could be tested with animal experiments, with epigenetic measurements of current populations, and by the development of treatments on the lines proposed.

What We'll Explore

Biohistory proposes that the key epigenetic settings evolved over millions of years to help our ancestors adapt to conditions of food shortage and abundance. Thus, we will start our discussion by looking at how animals respond to food restriction, including the effects of dopamine and how the brain responds to it.

One type of epigenetic setting is a response to chronically limited food, associated with behaviors such as strong pair bonds, intense care of young, territoriality, and persistent hard work. Our model for this behavior is gibbons—apes that live in the rainforests of Southeast Asia. Biohistory refers to populations with this response as having "high C," wherein "C" stands for complex civilizations, controlled children, and community.

Another setting we will discuss is a response to highly variable food, with general abundance but occasional severe stresses from famine or the threat of predators. The associated behavior is aggressive and hierarchical, with the ability to migrate in cohesive groups. Our model for this behavior is baboons—ground-dwelling monkeys on the African savannah. Biohistory refers to populations with this response as having "high V," wherein "V" stands for vigor, with confident aggression and migratory behavior.

These traits are independent of each other. Populations can be high on one and low on the other, high on both, or low on both. Domestic animals, for example, are low in both C and V because they are both promiscuous in mating (low C) and lacking in aggression (low V).

We will then consider human societies with high C. These include wealthy countries with large states, such as nineteenth- and early-twentieth-century Europe and Japan. We will see how cultural practices such as limiting sexual activity and tightly controlling children promote C. These practices are referred to as "C-promoters."

We will discuss the effects of C-promoters at different ages by studying societies with different childrearing practices:

- Parental control in late childhood, and to a lesser extent in later life, increases the form known as "adult C."
    - This is the trait covered in *Birth-Rate Crisis* and involves brains that are highly sensitive to dopamine and a focus on children and family.
- C-promoters in infancy result in the form known as "infant C," which has overlapping but somewhat different effects.

    - Specific to high infant C are machine skills and strong impersonal loyalties, such as when citizens vote for a politician they've never met and don't have connections to.

Next we will consider societies with high V which tend to be confident, fertile, and warlike. These are the product of harsh environment such as deserts and mountains, or of V-promoters including patriarchy and the punishment of children.

Similar to C, V also has different forms, with some overlap in their effects, depending on the nature of the V-promoter:

- Patriarchy is associated with the form referred to as "adult V."
    - This is linked to confidence and aggression.
- Punishment of older children is associated with the form referred to as "child V."
    - This is linked to traditional thinking and acceptance of powerful authority, even if distant, such as an emperor.

Next, we will trace the rise of C in England and Japan over the past thousand years, considering both family patterns and the rise of wealthy and cohesive states.

We'll then take a look at ancient Rome, discussing how and why it collapsed and biohistory's proposal for why the Eastern Empire survived. Our findings on Eastern Europe will introduce our final term: S. Peoples who are high in S (for stability) tend to indulge infants and come from long-civilized populations. Their societies are more stable.

The chapters that follow the introduction of S will examine a number of societies including China, India, and the Middle East, showing how early societies with low S—and higher infant C—collapsed and were reborn in a more stable form with higher S.

Finally, we will trace the decline of C in the modern world, showing how prosperity is leading us toward collapse. We'll also discuss how investments in neuroscience could prevent collapse, with considerable benefits for human well-being.

Biohistory is not a "common sense" view, but common sense is not required for a theory to be valid. For example, neither relativity nor quantum mechanics is an especially plausible theory at first glance. Light can be "bent" by gravity? A particle can be in two places at once? What *is* required for a scientific theory is that it be testable, and we'll discuss exactly that toward the end of the book.

2. The Effect of Limited Food on Animals

"We're not, after all, separate from the animal kingdom. We're part of it." — Jane Goodall

In future chapters we will see that developed human societies show distinct patterns of family and personal behavior that are quite different from those of (say) hunter-gatherers. Among these are a strong preference for nuclear, monogamous families, intense training of young, restrictions on early sexual activity, and a capacity for routine work.

All of these preferences have broken down to some extent in the modern world, which is the subject of a later chapter, but they reflect traditional behavior not only of Europeans and Americans but of Chinese, Indians, the peoples of the Middle East, and elsewhere.

Animal societies vary widely in family and personal behavior. Some form nuclear, monogamous families. Others are polygynous or even promiscuous. Some spend a great deal of time caring for young. Others spend relatively little time with offspring. Some start engaging in sexual activity soon after puberty, while others abstain for many years. And some are hard-working, constantly searching for food, with others less so.

The key point to note is that all the animal societies showing behavior like that of developed human societies live in areas where food is in chronic short supply. Biohistory suggests that this behavior developed by evolution as a way of giving animals the best chance of flourishing in conditions of limited food. And it is also, at least in part, a direct response to limited food.

We will begin by looking at two species that live in very different environments: Asian gibbons and African baboons. Each species is subject to very different patterns of food availability, as well as having to deal with differing sets of environmental hazards, such as predators. In consequence, they display markedly different social behaviors.

Both these species differ from humans in important ways. They lack the capacity for complex language, form no large political units, make limited if any use of tools, and do not set out to change the environment for their benefit. Nevertheless, in their mating and personal behavior they show a number of parallels with human societies. They may form exclusive pair bonds or mate promiscuously, and spend more or less time socializing, competing, fighting, or searching for food which is their equivalent to human work.

Species and populations differ in all these areas, as do human societies. And studying why and where they differ will help us to understand why humans can be so variable in our social behavior.

Gibbons

Gibbons are found in the tropical forests of Southeast Asia. Living high in the forest canopy, they are physically adapted for brachiating—swinging spectacularly from tree to tree with their immensely long arms. There are many different species of gibbon, but all of them are similar in behavior.

One of the remarkable things about gibbons is that they are fussy eaters. They will only eat the leaves or fruits of certain trees, and then only at certain stages of ripeness. The peculiar consequence of this is that, even though they live in one of the world's lushest habitats, calories are hard to find. Their favored foods are widely and thinly scattered through the forest, so they have to spend a lot of time foraging and traveling.[31]

Despite these feeding habits, gibbons rarely starve, as in times of scarcity they can switch to less palatable foods.[32]

For Javan gibbons, food can be so hard to find that families may struggle to maintain themselves, even with an exclusive territory. Squabbling within groups over food is one of the ways in which the young are expelled from the group on reaching sexual maturity. Because they live high in the trees, gibbons are rarely taken by predators. This means that gibbon populations are mainly limited by the availability of territories with enough food resources to support a family.[33]

Baboons

The habitat of African baboons is very different. Unlike gibbons, baboons are omnivores and not overly picky about what they eat, so it is possible for large troops to forage together. They are ground-dwelling, so predators like leopards and lions are a regular hazard, particularly for smaller groups. This means that even in normal years, predation can have significant impact on baboon populations.[34]

But their environment is also more variable than the tropical forests favored by gibbons. Severe crises, such as the 2008-9 Kenyan drought, can create genuine food shortages. This causes damage to health, reproductive failure, and higher death rates, especially among vulnerable groups such as the young. Such crises are occasional rather than the normal condition of baboon populations.[35]

Compared with gibbons, baboon populations are limited less by chronic food shortage and more by predators and occasional starvation.

Differences in Social Behavior

The social behavior patterns of baboons and gibbons are markedly different, in keeping with the habitats in which they live.

Gibbons, living where food is only patchily available, tend to form very small social units, typically a mated male and female with their young. Each pair lives within a territory which they defend from other gibbons. Adult males drive away other males, and females typically reject other females. The young tend to leave the parental territory once they pass the age of puberty.[36] In biological terms, this makes sense. When food is limited, only an exclusive territory makes it possible to successfully rear young.

Gibbons are cautious in the face of danger and will vocalize or swing away through the treetops when threatened.[37] This makes biological sense—there is no point risking your life by attacking a predator that is unlikely to catch you.

Baboon behavior is at the other extreme. Baboons spend more time socializing within their troops, which are larger than those of gibbons. These normally consist of multiple males and females. High ranking males have priority access to females and sire a disproportionate share of the young.[38]

Since predators are plentiful and hard to avoid in the open, baboons are vigilant and active in defense. They often raise the alarm against lions and retreat to rocky ledges or trees, if available. But a leopard may be fiercely mobbed if cornered or isolated, and some have been seriously injured or killed in such attacks.[39]

Compared with gibbons, baboons spend more time in grooming to establish and maintain alliances in their complex social world.[40] All this behavior also helps baboons to flourish. With food plentiful there is no need for an exclusive territory, and a large troop is helpful for warning and defense.

Differences in Breeding

Gibbons and baboons differ in their reproductive strategies. Gibbons are relatively slow breeders. They mature more slowly than many monkeys of comparable size. Females reach puberty at 6-9 years, but do not normally give birth until 8-11 years, when able to find a mate and secure a territory.[41]

After this, they usually produce a single infant only every three years or so. Some mothers may nurse their infants for up to two years or more, which suppresses ovulation, and lack of sufficient food may also delay reproduction. Young gibbons typically delay breeding until leaving the parental territory and establishing a territory and pair bond of their own.[42]

This adapts them for an environment with scarce food, where too many offspring would result in very high infant mortality, which is a waste of the energy put into giving birth. For example, an infant born to a mother without a mate and a territory would be unlikely to survive. A female will be more likely to pass on her genes if she builds her strength and waits for a time when she has better prospects for raising her young. In white-handed gibbons, one of the best studied populations of gibbons, one study found that only about 6 percent of infants died in their first year, though mortality is higher in poorer habitats.[43]

Baboons breed early and quickly, with females reaching puberty between three and five years of age, compared with six to nine years for gibbons.[44]

Female baboons typically conceive for the first time about a year after puberty, following a period in which males begin showing sexual interest. Afterward, they generally give birth at intervals of around two years.[45] Young baboons rarely die of hunger under normal conditions, but many are lost to predation, attacks by adults, kidnapping by other females, disease, and the loss of their mother.[46] Among the well-studied Amboseli population, roughly 23 percent died within their first year.[47]

These deaths are largely random. A predator can strike at any time, and severe droughts are by their nature unpredictable. A female will be more likely to pass on her genes if she bears as many young as possible.

These species differ not only in how often they breed, but how they look after their young.

Differences in Care of Young

Young gibbons remain close to their mothers for the first year, with only short periods of independent movement. Weaning is not completed until two years or more for some species, but young gibbons continue to interact closely with both parents for several years, including intensive learning about food sources.[48] Tension within the family begins to increase around ages five to seven, followed by dispersal from the family territory between seven and ten years of age.[49]

Baboon mothers begin rejecting their young as early as six to eight months, sometimes dislodging infants that want a ride or refusing to suckle them. By eight to twelve months, the young obtain most of their food independently, with full weaning occurring by twelve to eighteen months. By eighteen to twenty-four months, they are largely independent in both feeding and movement. Males typically play a very limited role in caring for their young.[50]

This is a specific example of a principle in biology known as “life history strategy.” Animals like baboons that focus on breeding quickly are described as having a “fast life history strategy,” while

animals like gibbons that invest heavily in fewer offspring and their survival have a "slow life history strategy."[51] These strategies can also be described as "r-selective" (emphasizing reproduction and high quantity of offspring) and "K-selective" (emphasizing competition and survival or quality of offspring).[52] For example, a weed has a relatively fast life history strategy compared with a tree.

Changing Food-Restricted Behavior

The focus in this book will be on a specific type of fast versus slow life history strategy that allows species to adapt quickly to changes in food supplies. Much of this happens as a direct adaption to the environment, but it can be hard-wired genetically.

Gibbons are an example of hard-wiring. Gibbon behavior is adapted to a food-short environment but is not a direct response to it. For instance, even when gibbons in captivity have plentiful food, they remain slow breeders and continue to form pair bonds.[53] These behaviors suggest that these traits may have a strong genetic component.

Baboons are far more flexible. The environments they live in are more varied and include savannah, woodland, and semi-desert. Baboons in more stable environments with low predation, such as woodland, sometimes form smaller groups than in open savannah, though care of infants often remains the same.[54] Unlike gibbons, it seems they can change their behavior as a direct response to the environment.

Changing behavior in response to food resources is common in monkeys and apes. Primate groups have been observed to vary from 1 to over 800, and food availability is a major driver of these differences. For example, spider monkeys are like baboons in forming larger troops when food is plentiful, and smaller ones when it is limited. Chimpanzees will divide into smaller groups when food is scarce and reform larger groups when food is plentiful.[55]

It is important to note that this flexibility has limits. The black-and-white colobus monkeys, or guerezas, maintain small groups even when their diet and environment could support much larger groups.[56] Baboons and vervets have not been observed to form monogamous nuclear families.[57]

Each species has a range of variation that goes only so far. Baboons and vervets on the "food-plentiful" end. Gibbons are on the food-short end, but with little variation in behavior as a response to the environment. Each has a "set point" which determines the behavior that is most natural to the species and presumably set by genes, but with a limited ability to change in each direction.

Humans

Where do we fit in? One striking feature of human societies is a strong pair bond between couples. The most common pattern is one man with one woman, though families consisting of one man with multiple women are also not uncommon. A rarer pattern is one woman with more than one man. But no current society has the multi-male, multi-female mating system characteristic of baboon troops.[58]

This is thought to be an evolutionary response to the immense support needs of our offspring. Our babies are also born prematurely, by primate standards. They are too weak even to cling to their mothers at birth. Chimpanzee and baboon mothers raise their offspring with limited help from the fathers. But human mothers need help.[59] Human fathers may have one partner or several but in most societies they provide some level of support.

Other women also commonly provide support. This is also one possible reason women live decades after menopause, unlike other primates. Older women can help their daughters raise children, giving kids a better chance of growing up. Studies of historical populations have shown that children are more likely to survive when maternal grandmothers are present.[60]

In this sense, we are closer to gibbons than baboons. But no human society is like a collection of gibbon troops, with pairs defending an exclusive territory.

Judging by the behavior of hunter-gatherers, whose way of life most closely resembles that of our ancestors, humans belong on the "food plentiful" end of the spectrum. Hunter-gatherers typically live in multi-family groups that travel and hunt together.[61] Among the Mbuti pygmies, for example, who live in the Congo region of Africa, camps often consist of several related families. Both minimum and maximum group size are influenced partly by economic considerations: too few people make cooperative hunting difficult, while overly large groups increase competition for food and reduce mobility.[62]

Even in societies like those of the modern West, where families commonly spend much of their time apart from the wider society, they venture regularly into the general community to work, shop and socialize. In short, this is nothing like the gibbon or langur pattern where couples or polygynous males defend an exclusive patch of land. In terms of social groups, human hunter-gatherers act more like baboons and vervets than they do gibbons.

We form our intense pair bonds *within* multi-male groups. Where we vary is in the degree of polygyny, and in the extent to which families live apart.

To put this on an individual level, a man is showing more gibbon-type behavior when he devotes himself to his wife and children, coming home every day and avoiding sex with other women.

Baboon-type behavior, at the extreme, would be for him to have sex with as many different women as possible, abandoning any children that result while he seeks out new adventures.

Biohistory proposes that we have inherited a mechanism which adapts behavior and attitudes to the level of food availability. The trigger seems to be a common experience of mild hunger. When this happens, we act more like gibbons, preferring a single mate and spending more time and attention on our offspring. When food is more plentiful and hunger less common, we act more like baboons, pursuing sexual variety and investing less in our young. Given less interest in our young, we might choose not to have children at all.

In future chapters we will see that food-short or gibbon-type family behavior is especially associated with civilized societies, those with large political units, advanced economies, and farmers rather than hunter-gatherers. We will find that a characteristic of people with this temperament is that they are more suited to routine work, perhaps equivalent to the "work" done by gibbons in searching out scarce food resources in a familiar territory.

We will also suggest that this temperament has other aspects with no equivalents in non-human primates. It makes people more likely to control their children, in the sense of systematically guiding their behavior. This could mean training them to be polite, obedient, to look after their siblings, or to help with chores.

This temperament also gives them a more impersonal orientation which supports market exchanges and loyalties to larger political units such as nation states.

But how could a shortage of food have such wide-ranging effects, and how could it appear in societies that are not especially short of food? That is the subject of the next chapter.

3. Dopamine

"We are drowning in dopamine." — Anna Lembke

This chapter will look at how limiting food affects behavior. The key to it is the way adult brains respond to dopamine. This was a major focus of *Birth-Rate Crisis*, but here we will see it as only one of four biological traits that help to explain human behavior, changes in society, and differences between societies. Understanding dopamine is, however, the basis for everything that follows.

Studying the effects of food shortage in humans would be difficult because of the sheer expense and challenge of controlling diet for substantial numbers of people. And some of the effects can only be seen by examining brain tissues.

Fortunately, rats and mice show similar responses to mild food restriction, which has effects very different from severe shortages. Starvation is hugely stressful and dangerous to health in rats and mice. It compromises the immune system, causing extreme fatigue and weakness, apathy, reduced coordination, and loss of concentration, and eventually can damage major organs.[63]

In our studies, rats were mildly food restricted, similar to that of properly conducted weight-loss programs for humans. The diet contained adequate levels of protein, carbohydrates, calories, vitamins, and minerals. These mild restrictions were sufficient to produce meaningful biological and behavioral changes, such as reduced anxious behaviors.[64]

Dopamine is the "wanting" chemical in our brain that drives us to act. For example, it surges when we see food and when we eat, especially when we are hungry.[65] Similarly, when a male sees an attractive female, dopamine is released in his brain. The surge continues as he approaches her and engages in mating behavior.[66]

But there are also long-term effects. We can understand these by considering the impact of addictive drugs such as cocaine and heroin. These drugs produce powerful increases in dopamine activity in the brain's reward system, and their effects have been extensively studied.[67]

Dopamine Surges

Cocaine and other addictive drugs appeal because they trigger an abnormally high dopamine surge, far stronger than that resulting from natural rewards like food or sex. With repeated drug use, the brain's reward system becomes less responsive both to the drug and to ordinary pleasures. As a result, over time, larger doses are required to produce the same effect. Eventually, the drug is needed simply to feel normal, rather than to achieve a high.[68]

Our brains have evolved to drive behaviors that support our survival such as eating and mating. But if we are constantly flooded with dopamine, ordinary rewards become less motivating. This is partly why drugs can cause people to lose weight.[69]

The brain was designed to protect itself from being overwhelmed by constant surges of dopamine. When drugs like cocaine cause a flood, the brain tries to restore balance by making the system less sensitive. As a result, more and more dopamine is needed to get the same feeling of satisfaction.[70]

Drugs are an especially potent source of dopamine surges, but there are others sources. These include high-calorie foods, alcohol, novel environments, gambling, competition for status, and sex with a variety of partners.[71] All have similar effects, though to a much lesser extent: they make the brain less sensitive to dopamine.

Dopamine Ebb and Flow

There are sources of dopamine that give pleasure without reducing the brain's response or lowering sensitivity. In fact, they can actually strengthen the system. Biohistory refers to these metaphorically as "ebb and flow" activities—an analogy of gentle waves lapping on the beach. This is in contrast to surges, which are like giant waves crashing over the beach and beyond.

Activities such as working regularly toward meaningful goals, exercising, maintaining long-term relationships, and developing skills support healthier regulation of dopamine and motivation systems. [72] Each involves repeated cycles of effort, anticipation, achievement, and recovery, which research suggests can strengthen motivation, emotional stability, and responsiveness to ordinary rewards without the severe tolerance effects associated with drugs.

Another source is group activities with friends, churches, or communities, including shared meals, traditions, volunteering, group singing, and dancing. These activities release not only dopamine but also oxytocin and other chemicals that regulate emotion.[73] The result is a greater sense of meaning, belonging, and shared identity, while the brain becomes more responsive to ordinary social rewards and less dependent on damaging surges.

A Stronger Response to Dopamine

Mild hunger, such as that experienced during intermittent fasting, can also make the dopamine system more efficient and responsive. It can also improve motivation and drive.[74] Its effects appear similar to those of exercise and work, though the mechanisms are different. This is not the case for starvation, which has very different effects.

Animal studies have shown that early life experiences of mild and intermittent hunger can have lasting effects on adult's motivation, weight, and cognition.[75] While human studies lack the methods to fully investigate the lasting effects of early food restriction on the brain, observational and correlational evidence, as presented in *Birth-Rate Crisis*, suggest mild hunger in early life may have a permanent effect in increasing motivation and making the dopamine system more efficient. Though again, not if hunger is too frequent and unpredictable, or combined with stress or neglect.

The effect can be amplified even further if parents or grandparents also lived through similar conditions, since there is growing evidence that certain epigenetic changes may be transmitted across generations.[76] When all these factors come together, the brain develops an especially powerful response to dopamine, meaning it needs much less to feel rewarded.

An especially important effect is the willingness to put in effort to achieve a greater goal.[77] For example, a rat with a more active dopamine response is more likely to scale a wall to reach more attractive food, rather than being satisfied with lower quality food.[78]

Humans with a more active dopamine response tend to be more persistent and harder working in achieving their goals, and may gain more satisfaction in minor steps along the way. They are more willing to learn, if it will help them achieve their ultimate aims.[79] This may be associated with a greater sense of purpose.[80] A student dedicated to achievement, for example, might devote more effort to study and be willing to sacrifice immediate rewards such as alcohol or sex.

Such an attitude would be advantageous for a gibbon, needing to learn how to find food in a complex environment, and eventually to establish and defend a breeding territory. And once a territory is established, reduced need for novelty means that sexual desires are likely to be satisfied with a single mate.[81] Contact with that mate is rewarding and boosts dopamine at the "ebb and flow" level, which is less likely to affect the brain's sensitivity.

Animals with brains that are highly sensitive to dopamine also find brief social interactions with strangers less appealing, preferring to establish warmer relations with fewer people. It may even be unpleasant, as seen in human introverts who tend to avoid noisy and stimulating environments such as a lively party and prefer quiet gatherings with family and friends.

In the case of gibbons, this reaction is so strong that they avoid interaction with anyone outside the family. Thus, the typical gibbon troop is a mated pair with immature young.

Avoidance of novelty makes the familiar territory more attractive, as is the job of patrolling it regularly in search of food. As described above, people with more active dopamine responses can be more persistent in achieving desired goals.

The same principle applies to the care of young. Offspring are familiar, so spending time with them is appealing and provides the mild ebb-and-flow dopamine boost which is satisfying. There is less need for the intense dopamine surges generated by novelty and change.

Biohistory proposes that this mechanism, limited food—which makes the brain more sensitive to dopamine—helps animals to prosper in an environment where food is chronically short. Pairs work together to defend and patrol an area sufficient to feed them and their offspring. They provide intensive care and training of young, who otherwise would have little chance of survival and breeding themselves.

A Weaker Response to Dopamine

By contrast, Biohistory posits that an animal in an environment with generally plentiful food tends to become less responsive to dopamine. This effect is even stronger if it had ample food in early life, and if this was also the experience of parents and grandparents. Compared to individuals in a food-limited environment, a much higher level of dopamine is needed for them to feel comfortable.

Consider how animals from a generally food-rich environment, such as a baboon, might react to ample food. For them, sexual activity becomes more appealing. While gibbons defer mating until they have established a territory, a female baboon typically begins mating soon after puberty. Males will also seek sexual opportunities, though with less initial success because of their low position in the dominance hierarchy.

Dopamine can be boosted by multiple sexual partners, which could help explain why baboons with plentiful food rarely form stable pair bonds. A preference for novelty also makes baboons effective migrants, a useful trait when local food sources vanish in a drought.

Dopamine is one of the hormones boosted by social activity, which leads baboons to prefer larger troops. This social preference is another trait that is useful for animals that rely on group defense and may need to migrate long distances in search of food.

Competition, and especially success in competition, is a powerful source of dopamine. This makes vying for status highly attractive, especially for males. Social interactions that allow baboons to build coalitions may advance them in the hierarchy. These interactions may be frightening but can still be attractive, similar to the thrill experienced by some humans who enjoy bungee jumping or sky diving.

By contrast, caring for offspring stimulates less dopamine. Infants are, by their nature, familiar, and lack the novelty and excitement needed to produce intense dopamine surges. The milder

dopamine surge that they trigger is simply not enough to be highly reinforcing to dopamine insensitive brains.

Such an animal would be ill-suited for the lifestyle of gibbons, roaming a familiar territory in a search for scarce fruiting trees. Baboons might find such activity boring, but they do not need to do it. Their food is abundant but varies in quality. They spend much of their day foraging individually, but in contact with other troop members.

In this way plentiful food, which makes the brain less sensitive to dopamine, helps animals to prosper in an environment where food is normally plentiful. They form larger troops, useful for warning and defense, and which combine with a taste for novelty to make long distance migration feasible in times of drought.

The high death rate in such environments, either from predation or occasional famine, also make it vital to maximize birth rates. This is met by starting sexual activity early and providing only limited care of young, who will find it relatively easy to feed themselves. As discussed in the previous chapter, baboons are weaned early but rarely die from hunger in normal conditions. Their relatively high death rate is a result of other causes such as predation and attacks by adults.

This is in sharp contrast to gibbons, whose young would have less chance of maturing without parental care and a parentally-protected territory.

But it is food limited behavior, characteristic of gibbons but not baboons, which is most typical of civilized human societies. For example, as will be discussed in future chapters, civilized human societies have higher levels of monogamy and nuclear families that are more independent of the wider society. They also approach parenting more seriously and are willing to persist toward valued, long-term goals.

For ease of reference, biohistory refers to this food short mechanism as “C.” It uses this letter because “high C” societies tend to control children, and are often described as more complex and civilized.

Gibbons and other species adapted to limited food are “high C.” Baboons and other animals adapted to usually plentiful food are “low C.”

C is basically an epigenetic mechanism that adjusts animals to conditions of food shortage. It is affected by experience at any age but follows the general principle that environmental effect on the epigenome tends to be strongest in early life. Like other epigenetic effects it can also be inherited, to some extent, from parents through sperm and ova.

We will discuss societies that are high C in the next chapter.

4. High C Human Societies

"Go to the ant, you sluggard: consider its ways and be wise." — Proverbs 6:6

In the last chapters we saw how behavioral patterns such as nuclear monogamous families, slow breeding, and "hard work" are characteristic of animals in food-restricted environments, and also of civilized human societies. Biohistory refers to this pattern of behavior and temperament as high C.

In this chapter we will look at human societies with high and low levels of C, considering not only how high C makes people better at routine work, but also more aligned to large political units and the market economy. Typical low C societies live off the land and have no political organization beyond the local band.

This is not a moral comparison. No one kind of society is better than another, and people in small-scale societies may be in some ways better off than we are. For example, the few hunter-gatherer peoples that still exist in the modern world seem to rarely suffer the disabilities of old age, such as type 2 diabetes and dementia.[82] This was likely also the case in the past, since all humans were hunter gatherers until about ten thousand years ago.

But the high C temperament gives societies a major advantage in the struggle for survival, helping them to overcome those with lower levels of C. This has been the case throughout history, with farming peoples exterminating or absorbing hunter-gatherers, or pushing them into poor lands not suited to agriculture.

Japan

An example of a high-C community is the Japanese village of Niiike, the subject of a study in the 1950s. The community still exists today, though its way of life has likely changed considerably. At the time of the study, Niiike was a small, rice-growing community in Okayama Prefecture, likely typical of Japanese rice-growing villages of that era.[83]

Niiike is particularly useful as an example because Biohistory proposes that political and economic systems reflect the attitudes and temperament of ordinary people. At the time, Japan was a nation-state, governing tens of millions of people with an advanced industrial economy. The behavior of people in Niiike therefore gives us some insight into the kind of temperament that supports such a society.

One key form of behavior in high C communities is control of children which was systematic and consistent from earliest childhood.

> Training of children beyond the toddler stage is a conscious goal of Niiike parents and grandparents. They have certain well-defined goals to which they direct their efforts … The

> child must learn early and well, however, to obey and conform to certain inflexible rules. Obedience is easier, perhaps, in that these are rules for a way of life followed by everyone he knows, not rules made especially for children. Many express the pattern of hierarchy. Speech is one example.[84]

Their family and sexual patterns were those which cross-cultural analysis shows to be typical of civilized societies. All marriages were monogamous, and brothers who married moved out of the family household to form new nuclear families, though one son (usually the eldest) continued to live with and look after his parents. There was little premarital sex, at least for women, and the stigma of sexual misbehavior made it much harder for a girl to marry. Marriages were arranged at a relatively late age.[85]

In future chapters we will see that these family and childrearing patterns are typical of high C societies. They include tight control of children, monogamous marriage, and strict control of sexual behavior. This same pattern has been the norm in all Western societies until quite recently, and in a slightly different form throughout India, China, and the Middle East.

Yanomamo

Consider by contrast the Yanomamo, an indigenous people of the Amazon rain forest who were studied by Napoleon Chagnon and others from 1964 into the 1980s.[86] Family and personal behavior remained much as it had in pre-contact times, though widespread violence was somewhat less common as the Yanomamo came under control of the Venezuelan and Brazilian states.

The Yanomami showed typical low C behavior. Their traditional society had no centralized political organization beyond the village, and feuding between villages was common. Much of their food was from gardens, but men and women often worked for only a few hours a day. Hunting was also important, particularly for men and for social prestige.[87] Though this was a fiercely warlike people, their attitude to children was lenient in the extreme. Though parents might strike out in anger, they did not control children in any systematic manner.

> Yanoama are indulgent with children. … Children are punished infrequently. However, a severe beating is sometimes given suddenly by an angry parent. Spanking, or other formalized punishments, are not used.[88]

Boys openly explored their sexuality and enjoyed a childhood that was only loosely supervised and could stretch into their late teenage years, only gradually taking on adult male work such as hunting, fishing, and clearing and cultivating gardens.[89] Girls started work much earlier by assisting their mothers with childcare, food preparation, gardening, and household chores.[90]

Yanomami marriages were often polygynous, with high-status or successful men often having multiple wives, while lower-status men sometimes struggled to find partners. Jealousy and sexual rivalry were major causes of conflict, and disputes over women contributed to feuds and violence between men and villages.[91]

Note that the key distinction in terms of childrearing is in *control*, rather than punishment. Although Yanomamo children were allowed more latitude and were indulged, Niiike parents were actually *less* likely than the Yanomamo to inflict painful punishments on their children. Parents in civilized societies may or may not punish their children, but they almost always control them, giving them fewer liberties and more prescribed rules of behavior.

Given the different levels of development between these two societies, it is important to understand the nature of these behavioral differences, what they mean, and where they come from.

High C and Routine Work

An example of the way temperament affects economic behavior can be found in the Mbuti pygmies, a tribe of nomadic hunter-gatherers studied by Colin Turnbull in the 1950s, in what was then the Belgian Congo.[92] For several hundred years, farmers had been moving into the forest, converting land for agriculture. These were a distinct ethnic group, originally from the Nigeria-Cameroon area and speaking a distinct Bantu language.[93]

The Mbuti, descended from the original population of the area, appreciated the benefits of farming and easily learned the required skills, but were far less keen on the hard physical work it demanded. As reported by Turnbull:

> The village was still a place where they could relax, enjoy luxury foods, wine and tobacco, in return for a minimum amount of service. Being a practical people, however, they responded, to a token extent, to the new demands for service, in the form of plantation labor. But it was not to their taste, and it proved highly detrimental to their health. The villagers in many cases realized this and compromised by using the Mbuti mainly to maintain guard over the plantations, so they would not be affected by the unaccustomed sunlight or exercise, and only in emergencies asked them to actually work in the fields.[94]

Successful farming requires high C, as traditional farming involves hard, repetitive work and performing similar tasks in a familiar area. Farmers in such communities may have a rich social life, but their work leaves less time for social activities than hunter-gatherers, who typically spend only a few hours a day finding food.

In this sense farmers are more like gibbons, relentlessly searching for food in the familiar bounds of their territory and socializing little outside the family.

This problem is not especially acute for slash-and-burn agriculture, as practiced traditionally in places like New Guinea or the Amazon. In this case, forest is cleared and burned, releasing nutrients from the vegetation and increasing the fertility of the soil. Crops are grown for a limited period, before the fields are left to regenerate. This system requires a great deal of land, and substantial effort in clearing new gardens, but only moderate work overall.[95]

However, civilization depends on growing large amounts of food per acre, which requires an intensive work schedule day after day, month after month, year after year. The same applies to the routine work of factory and office. Thus, civilized peoples need a greater tolerance for work than (say) hunter-gatherers. Which means they need the temperament we refer to as high C. Building and maintaining this temperament is the key to the success of civilization.

The Rise of Farming

For people to start farming, they must have access to plants that can be domesticated. Wild plants produce relatively little food per acre and must be selectively bred for larger seeds, ease of gathering, and other desirable features that allow more people to be fed from the same area. Some plants, such as the wild grasses that gave rise to wheat and barley, are relatively easy to breed into productive forms. Others, such as oak trees, are not.[96]

The same applies to animals. Some species, such as the wild ancestors of goats and sheep were relatively easy to domesticate. Others, such as zebras, were not. Jared Diamond's book *Guns, Germs, and Steel* details how regions such as the Middle East, with a variety of suitable plant and animal species, allowed farming to arise earlier than elsewhere. Even a small improvement in yield could permit more people to be fed from the same area, making it possible for the earliest farmers to have more surviving children and thus outbreed their neighbors.[97]

But productive plants are not enough for farming to thrive. The earliest farmers would have also needed to sow, weed, and harvest the plants. And being hunter-gatherers, which everybody was until that time, they likely would have found such work boring, as do the Mbuti today. What they needed was a temperament that made routine work more congenial.

Let us go back ten thousand years to the Fertile Crescent of the Middle East, which contained wild plants such as wheat and barley that were both nutritious and relatively easy to domesticate.[98] Anthropologists have found small-scale societies today to be extraordinarily diverse in their social organization, beliefs, family structures, and patterns of behavior—often more diverse than populations living in large states.[99] The same would likely have been true in the past.

Suppose that one group developed customs that gave them slightly more tolerance of routine work and the willingness to put in effort for a distant reward. This could be achieved by a higher level of C, the temperament associated with mild food shortage and a stronger response to dopamine.

Recall from the last chapter that such people, in the modern world, are more able to sacrifice short term indulgence for long-term goals.

Given even a slight gain in worth ethic, a band with this temperament would tend to grow, and thus drive out or absorb neighboring bands. Within this larger group, a local community might continue to grow in C, and become more successful still. Their numbers, and their customs, would spread in turn.

Their advantage would become even greater as early farmers learned how to breed their crops and animals to be more productive.[100] And the more time they spent farming, the more they could focus on such matters.

These neolithic farmers spread out north and west. Europe had been inhabited by hunter-gatherers some forty-five thousand years earlier, but genetic tests show that modern Europeans are descended far more from Anatolian farmers than from these existing peoples.[101] Note that there is no clear evidence that these higher C people were more aggressive or violent than their lower C neighbors. Rather, regular, hard-work farming allowed these groups to support larger populations and thus expand into new territories.[102]

The local peoples would have been quite capable of copying the invaders' physical technology of seeds and tools, as were the Mbuti pygmies described earlier. What they would have found harder to copy was the cultural technology of the farmers, which gave them a temperament better suited to farming.

Even if they adopted the invaders' customs, it likely would take several generations for these to have maximum epigenetic impact. An individual's epigenome reflects not only their own life experience but that of their parents, grandparents, and potentially earlier generations as well.[103] The descendants of hunter-gatherers would have had a poorer work ethic than the immigrant farmers, so would be less able to feed their children and would have been less desirable as marriage partners.

Of course, the people would not understand *why* this worked. Most likely, they simply believed that their god or gods required them to act in a certain way and would bless them if they did, and blight them if they did not. It is an attitude commonly expressed in the Book of Genesis and throughout the Hebrew bible.

And, of course, they were right. Acting in certain ways did help the Israelites and other ancient peoples to prosper, as we will see, though in this case any direct divine intervention would be greatly aided by the fact that these customs *worked*. They worked in the sense that those who followed the approved customs would be more disciplined and hard working and thus more prosperous. Which means their children would be more likely to survive and to attract partners.

The rise of farming and civilization was made possible by physical technologies such as productive crops and farming methods, domesticated animals, irrigation systems, roads, markets, metal-working, and writing. But biohistory proposes that equally vital was the culture that created the higher C temperament, and which became steadily more powerful and effective over the next ten thousand years.

High C and Impersonal Loyalties

The combination of behavioral and physiological responses associated with food shortage is even more vital to civilization when we recognize that it has another effect—making people more capable of impersonal loyalties. Societies with behavioral signs of food shortage, such as nuclear monogamous families, late breeding, and control of children, also tend to have larger political units.

Such attitudes have no direct equivalent in monkeys or apes, but we can understand them by inference. For example, a baboon's loyalties and ties are to members of its group, and so too are the ties that bind hunter-gatherer societies. In other words, they are *personal*.

A gibbon, by contrast, is attached only to its mate and offspring, and beyond that to a piece of land—its territory. This latter attachment, which baboons do not have, is by nature *impersonal*. It is attachment not to an individual but to a place.

A nation is also a place. It is, like a gibbon territory, a piece of ground. Leaders may come and go, but the nation persists. It is impersonal, not relating to any specific individual. So too is a code of laws or a constitution. Large-scale societies are more stable when people are loyal to all of these, rather than to individuals. That is why prime ministers and presidents can be removed in a democracy, without resort to violence. Impersonal loyalties triumph over personal ties.

As loyalties shift from personal relationships to institutions and larger groups, more complex forms of political organization become possible.[104]

At the most personal level, as in a hunter-gatherer band, loyalties are felt to friends and relatives who are seen every day.

A slightly more impersonal loyalty might be to a tribal chief or feudal lord, who may be personally known but not nearly as well.

Someone with a still more impersonal orientation might accept the authority of a king or emperor—an identifiable individual, but one who they might rarely or never see.

At the most impersonal, there can be loyalty to the laws and institutions of a state rather than any individual as such. This is why people in a democratic society accept the authority of a leader even when they voted for the opposition. It also allows them to form efficient and impersonal bureaucracies.

The same concept of impersonality also explains why people with family patterns typical of food shortage tend to have market economies. Markets and money are impersonal ways of distributing goods, as compared to more personal motivations such as friendship, reciprocity, or fear, which tend to form the basis of trade and distribution in smaller-scale societies.

This pattern first became evident in especially fertile areas, such as the river valleys of southern Iraq and Egypt. Soil enriched by flood waters gave hard working farmers an exceptional advantage, leading to ever higher levels of C and thus larger and denser populations. Higher C in turn increased impersonal loyalties, making possible larger and more stable political units that enjoyed an extra advantage in the struggle for success.

By about 4000 BCE, the first cities began to arise.[105] At each stage, the higher C communities would tend to prevail over those with lower C, spreading the higher C cultures.

Hard-working farmers, larger states, and markets are benefits of the temperament that comes from the food-shortage mechanism. When it comes to competition between different groups, civilized societies have huge advantages in the struggle for survival. With better-organized states and dense, hardworking populations, they tend to sweep aside smaller scale societies and hunter-gathers with relative ease.

But to achieve all this, people have to behave more like gibbons and less like baboons, which for humans is very unnatural behavior. Societies which come out on top are those with the highest C. And the higher the C, the greater the advantage. That is why European settlers so easily overcame the native peoples of North America and Australia. There were far more of them because European farmers needed less land than hunter-gatherers to support themselves. And they were also better organized.

The Drawbacks of Lower C

People with lower C are relatively insensitive to dopamine, so need a higher level to feel comfortable.

For this reason, they seek out variety, change, competition, and social stimulation. They are likely to be more sexually active with a wider range of partners, less interested in spending time with their children, and less likely to control or discipline them. They also tend to work less, save less, and invest less for the future. Familiar and routine activities produce only a trickle of dopamine, which is not enough to satisfy them, so they perceive such activities as boring.

Low C works well for a hunter-gatherer society, in which men may work for as little as five hours per day at non-routine jobs such as hunting. The most successful men will tend to be aggressive and dominant, good at hunting and war, sociable enough to build coalitions, and successful at attracting or controlling fertile women. Low C women also tend to work shorter hours than in farming societies and in more varied activities such as gathering wild plants.

People with higher C are comfortable with a lower level of dopamine. They are less interested in variety, change, competition, and social stimulation. The familiar and routine including partner, children, and steady work, are more satisfying.

This works better in settled societies. Men with higher C tend to excel at jobs which require hard work and delayed pay-offs. Examples include farming, craft work, and business. Success in all such fields is associated with a high C temperament.

The key point is that while hunter-gatherers do well with low C, farmers and others in large-scale societies have much to gain from higher C. As our ancestors moved from hunting and gathering to farming and larger-scale societies, people with higher C tended to prevail in each generation over those with lower C. They achieved higher C by adopting cultural norms that effectively promoted C, especially associated with religion.

Civilization needs physical technologies such as farming, metallurgy, and writing. But it also needs cultural technologies to create the kind of people who can make use of physical technologies.

Low C societies of hunter-gatherers can readily see the benefits of technologies such as advanced seeds and metal tools. But without the benefit of cultural technologies, which take many generations to take full effect, they lack the work ethic and long-term orientation to make use of them.

This is why hunter-gatherers tend to be absorbed by higher-C peoples or disappear altogether when higher-C populations move into their lands. Examples include the expansion of Middle Eastern farmers into Europe, as mentioned earlier; the expansion of farmers from the Nigeria-Cameroon region into sub-Saharan Africa; and the European colonization of Australia and North America.

As noted previously, the success of high C peoples is not a result of greater violence or aggression. Indeed, many tribal groups showed tactical superiority in battles against these larger groups, and failed due to a lack of numbers and fortifications, not due to fighting acumen.[106] We will see in future chapters that some high C minorities, such as the Amish, value and actively practice non-violence.[107] High C peoples succeed simply because they are harder working and better organized.

In animal populations, high C is invariably linked to food shortage. But people in civilized societies are not typically hungrier than hunter-gatherers. In fact, as we will see, the one society in world history with the most extreme form of “food short” behavior—mid to late nineteenth-century

Europe—was actually quite well off, by historical standards. Famine, especially in western Europe, was less common than in earlier centuries.[108]

To achieve high C, societies need cultural systems that encourage behaviors people might not otherwise adopt. Biohistory refers to these systems as "C-promoters," and they are the subject of the next chapter.

5. C-promoters: Food, Sex, and Community

"Discipline is choosing between what you want now and what you want most." — Abraham Lincoln

In this chapter we will consider how societies achieve a high C temperament by the use of C-promoters.

A C-promoter is a practice or experience that strengthens the responsiveness of the dopamine system. This may occur either by limiting surges, or by ebb-and-flow dopamine responses from naturally rewarding activities such as work and childcare. Although these processes operate through different neural mechanisms, their effects on behavior are much the same.

Biohistory suggests that C-promoters in human societies take the form of cultural technologies: systems of belief or tradition that guide and govern behavior, often through religion. Unlike physical technologies, such as farming and metalworking, cultural technologies shape temperament and behavior. In doing so, they can help people develop the traits needed to use and sustain those physical technologies effectively.

A summary of this concept can be found in books by Joseph Henrich, notably, *The Secret of our Success* and *The Weirdest People in the World*. He shows for example, how Catholic traditions such as monogamous marriage and wide-ranging incest taboos helped break up political units based on kinship, and thus make possible wider cooperation.[109]

Cultural technologies can achieve even more than this. They can hijack the biological response to food-shortage, causing people to act as if short of food even when they are not.

Let us now consider the customs and practices that act as C-promoters, and thus create the high C character.

Fasting

The most obvious C-promoter is fasting, which is an artificially induced hunger. Fasting is prescribed by a number of religions including Judaism, Catholicism, and Orthodox Christianity. Christians have traditionally been expected to observe the Lenten fast in the weeks leading up to Easter. Buddhist monks and nuns are commonly expected not to eat after midday each day, and Hindus, Jains, and Bahais all practice various forms of fasting.[110]

Muslims are expected not to eat or drink at all during daylight for a whole month, being taught that fasting promotes patience, self-discipline, and self-control.[111] This is especially rigorous because of the lack of water, especially in hot climates with long summer days.[112]

Limiting the types of food has a similar effect. The Lenten fast of some Christian churches mainly involved prohibiting foods such as meat and eggs, and in some eras might limit eating to a single meal each day. The same applies to complete or partial vegetarianism, as practiced by many Hindus, Buddhists, and Christian groups such as Seventh Day Adventists. The Jains in particular are rigorously vegetarian.[113]

Fasting is a powerful C-promoter, but on its own it is not enough, and when taken to an extreme, it can undermine health. Eating is also a somewhat private activity and therefore not easily subject to social controls. Finally, fasting is almost certainly not powerful enough to create the ultra-high levels of C that are characteristic of the most successful human societies. As discussed in the last chapter, these are the societies with hard-working populations that form large, cohesive political units.

Restricted Sex

Fortunately for the development of human civilization, there is a highly effective C-promoter that has none of these drawbacks. And that is restriction of sexual behavior. As sexual activity produces a significant dopamine response in the brain,[114] restricting it makes the brain more sensitive to dopamine. This in turn makes routine tasks such as work and child care more appealing. People with dopamine-sensitive brains are better able to focus on long-term goals, achieving satisfaction from the trickle of dopamine that comes from progress towards such goals.

The effects of C-promoters in general are strongest and most enduring in early life, which generally means childhood. [115] For sexual behavior, the strongest effects will be those of adolescence.

Conditions such as impulsivity, sensation-seeking, and risk-taking have been linked to compulsive sexual behavior and pornography addiction in adolescence. Even so, the current scientific consensus sees no harm in early sexual experience.[116]

Biohistory challenges this view by proposing that any form of early sexual experience affects adult character. It's a subtle effect and will not show up in rates of delinquency or conditions requiring medical intervention. But, in effect, delaying sexual activity should be an especially strong and durable C-promoter.

This effect explains why restricting or at least delaying sexual activity has been a feature of all known civilizations, even though no one had any idea of its actual function. It was simply that religions and groups that were stricter in this area simply prospered more than those that did not.

It is also a matter of historical record that the loosening of such standards tends to be followed by decline, as occurred in Rome between the middle Republic and the Empire (see chapter 15). The same principle can be seen in groups focused on commerce, such as Jewish communities, where a

strong work ethic has historically been vital to success and sexual activity has been subject to strict restrictions for both sexes.[117]

A number of studies have found that lower adolescent sexual activity is associated with later educational success. Frisco, studying 7,915 American adolescents, found that later first intercourse was associated with greater likelihood of completing high school and entering further education.[118]

A Scottish longitudinal study similarly found that earlier sexual activity predicted a lower likelihood of entering tertiary education, although much of the relationship could be explained by other behavioral and social factors.[119] Sabia and Rees found that American girls who delayed sex until at least 18 achieved substantially higher levels of education, and concluded that some of the relationship might be causal.[120]

A limit of all these studies is that they look at sexual intercourse, and not sexual behavior as a whole. Masturbation is less subject to social controls, and yet should be equally effective in producing dopamine surges. To maximize C, an individual should refrain from any form of sexual activity, especially in early adolescence when the brain is most plastic. An ideal measure of this, for boys, would be the number of nocturnal emissions.

But the only study to measure this connection was done by Alfred Kinsey, in the 1940s. He found that the biggest correlate of academic and occupational success was the level of nocturnal emissions, with the strongest link being at the youngest age. Boys who went on to tertiary education had eight times the nocturnal emissions before age 15 than those who failed to complete high school, a stronger correlation than in any other study.[121]

A common interpretation of these findings is that character traits such as self-control and future orientation were responsible both for limits on sexual activity and future success. None of them, least of all Kinsey, suggest that lack of sexual activity *caused* these young men to be more successful.[122]

But understanding of the dopamine system suggests that it might have, in that lack of sexual outlet could make young minds more sensitive to dopamine. This would, in turn, make hard work and self-discipline easier to achieve.

As mentioned in chapter two, a number of studies have found a link between sexual restriction and civilization. Limits on sexual activity are significantly correlated with larger political units, the capacity for hard work and market economies, and also with the “biological” aspects of C such as monogamous nuclear families, late marriage, and control of children.[123]

Previously considered as an indication of C, we can now recognize limits on sexual activity as an effective C-promoter. Its value depends on reducing sexual activity well below the level that is

natural and congenial, which makes it hard to maintain. Only the strongest religious and social sanctions can achieve this.

Social Controls Limiting Competition

In cases where we do not have direct evidence of dopamine receptors, another hormone can provide an indirect if imperfect measure. This is testosterone, the male sex hormone which is also found to a lesser extent in females. Dopamine can indirectly trigger the brain to produce more testosterone, and reduced dopamine can lead to a lower level of testosterone.[124]

Its absolute level is not a good indicator of dopamine sensitivity, since levels are affected by a number of factors, one of which will be indicated later. For example, testosterone levels have been declining in recent decades,[125] even as the level of C has been falling.

In particular, higher levels of testosterone are associated with the V trait, briefly mentioned in Chapter One, but treated fully in Chapter Ten.

But testosterone can be a useful indicator of dopamine *changes* in individuals. When someone's testosterone rises, we infer an increase in dopamine, which will tend to make the brain less dopamine sensitive. When it drops, we infer a decrease in dopamine. Thus, higher testosterone indicates that C is being reduced. Lower levels indicate the action of a C-promoter.

When animals compete for mates, testosterone rises. Stags in the rutting season battle fiercely for access to females, with successful males collecting a harem while most others fail to breed. Testosterone levels soar during the rut, while staying much lower the rest of the year.[126]

The same pattern can be seen in naked mole rats—rodents living in large colonies where only one female and one to three consorts breed and the others do not. When a queen is challenged or removed, the colony becomes unstable, with testosterone rising to high levels and a great deal of conflict. But once the new queen is established, testosterone and conflict decline.[127]

In these colonies, low social status enforced by unpredictable attacks from a more powerful individual is highly stressful, causing cortisol and other stress hormones to rise. But when order is re-stablished in colonies, cortisol levels go *down*. An ordered and stable social environment lowers testosterone, but is apparently not stressful.

Indications are that competition provides dopamine surges and thus reduces C, while community and co-operation act as C-promoters.

Social Controls in Human Societies

The same applies to human societies that follow specific practices. Social controls that are consistent and predictable can act as C-promoters. These may include customs requiring respect and deference to parents and others in authority, as well as religious practices such as observing the Sabbath and following traditions surrounding food, drink, dress, cleanliness, or occupation. Other customs may govern everyday behavior, from using only the right hand for eating and proper forms of language to discouraging pride and boastfulness.

Jewish ritual law contains an extreme version of such social controls, with detailed regulations controlling all aspects of life. However, Hindus, Muslims, Buddhists, and Christians all have their own versions.[128]

Some of them make good practical sense. For example, in societies without access to soap, it is wise indeed to eat with the right hand and cleanse oneself after defecation with the left. And avoidance of pork may have begun at a time when undercooked meat increased the danger of parasites. Health benefits aside, any control of behavior could act as a C-promoter. The more detailed and pervasive the controls, the stronger the effect.

It is especially important that these controls be accepted and internalized. Forcing someone to (say) observe the Sabbath, could result in resentment and stress, while observing the Sabbath for reasons of conviction would not. People may be eager to act in a way that will bring approval from the wider community. And even more, to win the favor of an all-powerful and all-seeing God.

At present, the effect of communal controls as a C-promoter is an inference only, and my research team expects to do studies to confirm (or even refute) this. But it does explain why the most successful religious systems impose the strongest restrictions on behavior, including practices such as keeping the Sabbath that have no clear function.

As mentioned earlier, however, traditional thinking offered very different explanations for why such practices might lead to success. A standard one, common in the Hebrew Bible, is that abandoning God's commandments brings down divine punishment in the form of famine, disease, or military defeat.[129]

> For I, the Lord your God, am a jealous God, visiting the sins of the fathers upon the children to the third and fourth generations of those who hate me, but showing mercy to thousands of those who love me and keep my commandments. (Exodus 20, 5-6).

Biohistory also suggests why abandoning such controls typically results in indications of falling C. This can be seen in the lower fertility of Jewish families that abandon orthodoxy and Amish communities that relax some of the practices separating them from the wider society.[130]

Routine Work

People with high C tend to be better at routine work, such as farming and factory jobs. This is the biological equivalent of the "work" done by gibbons and other species adapted to limited food, constantly on the lookout for fruiting trees at exactly the right stage of ripeness. Social pressure to work hard is thus in itself a C-promoter.

Fertility

In civilized societies, people with higher C tend to have more children. This is partly because the struggle for survival has been so tough through most of history that to successfully raise a family needs relentless hard work to support them.

It is also because higher C people are more interested in children, and more suited to the careful training that makes it possible for them to thrive. This is the gibbon pattern of careful ongoing attention, as opposed to the baboon pattern of making the young independent as soon as possible.

This is all the more crucial given the high death rates from infectious disease in crowded settlements,[131] and growing knowledge of abortion and contraception in the Roman world.[132] Not to speak of infanticide, which was common in Greek and Roman times but became less so with the rise of Christianity.[133] People who wanted children more, because of higher C, were more likely to have them and to raise them.

And having more children means, on the whole, spending more time with them, which is a C-promoter in itself. Religious beliefs tend to favor fertility, as indicated by the long Catholic struggle against contraception, and the modern fight against abortion. But the biggest effect is not from the number of children we have, but how we treat them.

6. C-Promoters: Family and Faith

It is a general principle of physiology that early life experiences have the biggest effect on character. For example, as we have seen, early sexual experience has more impact than the level of sexual activity in later life.

One of the most powerful C promoters, then, is control of children. This means directing what they do in a systematic way, so that they will internalize and accept principles of behavior. Teaching such values as honesty, hard work, respect, self-control, courtesy, abstaining from the use of forbidden substances such as alcohol and tobacco, etc. The exact list will depend on the society, but in every case, it involves an individual learning to steer their behavior according to social norms.

Because higher C people are disciplined in their own life, it is easier for them to control their children in the same way. Consistent control of children, with rules that become internalized, have many positive effects on adult behavior. Studies show that such children grow up to be better educated and more occupationally successful, with lower rates of crime and better mental health. They are better able to delay gratification and control their impulses.[134]

Parental discipline and the teaching of values may help shape the developing reward system. By encouraging behaviors such as work, persistence, and caring for others, parents can teach children to find these activities satisfying and to resist more immediate pleasures. Studies show that parenting can influence dopamine reward circuits in the brain.[135]

Such training of children may involve elements of punishment, as long as this works to ingrain social values. But harsh and arbitrary punishment may produce the desired behavior only out of fear, rather than because the child accepts and internalizes parental standards. Studies show this is more likely to lead to antisocial behavior and a greater risk of substance abuse, the opposite of a C-promoting effect.[136]

Helicopter parenting would also decrease C. This is where parents excessively monitor their children's lives, intervening, problem-solving, and protecting them from any form of harm.

A 2025 meta-analysis combined 53 studies involving more than 46,000 young adults, and found that helicopter parenting was associated with indications of *lower* C. These young adults were less able to cope with challenge or regulate their own behavior, had poorer academic achievement, and suffered more anxiety and depression. These are modest effects, but they were quite consistent across studies.[137]

Along with epigenetic inheritance from parents and grandparents, discipline of children helps pass C from one generation to the next. Attentive and disciplined child-rearing affects the physiological

and epigenetic development of children, and therefore their temperaments and behavior their entire lives.

The pheromones of parents who are in constant contact with their offspring may also play a role. Our own studies have found that rats exposed to the bedding of calorie restricted animals show some of the behavioral and physiological changes associated with food restriction, despite having plentiful food their entire lives.[138]

The wider culture can help reinforce the C of each generation by pressuring low C parents to conform and exert control over their children through community expectations, religion, schooling and even legal sanction. Thus, a high C society can raise the C in even its lower C individuals and groups.

As with sexual restraint, a society experiencing a decline in C will either reduce the teaching of moral principles, or indulge in helicopter parenting which has the opposite effect. Western societies are presently in such a decline, and have been for many decades.

Monogamy

Another powerful C-promoter is monogamy, which also increases the potential for the training of children by focusing men on their offspring. Though most marriages across the world are monogamous, many societies also permit high status men to have multiple wives. This is the case not only of pre-literate societies in general, but it has taken the most extreme forms in the advanced civilizations of India, China, and the Middle East. In these very unequal societies, high-status men in the past could have had dozens or even hundreds of wives.[139]

Monogamy makes it possible for more men to marry, and numerous studies have shown that marriage and fatherhood reduce testosterone.[140] There appears to be a shift in dopamine-related motivation from novelty seeking and competition to caregiving and attachment.[141]

These are what Biohistory refers to as “ebb and flow” activities. It is a feature not only of humans but of animals in general, that males in pursuit of a partner have higher testosterone. This applies whether they are currently single, or are married and seeking more partners.[142] Thus, monogamy of itself acts as a society-wide C-promoter.

Limiting sexual activity to marriage is a C-promoter in itself, because it limits the frequency of sex and the variety of partners. But even when higher status men have affairs, they tend to focus far more on their legitimate offspring,[143] and thus provide more of the training that promotes C in their children. Plus, they are not actively chasing extra wives so their own C is reduced by competition for mates.

Strict monogamy is largely a European pattern. The Greeks and Romans were culturally monogamous, though relaxed about men having sex with lower status women and adolescent boys.[144] This was one factor giving them higher C than other ancient peoples, which made possible their highly disciplined and thus effective armies, such as the Macedonian phalanx and Roman legion.

With the rise of Christianity, monogamy became even stricter. For most men, treating fornication and adultery as sinful in the sight of God must have imposed strong restraints on their sex lives. Even very high-status men such as kings could feel the need to restrain themselves. For example, King Alfred as a young man is recorded as praying for help in controlling sexual desire, even to the extent of asking for an illness to restrain his lust.[145] Homosexual activity was totally forbidden, so that men with this preference would be especially restricted.[146]

The Christian church thus played a key role in the rise of C to unprecedented heights in the nineteenth century, as will be detailed in chapter eleven.

Religion as a Driver for Success

When considering C-promoters in human societies, we are drawn again and again to religion. Scientists such as Richard Dawkins argue that religion is the outdated superstition of another age, without value or purpose today.[147] But a study of history and biology indicates that religions can be better understood as advanced cultural technologies that create a high C character. And this character has made possible the modern world.

Consider the Seven Deadly Sins of Catholic theology. All except one are clear C-promoters:

Pride, greed, and envy: selfish individualism that puts the interests of an individual before that of the group. Suppressing them promotes C.

Lust: chastity is a powerful C-promoter.

Gluttony: food restriction is a C-promoter.

Sloth: routine work is a C-promoter.

The only Deadly Sin that doesn't clearly undermine C is wrath, which harms social cohesion rather than C as such.

To understand how religion can help a people thrive, consider Judaism. The elaborate structure of Jewish ritual law controls every detail of its followers' lives, and thus forms an especially powerful C-promoter. In three millennia of history which include long periods of insecurity, many Jewish

communities strongly emphasized literacy and religious scholarship. Gifted young men might devote years to rabbinical study, supported by fathers-in-law and the community.[148]

From an economic standpoint, it might seem to make better sense to divert such resources into making a living, but not if we understand the real value of Jewish law. It maintains ultra-high C, which is especially valuable for success in commerce. It is even more crucial given that commerce is far more of a competitive business than (say) farming, and so itself acts to undermine C.

The communities and families that adhered most strictly to the law were the ones that prospered and persisted. And the stricter the law became, the greater the effect. Thus, Jewish ritual law can be seen as one key reason for the survival and success of the Jewish people.

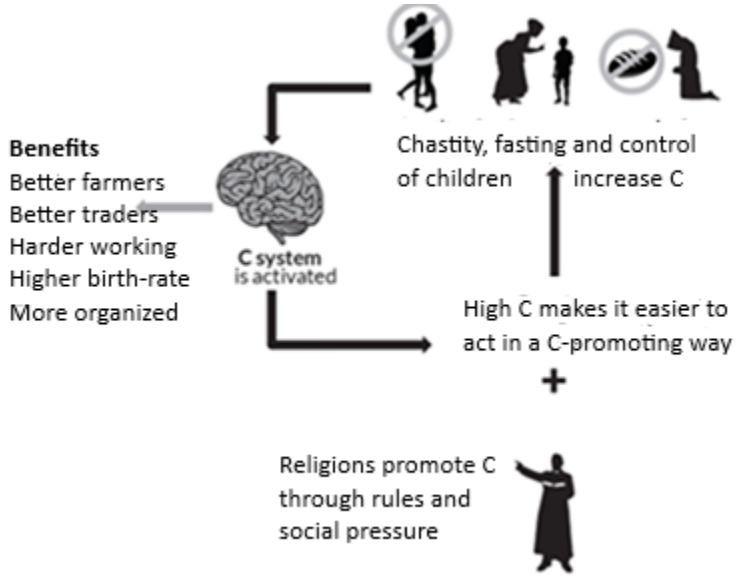
This helps explain why Jewish communities that abandon traditional religious practice tend to assimilate more rapidly into the wider community.[149]

The Effect Feedback Cycle—How C Promotes C

C-promoters are to some extent self-sustaining. High C parents tend to discipline their children, which transfers C to the next generation. People who restrict their sexual behavior, whether through personal choice or cultural pressure, have higher C, which encourages more disciplined behavior. That is a very simple form of feedback where a C-promoter (sexual restraint) raises C, which makes it easier to control sexual behavior.

The same applies to food. Eating less than one would like, for religious or cultural reasons, increases C. This in turn makes disciplined eating easier. Biohistory refers to this as the *effect feedback cycle*, as illustrated in Fig. 5.2.

Fig. 5.2 The effect feedback cycle



But C-promoters are not completely self-sustaining. Higher C people may find it easier to restrain their sexual activity or eating than those with lower C, but that does not make it easy. To maintain C, they will still need to have less sex at any age, and especially in adolescence. They should also eat less food than they would otherwise like. High C can only be maintained by considerable cultural pressure.

The reason for this is that we humans are naturally a low C species. As noted in chapter one, our genetic set-point for C is more like that of baboons than of gibbons. To maintain C at unnaturally high levels is profoundly difficult, which is why it has taken human societies ten thousand years to learn how to do it.

How C Declines

This also helps to explain why civilizations collapse. Our low C biology and the C-promoting forces of religion are in a constant state of tension. It is as if two groups of men were equally balanced in a tug of war, straining mightily to keep the rope in place. On the one side is community pressure and the force of religion. On the other, our low C human nature.

Add a single extra man to the human nature side, even a not very strong one, and C starts to give way—slowly at first, but then faster and faster as more of them slip and fall over, until the gradual slide becomes a full retreat.

The one force most likely to upset this balance is wealth. Plentiful food and material comfort have the opposite effect to C-promoters and may be termed “C-reducers.” An initial reduction in C by

affluence not only makes high C behavior more difficult, but lessens the religious sentiment that helps support it. Lower C people are less inclined to accept religious controls on behavior.

This process can only go so far in a single generation because the basic level of C is set by parental control and epigenetic inheritance. But over a number of generations, the process is inexorable. As C declines and traditional C-promoters collapse, ever more powerful C-reducers are sought, such as high-calorie foods leading to an obesity epidemic, and addictive drugs such as heroin and cocaine.

To take just one example of how calorie intake can affect C, it has been found that adolescents who drink more than five cans of soft drink a week are more likely to act violently with peers, family members, and dates. Other studies have linked soft-drink consumption with violence and mood problems in adolescents, and with aggression, withdrawal, and attention problems in young children and teenagers.[150]

All these behaviors indicate lower C, though, of course, the causal effect can go both ways. Individuals with lower C are more inclined to favor short-term indulgence over long-term goals such as health and, as a result, are likely to consume more soft drinks.

Civilization has developed over the past four thousand years through the growth of religious traditions with ever more powerful C-promoters. The weakness of this process is that people are required to act in ways that are very different from those congenial to our genetically set low C temperament. Civilizations fall, at least in part, because wealth upsets the balance, pushing down C and thus undermining the C-promoting behavior that supports C and civilization itself.

But there are differences between societies that do not fit neatly into the distinction between high and low C. That is the subject of the next chapter.

7. Control in Infancy vs Late Childhood

"When you teach your son, you teach your son's son." — The Talmud

There are important differences between societies that are not easily explained by absolute levels of C. These have to do with the ages at which C-promoters apply. In particular, C-promoters in infancy have a very different effect from those in late childhood.

We will start with a society that controlled children very tightly in infancy, but with virtually no control in late childhood. This is a unique case, and it only existed for a very short time, but it gives a valuable insight into the effects of this aspect of childrearing.

Manus Childrearing

The Manus people of the Admiralty Islands were studied by the anthropologist Margaret Mead in the 1930s. At this time, they were living in stilt houses over a lagoon, an exceptionally dangerous environment for infants. This made rigorous training necessary to prevent them falling in the water:

> When [the child] is about a year old, he has learned to grasp his mother firmly about the throat, so that he can ride in safety … The decisive, angry gesture with which he is reseated on his mother's neck whenever his grip tended to slacken has taught him to be alert and sure-handed … For the first few months after he has begun to accompany his mother about the village the baby rides quietly on her neck or sits in the bow of the canoe while his mother punts in the stern some ten feet away. The child sits quietly, schooled by the hazards to which he has been earlier exposed.[151]

But training went far beyond the requirements for physical safety. It also applied to property:

> Before they can walk they are rebuked and chastised for touching anything which does not belong to them. It was sometimes very tiresome to listen to the monotonous reiteration of some mother to her baby as it toddled about among our new and strange possessions: "That isn't yours. Put it down. That belongs to Piyap [Mead]. That belongs to Piyap. That belongs to Piyap. Put it down." But we reaped the reward of this eternal vigilance: all our possessions … were safe from the two and three-year-olds who would have been untamed vandals in a forest of loot in most societies.[152]

Young children were also taught rigorous privacy in excretion and a strong sense of modesty.

But this rigorous training of infants was accompanied by an almost total lack of discipline or obedience after infancy.

> The children are taught neither obedience nor deference to their parents' wishes. A two-year-old child is permitted to flout its mother's request that it come home with her. At night

> the children are supposed to be home at dark, but this does not mean that they go home when called. Unless hunger drives them there the parents have to go about collecting them, often by force. A prohibition against going to the other end of the village to play lasts just as long as the vigilance of the prohibitor ….[153]

Manus Character

The effect of this training was that the Manus were highly successful traders, obsessively hard working and ambitious and collecting a great deal of wealth. Underlying the fervent capitalism of the Manus was an intensely moralistic religion, based on ancestral spirits, and focusing very heavily on property. They also had rigorous sense of commercial honesty.

They also, and very significantly, showed an unusual aptitude for machinery, an enthralled fascination that had them examining and tinkering with every engine and gadget they could find, to the vast amusement of American troops stationed on Manus Island during the Pacific War. Commenting on the American machines later, after the war:

> We can understand Australian engines … easily because they are all open and you can see them work. The American engines are closed up in boxes, and all you can see is the button that starts it and the button that stops it. But, they added confidently, if we could just see inside, we would understand how it works.[154]

The Manus were also extraordinarily open to change. This was shown not only by their success as traders, which requires a great deal of flexibility and creative thinking, but their extraordinary willingness to adopt—almost overnight—an ideology that reversed almost every tenet of their culture. Margaret Mead describes their obsession with change and new ideas:

> The great avidity with which they seized on the new inventions which came with European contact, was partly rooted in their driving discontent with things as they were.[155]

Within a few decades, much of their society underwent rapid cultural change under the influence of the "New Way" movement, which challenged traditional religion, economics, and social relationships.[156]

In many ways, the Manus people were very much like Europeans in the nineteenth century, a time when-as we will see-C was at an all-time high. They were commercially minded, honest, with a moralistic religion, open to change, and skilled with machines.

But with one huge difference. They were not politically organized. Traditional Manus society had little political organization beyond the village. Although many settlements shared common origins and cultural ties, there was no larger unified political authority. Leadership depended largely on personal influence, wealth, trading ability, and forceful personality.[157]

Next we will consider a society which controlled children tightly in infancy and late childhood.

Control in infancy and late childhood: Victorian England

Victorian England was a byword for the strict treatment of infants. We have vivid descriptions of the English nanny, who was responsible for raising virtually all infants in upper-class families. A prime example of how she enforced her renowned discipline, and the kind of values she represented, is her obsessive drive against sexual behavior, and her rigorous and very early administration of toilet training:

> Pot training began very early, in the first month or so. Thereafter it was continued, in a sense, right up to the moment the child left Nanny's care … Training took several forms. At first—innumerable placings on the pot, dozens a day. Once the baby or child had learnt, the most common method of persuading a child to go was to leave him or her there … till something "happened." Eleanor Acland describes in her autobiography how "It was nursery law that we might not quit the water closet till we were fetched." Once one of them was forgotten from tea until bedtime and sat there for five hours.[158]

Based on parental advice books, such rigorous training seems also to have been commonplace for the literate middle classes. And this was not just the case in England. For example, the most authoritative Dutch family manual of the Victorian era was *The Development of the Child* by Dr Gerard Allebe. Dr Allebe's main concern was that a mother not be sentimentally over-protective. This was a serious danger because it would deprive the child of the necessary exercise for courage and result in weakness. Mothers must suppress their inclination to indulge and spoil their children, as doing so would result in the children becoming fearful.[159]

Swedes seem to have focused even more on the early years, as judged by *The Century of the Child*, published in Sweden in 1909 and becoming an immediate bestseller.[160] The idea seems to have been that if discipline was firm and consistent in infancy it would hardly be needed later:

> Only during the first few years of life is a kind of drill necessary, as a pre-condition to a higher training. The child is then in such a high degree controlled by sensation, that a slight physical plain or pleasure is often the only language he fully understands. Consequently, for some children discipline is an indispensable means of enforcing the practice of certain habits. For other children, the stricter methods are entirely unnecessary even at this early age, and as soon as the child can remember a blow, he is too old to receive one … The child must certainly learn obedience, and besides, this obedience must be absolute. If such obedience has become habitual from the tenderest age, a look, a word, an intonation, is enough to keep the child straight … With a very small child, one should not argue, but act consistently and immediately.[161]

Victorians had much in common with the Manus people described earlier. They were intensely commercial, with high standards of honesty, open to new ideas especially in areas such as engineering, commerce and science, and skilled with machinery. This was the home of the

Industrial Revolution, when people first developed the techniques and machinery that has so changed the world.[162]

There is nothing extraordinary about the idea of machinery as such. Heron of Alexandria developed a steam-powered device in the first century C.E., though he considered it no more than a toy.[163] But starting 250 years ago, first in England and then throughout Europe and North America, people seemed to have a remarkable talent for inventing and improving mechanical devices.

But at the political level, there could scarcely be more of a contrast. The peoples of Europe and North America had systems of government that formed millions of people into cohesive and well-organized states. So efficient were these that they enabled Britain and other European powers to run world-wide empires. Combined, of course, with the advanced technologies of steam ships and maxim guns. This is very different from the village level organization of Manus society.

There were also important differences in attitudes to family. Mead described young Manus men as being forced into marriage for economic reasons. Before marriage or even after it, she saw little of sentiment or love.

> He knows that men without wives are men without prestige, without homes of their own, without important parts in the gift exchange. He does not rebel at the idea of marriage. He cannot rebel in advance against his fiancé for he has never seen her. He knows there will be less fun after marriage. Wives are exacting. Married men have to work and scarcely ever come to the boys' house. Still-one must marry.[164]

Victorian attitudes could hardly be more different. Family had less to do with economics and everything to do with sentimental, emotional ties.[165]

> Every Englishman has, in the matter of marriage, a romantic spot in his heart. He imagines a "home," with the women of his choice, the pair of them alone with their children. That is our own little universe, closed from the outside world.[166]

Japan

Another society controlling both infants and older children is Japan. Japanese families, as observed in the 1950s, also began training well before the age of two, though not to the extent of Victorian nannies.:

> Until well into the toddling age, a child "does not understand" attempts to train him, so Niiike people do not hold it against a youngster if he fails to follow instructions nor do they blame him for disobeying. Actually, of course, many principles and habits are instilled in

> the baby before the age of "understanding," and the real consequence of the Niiike point of view … is a minimum of early punishment or negative discipline.[167]

The same pattern can be seen in a remote rural village in the 1930s. Toilet training was typically complete in the first year of life and polite manners taught from infancy by constant repetition and instruction.[168] This early start is especially striking given that these parents were far less strict than in Niiike, in that younger children would commonly disobey their parents.

Given that other early control societies are both innovative and skilled with machines, it is significant that Japan was the first non-Western country to industrialize after being forcibly opened to the West in 1853. This was so successful that in only 50 years it defeated Russia in a largely naval war that required advanced skills in shipbuilding and modern armaments.[169]

Another feature of Japanese history in common with Western Europe is that the modernization of the economy went hand-in-hand with the beginnings of democracy. Japan developed parliamentary institutions early, by non-Western standards, though with a hiatus in the 1930s and early 1940s.[170]

Democracy also developed, as in nineteenth century Britain, when C remained high, judged by high and rising fertility rates into the 1920s. In societies that industrialized later, such as Taiwan and South Korea, democracy only arose after they became wealthy and the birth rate began to fall.[171] This is a separate and quite distinct pattern, for reasons to be discussed later.

The other is a kind of intense localism in political loyalties, reflected in European nation-states, and the survival of Japanese daimyo for nearly 300 years under Tokugawa control after 1603. Formerly independent rulers, they kept much of their power and status but with enough central control to maintain the peace.[172]

This made political boundaries more stable, compared with the cosmopolitan empires of Asia. It perhaps reflects the 'territorial' nature of very high C, the same motive that drives gibbons to establish and defend a territory.

It is also interesting that Japan is one of the few non-Western civilizations in which a monarchy retained enduring cultural and symbolic authority long after losing most practical political power.[173] By contrast, Chinese and Middle Eastern dynasties rarely survived their loss of their power by more than a few decades.[174]

European countries such as the UK and Denmark retain constitutional monarchs that have reigned but not ruled for more than a century.[175] For much of the last thousand years, real political power in Japan was commonly exercised by regents or military rulers rather than by the emperor, whose authority became largely ceremonial.[176] This is a topic we will come back to in a later chapter.

C-promoters in infancy and late childhood.

Bringing this together with our analysis of Manus society, we can see that C-promoters in infancy and late childhood have different, and in some ways quite opposite effects. For example, C-promoters in infancy seem to promote competition, and C-promoters in late childhood community.

The effects of C-promoters in infancy, Biohistory refers to as 'infant C', because they cannot be changed in later life. The effects of C-promoters in late childhood, because they can also change to some extent in later life, are 'adult C'. The two together, and they often rise and fall at the same time, will be simply 'C'

Maximum C can only be found when both forms are high. In other words, when C-promoters are strong throughout infancy and childhood. Of all societies studied, the only one that shows this pattern to an extreme degree is nineteenth century Europe and North America. This explains why the age of puberty at this time was around 17, far later than in the in any society today.[177]

And this was not a result of poor nutrition, as is often proposed.[178] People in the Middle Ages typically reached puberty around 13 or 14, similar to the present day, and this at a time when hunger and even famine were more prevalent than in Victorian England.[179]

Both aspects of C can be transmitted epigenetically, through sperm and ova. It seems likely that parents with high infant C will transmit infant C, while parents with high adult C will transmit adult C. These levels can then be changed by life experience, in infancy and from late childhood onwards, respectively.

To this time. we have treated infant C as the product of parental control in infancy, and adult C as resulting from control in late childhood. But C-promoters can also depend on the economy. People who pass their late childhood in prosperous times tend to show features of lower adult C. Those who pass it in times of recession have higher adult C.

By studying the effects of prosperity and recession in late childhood we can gain a clearer picture of adult C. This will also help us to understand the reason for calamities such as the Great Depression, and for (among other things) the postwar baby boom. That is the subject of the next chapter.

8. The Recession Cycle

"*Hard times create strong men.*" ― G. Michael Hopf

In earlier chapters we have looked at civilization cycles, which take thousands of years to play out. This chapter will consider another kind of cycle, which Biohistory refers to as a 'recession cycle', which takes only a few decades, but also has a pronounced effect on demography.

Each cycle depends on particular variables. Civilization cycles reflect long-term changes in child V and infant C. Recession cycles are the result of fluctuations in adult C which, as outlined in chapter three, depend on how the brain reacts to dopamine.

People with high adult C are relatively sensitive to dopamine, and so are more likely to be satisfied by the trickle of dopamine from such activities as work, family and children. People with lower adult C are less sensitive to it and so feel the need for dopamine surges from gambling, sex, competition, alcohol and drugs, and novelty and variety of all kinds.

In chapter seven we looked at how economic depression raised adult C in the people who experienced it between the ages of six and 12, the most crucial age for these epigenetic settings. Twenty years later, when this generation reached peaked childbearing age, the birth rate surged. In this chapter we will discuss what caused the recession in the first place, outlining the entire recession cycle.

On September 3, 1929 the US stock market was at an all-time high. There had been an unprecedented bull run for nine years, with the Dow Jones Industrial Average worth ten times as much as it had been at the start of the decade. Some stocks did even better than that. In 1921, shares in RCA were worth $1.50; by 1928 they had soared to $420.[180]

Stock speculation had become a national mania, with many investors buying "on margin" (using cash borrowed against collateral), which meant that a rise in the share price made big money but a fall could wipe them out.[181]

Stock prices eased slightly during September 1929, but then on Black Tuesday, October 24, the market lost 11% of its value. Despite all the efforts of bankers and politicians, the decline went on until the Dow was down 89% by July 1932. America was plunged into the strife and privation of the Great Depression. Industrial production fell by 46%, foreign trade by 60%, and unemployment rose to more than six times its previous level. Other countries caught the contagion, with unemployment more than doubling in France and Germany.[182]

Other areas of society, not just the economy, felt the effects. Political disputes often became bitter and sometimes violent, and in an atmosphere of fear and instability there was a growth of extremist

parties on both the right and left. In Spain, ideological conflict contributed to civil war between left-wing and right-wing forces.

In Germany, the economic crisis helped bring the Nazis to power. While the origins of the Second World War lie primarily in the aftermath of the First World War, the radicalization and brutality of the Nazi regime were intensified by the political tensions and crises of the time.[183]

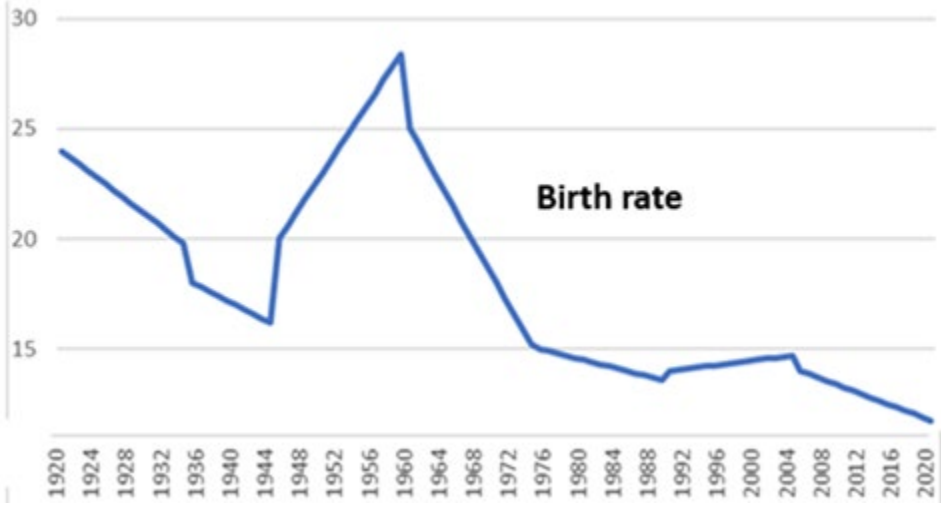
What caused the crash?

Explanations for the Great Depression are many and varied. They range from Keynesian lack of stimulus to contraction of the money supply, to trade protectionism and attempts to freeze wages and prices. Biohistory, once again, takes a different approach. As with the cyclical patterns of civilization, it proposes that recessions are the result of a change in the temperament of the general population.

What is so striking about the early twentieth century is the sharp contrast between the prosperity and optimism of the 1920s, the poverty and gloom of the 1930s, and the baby boom of the 1950s. What Biohistory suggests is that the prosperity of the 1920's actually *caused* the poverty and gloom of the 1930's. And that the poverty and gloom of the 1930's actually *caused* the baby boom of the postwar period.

One striking effect is on birth rates. Twentieth century America saw an overall decline in fertility, but as Fig. 29.1 shows, the decline was far from uniform.

Fig. 7.1. US crude birth rate 1910–2010 (births per 10,000 population)[184]



The birth rate was at its lowest during periods of economic malaise such as the 1930s late 1970s to early 1980s, when unemployment was high. It is common to blame these birth rate "troughs" on economic recession but, as can be seen from the data, the greatest declines in birth rate occurred in the periods of prosperity such as the 1920s and 1960s *before* the recessions. There is a connection between birth rates and recessions, but it is far more interesting than commonly thought.

Roaring Twenties, rising stress

The decade of the 1920s, known as the 'Roaring Twenties', showed every sign of an especially rapid fall in adult C. It was a time of prosperity and rapid urbanization. [185] The Dow Jones index of the American stock market increased more than five times between 1921 and 1929.[186] Share ownership also became far more widespread, with millions buying stocks on installment plans.[187] This 'get rich quick' attitude is clear sign of dopamine insensitivity, which Biohistory refers to as falling adult C. It is the desire for wealth, without the routine work that is the best way to achieve it.

It was a time of innovation and change. Jazz grew rapidly in popularity, especially in the United States and Europe. New architectural and design styles such as Art Deco emerged, emphasizing modernity and geometric form. In the visual arts, movements such as expressionism (developed earlier but influential in the period) and surrealism broke with older traditions and explored new ways of representing reality.[188]

None of these changes were positive or negative in themselves, of course, but they are a sign of a growing thirst for novelty typical of the dopamine-insensitive mind.

In the 1920s, especially in urban areas of Western countries, fashions changed, with skirts becoming shorter and styles more relaxed. At the same time, social attitudes toward relationships and sexuality became more permissive in some circles, particularly among younger and urban populations.[189]

All this indicates insensitive brains chasing dopamine surges from sex, novelty, and excitement, especially among the young. These changes were seen not only in America but in other advanced areas such as Europe. The effect was extreme, much stronger than anything experienced in previous generations.

People with lower adult C have brains that are less sensitive to dopamine. They are more hedonistic and pleasure seeking. They tend to have wide social networks and enjoy crowded parties and exciting and competitive occupations. This cascade of high-density experience induces a rise in cortisol levels, which can be pleasurable. For example, people who take Ecstasy at dance clubs and raves can experience an 800% increase in cortisol.[190]

It might seem strange that people would choose activities that increase stress, but this is a well-known facet of human psychology. A common reaction to excitement, novelty and danger is a rise in adrenaline and cortisol, both stress hormones. At moderate levels this can be pleasant, even euphoric. It is the thrill that people get from extreme sports, or from bungee jumping or a roller coaster. The sense of danger is what makes it attractive.

The same can be said of the crowds, flashing lights and loud, thumping music at a nightclub, as well as the adrenaline rush experienced by elite traders in a fast-moving market. But the fact that a particular kind of stress may be welcome doesn't make it safe. People who experience divorce, the death of a spouse or financial crisis suffer an increased risk of illness and death. But positive events such as marriage, a change of job, the birth of a child or outstanding personal success are also stressors which increase the chance of illness or death.[191]

We can see evidence of rising anxiety in the 1920s, beneath the surface level of exuberant optimism. This shows most clearly in literature, art, and intellectual life. Writers such as Ernest Hemmingway and F. Scott Fitzerald portrayed the moral and emotional emptiness beneath wealth and glamor in novels such as The Great Gatsby (1925).

In art, expressionist works often emphasized distortion, tension and emotional intensity. Popular films such as The Cabinet of Dr Caligari (1920) expressed themes of madness, authority, and fear. Freud explored themes of repression and the instability of the self, seeing humans as less rational and more conflicted than in the past.[192] Historians commonly refer to the 1920s, along with the 1930s, as an 'Age of Anxiety'.[193]

Chronic stress affects how the brain processes emotions and expectations. Prolonged exposure to stress hormones like cortisol can make individuals more likely to focus on negative outcomes, expect failure, and feel less in control. Over time, this contributes to a more pessimistic outlook, often associated with anxiety and depression, which further reinforce negative thinking patterns.[194]

In biological terms, what happens in periods such as the 1920s is a society-wide change equivalent to a growing drug habit. Dopamine surges feel good in the short-term, but cause growing levels of unhappiness. The quest for surge activities makes everyday interests such as work, family, community and faith seem boring by comparison. Yet these are exactly the activities most reliably linked to happiness.

Preference for the excitement of crowds may also increase the perception of crowding, which in animals is a major stressor. These stresses build until a tipping point is reached. This is what happened in 1929, when the stock market reached a peak, and then began to fall.

The Great Depression

After 1929, the optimism of the late 1920s abruptly gave way to deep pessimism and uncertainty. The stock market collapsed, triggering a wider economic crisis, and millions lost their jobs. The effects of the Great Depression were severe and long-lasting. Many people experienced poverty and hunger, while others struggled to afford basic necessities such as heating and adequate clothing. For those who lived through it, the Depression left lasting social and psychological scars.[195]

Biohistory proposes that the Depression was so severe because the level of stress was unusually high, itself a product of the unusually rapid fall in adult C during the 1920s.

There are even more grave effects when stress soars. High levels of stress are deeply unpleasant, and people experiencing them tend to be angry or fearful, and suspect others of ill will. We have seen how the highly stressed Mundugumor were filled with anger and mutual suspicion.

The rise of fascism in the 1930s can be understood in the way. German anxiety was accentuated by unemployment and insecurity. This raised the appeal of groups such as the Nazi Party, which preached hostility and hatred towards Jews and other minority groups. Paramilitary groups such as the SA (Stormtroopers) used violence and intimidation against political opponents, especially communists and socialists, helping to undermine democracy.[196]

Historian Richard Evans describes the innate aggression of the SA, the Nazis' private army, after the party came to power:

> As the young brownshirts found their violent energies deprived of an overtly political outlet, they became involved in increasing numbers of brawls and fights all over Germany, often without any obvious political motive. Gangs of storm troopers got drunk, caused disturbances late at night, beat up innocent passers-by, and attacked the police if they tried to stop them.[197]

Insecurity was also rife within the Nazi hierarchy, as seen in the personality of Adolf Hitler. Having established himself as Chancellor of Germany in 1933 and sensing a possible threat to his power, in 1934 he ordered various potential rivals to be dispatched in the "night of the long knives." Hitler was quite aware of the appeal of Nazi ideology to the anxious and discontented, as he stated in *Mein Kampf*:

> The fact that millions of our people yearn at heart for a radical change in our present conditions is proved by the profound discontent which exists among them. This feeling is manifested in a thousand ways. Some express it in a form of discouragement and despair. Others show it in resentment and anger and indignation. Among some the profound discontent calls forth an attitude of indifference, while it urges others to violent manifestations of wrath. Another indication of this feeling may be seen on the one hand in

> the attitude of those who abstain from voting at elections and, on the other, in the large numbers of those who side with the fanatical extremists of the left wing.
>
> To these latter people our young movement had to appeal first of all. It was not meant to be an organization for contented and satisfied people, but was meant to gather in all those who were suffering from profound anxiety and could find no peace, those who were unhappy and discontented.[198]

Hitler was aware that anxious young people were also attracted to Communism, which flourished at the same time, especially in its more violent forms. Though ideologically opposed to one another, Communism and Nazism were psychologically similar in that both legitimized hostility and anger.[199] Both were therefore more readily accepted by people who were anxious and highly stressed.

Political confrontation between left and right was most dramatically played out in Spain in the 1930s, culminating in the Civil War of 1936–39. The conflict pitted a coalition of left-wing groups—including socialists, communists, and anarchists—against right-wing Nationalists led by Franco, which included fascists, conservatives, and monarchists. Both sides used violence and repression, though their ideologies and aims differed significantly.

The Nationalists ultimately established an authoritarian regime with strong links to fascism, while the Republican side included movements that sought radical social and economic change.[200] The appeal of both left- and right-wing movements in Spain can be partly explained by already high anxiety made worse by the economic and political crises of the 1930s.

Once again, the explanation for the appeal of both Communism and Fascism in Spain is that Spaniards also experienced a surge of stress in the 1930s, along with the rest of Europe and North America.[201]

The Russian Revolution and the Terror

The same analysis can be applied to Russia, with the major difference being that the Russians were already more stressed than elsewhere. Writing in the late 1890s, Olga Semyonova Tian-Shanskaia gives us a vivid account of the treatment of children among the Russian peasantry:

> Up to the time Ivan takes his first steps, he is looked after by his sister, a girl of nine or ten years of age. She has difficultly carrying him and drops him … Sometimes Ivan tumbles down a hillock. When he cries, his baby-sister uses her free hand to slap him on the face or head, saying "keep quiet, you son of a bitch." Sometimes his sister leaves him on the ground … For an hour or more, he crawls around in the mud, wet, covered with dirt, and crying.[202]

Infant deaths were also common in this period, and some were thought to be intentional, the prevalence of infanticide being strong evidence of a highly stressed society. Children were also treated harshly, beaten for such offenses as screaming, getting muddy, stealing food, lying,

swearing and fighting. Domestic violence was endemic, with many husbands beating their wives severely, sometimes to death.[203]

All these indications paint a picture of Russia in the late nineteenth century as far more stressed than Western Europe or America. Like them, Russia too was experiencing a decline in adult C, as observed by loosening sexual morals.[204] This effect was strongest in the cities, and so it is no surprise that Bolshevik support was strongest in urban areas.

When the Tsar was overthrown in February 1917 and replaced by a democratic socialist government, stressed and anxious Russians lacked the temperament to support it. Primed to accept brutal authority, most accepted the October Revolution which brought the Bolsheviks to power.

A bizarre but commonly expressed desire among workers and peasants during the 1917 revolution was for a "democratic" government but with a "strong Tsar" at the head of it.[205] This does not mean they would have voted for dictatorship, if given the chance, but they were more ready to accept its dictates once in power.

Thus it is that when Russia shared in a European surge of stress during the 1930s, it turned from an already brutal autocracy to a far more brutal and even murderous one with show trials, gulags and mass murders. Fear and suspicion were rampant at all levels of society, making people ready to accept accusations that this or that person was a traitor or saboteur. One historian describes the effects of this stress at its height:

> The "Gulag archipelago" of labor camps strung across the less hospitable parts of the Soviet Union, above all in Siberia, swelled to bursting with millions of prisoners by the late 1930s. From Stalin's acquisition of supreme power at the end of the 1920s to his death in 1953, it has been estimated that over three quarters of a million people were executed in the Soviet Union, while at least two and three-quarter million died in the camps. In this atmosphere of terror, fear and mutual recrimination, anything out of the ordinary could become the pretext for arrest, imprisonment, torture and execution.[206]

To us, looking back, this sort of behavior makes no sense, but we are not psychologically attuned to see treachery around every corner. Nor are we primed to submit to brutal authority.

But it was the very brutality of the government which caused the highly anxious Russians of that time to obey it, while the same brutality would cause less anxious people to resist it. As discussed earlier with reference to the Middle East, government reflects the prevailing attitudes of the population even when most people hate it. Anxious people tend to accept and obey powerful authority, whether elected or imposed.

Russians were already stressed in the 1920s, as evidenced by the brutality of the Revolution, and became even more so in the 1930s. Conventional wisdom is that a brutal regime imposes stress on

a society. Biohistory accepts this, but suggests that increasing levels of stress in the general population is what makes a regime more brutal in the first place.

Human societies under stress behave in ways that are fundamentally similar to the Whipsnade baboons described in chapter nine. Under extreme stress the normally protective dominant male began to attack other baboons without provocation. Likewise, each animal below him was liable to attacking those beneath, to the extent that almost all females and young were killed. In other words, the autocrat does not create the stress, the stress creates the autocrat.

Thus, Stalin can be understood as not only the cause of widespread stress but a product of it. And as stress ebbed during the 1940s and early 1950s so too did the Terror, even while Stalin was alive. Though Russians remain more stressed than Western Europeans to this day. Which is why, in effect, the Russian have elected themselves a new dictator in the form of Vladimir Putin, while keeping some forms of democracy.

Stressed animals and people tend to give higher status individuals more power. In humans this can translate into governments taking or being granted more power over the economy. This was a common feature of the 1930s. In Russia, the relative liberalism of the New Economic Policy in the 1920s gave way to forced collectivization, including deliberate mass starvation of those who resisted. In Germany, the Nazis left ownership in private hands while giving the State far more power over the economy.

The same thing happened even in societies that remained moderate and democratic. In the United States, Roosevelt's New Deal introduced a range of measures to address the Depression. The government acted to raise agricultural prices, establish minimum wages and labor standards, regulate the banking system and insure deposits, and implement large-scale programs of public works and unemployment relief.[207] Much of this would be uncontroversial today, but it was a huge expansion of federal power for the time.

The Baby Boom

The Depression was to have another and very marked effect. Recall from the last chapter that people experiencing parental control in late childhood have a very different temperament than those who do not. This is because parental control is a C-promoter. But hard times are also C-promoters, and the people who experienced the Depression in late childhood had all the characteristics of higher adult C. In particular, they were the parents of the baby boom.

Popular thinking is that this was a response to the war, but history shows that major wars are typically followed by *falling* birth rates. The trauma of World War I in 1914-18 was followed by a baby bust, after a short-lived rebound in 1919-21. The same pattern was seen in America, Australia, and Western Europe. The only industrial country to see a surge in births after World War I was Japan, which did not actually join the fighting.[208]

The birth rate also fell after the American Civil War of 1861-65, by far the most traumatic in U.S. history. Between 620,00 and 750,000 soldiers died in combat and disease, more than 2% of the entire population. Per head of population, this was 6-7 times the fatality rate of World War II.[209] Yet in the 20 years after the end of the Civil War, the fertility rate *fell*. From 5.2 in 1865 to 4.61 in 1885.[210]

The same thing happened in England, some decades earlier. The Napoleonic Wars were another brutal and lasting struggle, with military deaths between 1.3% and 1.7% of the population.[211] When the war ended in 1815, the English fertility rate stood at roughly 5.5. Twenty years later it was down to under 5.[212]

It continued to fall until the 1840s, a time of Depression and poor harvests known as the Hungry Forties.[213] Then it began to recover, reaching a new peak in 1865.[214] This is the exact same pattern as the Great Depression and the baby boom, and even the same timing. The birth rate reached a peak twenty years after the mid-point of the Depression.

In fact, a better explanation of the baby boom is that it was a product of the Great Depression, in particular for those who experienced it in late childhood. This can be seen be looking at the ages of the people who had the most children.

The baby boom reached a peak in the 1950s, with the central year of 1955. The average age of U.S. mothers in the 1950s was 25-26, and of fathers 27-30.[215] Taking 27 as the average for both sexes, this means that 1950s parents were typically born between 1923 and 1933.

The Great Depression extended from 1930 to 1940, so someone born in 1923 would have experienced it between the ages of 7 and 17. Born in 1933, they would have experienced it from birth to age 7. People born before or after these dates had significantly fewer children.

This suggests that the cohort having the most children typically experienced the Depression between the ages of about 5 and 12. Interestingly enough, this is the same age at which so many cultures, such as those of India and China, exercise the maximum control of children.

This helps to give a clear picture of the effects of C-promoters in late childhood. It was not only a time of peak birth rate but of peak marriage. The proportion of U.S. adults who were married rather than single reached a peak in the 1950s.[216]

So too did engagement with community. All sorts of communal organizations reached their highest level of membership in the 1950s. These include churches, Trade Unions, fraternal groups such as the Elks and Masons, and even bowling leagues. A vivid picture of this time, and of the decline in community since then, can be found in Robert Putnam's book *Bowling Alone*.[217] Family, children, community-these are all clear indications of higher dopamine sensitivity.

People at this time also seemed less focused on the struggle for status, which made it the most egalitarian period in all of American history. The top federal tax rate in the 1950s was 91%, which put a virtual ceiling on how much people could be paid.[218] In 1960, CEO's were paid only 20 times as much as a typical worker. By comparison, that ratio has lately risen to 281 times.[219]

These were not the only effects. Anonymous surveys since 1997 have asked adults how often they feel nervous, hopeless, worthless, depressed, or that everything is an effort, a standard test for mental distress. The lowest rates were expressed by people born in 1930-34, compared with those born before or after.[220] Suicide rates show the same pattern, with people born in the 1930s killing themselves less often than any other cohort.[221]

An economic downturn in the late 1970s and early 1980s had a similar effect on fertility though less than that of the 1930s, presumably because the economic crisis was less severe. The decline in the American birth rate was slowed and even reversed for a time. In fig 7.2 the birth rate chart is plotted twenty years after the unemployment chart, to make the link clearer. People born in 1975-84 also had a lower suicide rate than those born in the decades before or after, though they were still more likely to kill themselves than people born in the 1930s.[222]

Fig 7.2. American unemployment and birth rate figures

These three examples show not only that recessions preceded baby booms, but that the timing was exactly the same. Birth rates fell most rapidly before the recession, somewhat more slowly during the recession, began to rise after the recession, and reached a peak some twenty years after the mid-point of the recession.

The Return of Prosperity

The baby boom did not last. By 1940, aided by the stimulus of World War II, the Great Depression was over. After 1945 the return of peace led to an unprecedented era of prosperity. Cars, home ownership and TVs spread rapidly. This prosperity continued until the mid-1970s, after which the "stagflation" of the late 1970s and early 1980s marked more uncertain times.

The cohorts most affected by postwar prosperity were those born roughly between 1940 and the mid-1950s, who passed their late childhood during a period of rising living standards and expanding education. Many of these young people formed the youth culture of the 1960s, which in some countries was associated with challenges to traditional social norms, including greater sexual freedom, experimentation with drugs, and new forms of music and lifestyle. These attitudes were captured in slogans such as Timothy Leary's 1966 phrase, "Turn on, tune in, drop out."[223]

As in the 1920s, the significant change was in the youth generation, not the population as a whole. Many older people were uneasy about the rapid social changes of the period. They often valued stability, discipline, and traditional moral standards, and viewed the behavior of some younger people—such as new fashions, changing sexual norms, and drug use—with concern or disapproval. This generational divide contributed to tensions within families and wider society.[224]

But it is the youth generation, especially people in their late twenties and early thirties, who must decide whether or not to have children. So another effect of falling adult C was a plunge in the birth rate, as in the 1920s. Economic theory would suggest that people should have more children in prosperous times, and less in recessions. But biology follows a different logic. People with lower adult C, and thus brains less sensitive to dopamine, are more likely to put wealth and success ahead of other values, such as religion and family.

Putting all this together provides an overall picture of the twentieth and early twenty-first centuries in terms of infant and adult C. The picture is especially applicable to America but has relevance for other Western countries. Its basis is a prolonged decline in both C as a consequence of the civilization cycle and modern wealth.

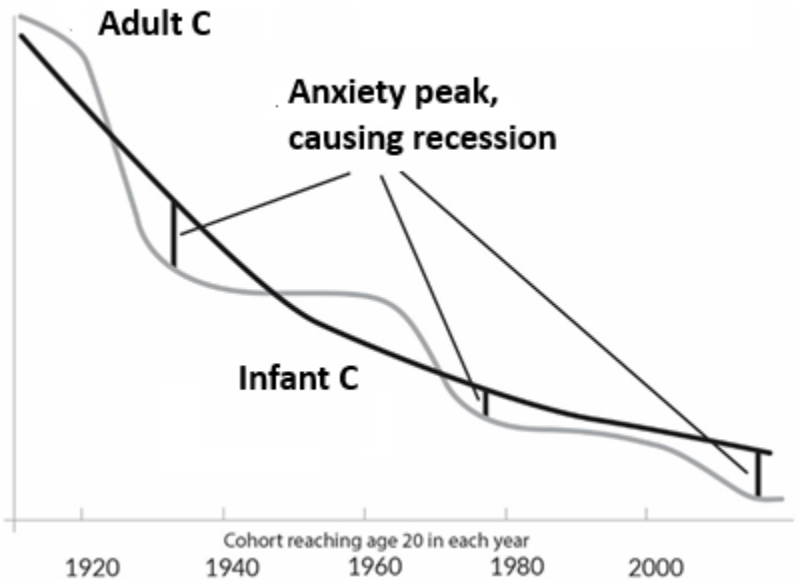
Adult C is associated with community and family, infant C with competition and isolation. People with high levels of infant C relative to child C tend to be unhappy. The Manus people described in chapter six, who controlled infants but not older children, were highly discontented. This is also characteristic of addicts, who push down their own adult C with drugs such as cocaine. Their infant C, of course, is fixed in early childhood.

Having low adult C as such is not a problem. Hunter gatherers, who have low levels of both infant and adult C, appear to be content with their lives.

But when adult C falls unusually fast, such as happened to youth in the 1920s and 1960s, rising anxiety tends to plunge the society into recession. People who pass their late childhood in the recession tend to have higher adult C, reducing stress levels and so promoting prosperity. Which then lowers the adult C of the next generation.

These fluctuations in the level of stress are described in Fig. 7.3 below.

Fig. 7.3. Uneven decline in C as an explanation for surges in stress levels. As adult C drops faster than infant C in hedonistic eras such as the 1920s and 1960s, stress rises causing recession and (in the 1930s) political terror.



The Global Financial Crisis

Biohistory proposes that governments have little or no power to halt the underlying forces of economic and political change, because these forces are driven by changes in temperament. Governments could not prevent or cure the Great Depression. And in 2007 they could neither prevent nor cure the global financial crisis.

By the end of the twentieth century a generation came of age that had known nothing but prosperity. Once again, as in the 1920s, there was a speculative boom, but this time in property rather than stocks. People borrowed more than they could afford to buy bigger houses than they needed, with the idea that ever-rising prices would make them rich. Governments supported this by arranging loans to marginal borrowers through government-backed institutions such as the US Federal National Mortgage Association ("Fannie Mae") and Federal Home Loan Mortgage Corporation ("Freddie Mack"). Trading houses bought up billions in mortgages without adequately checking the security behind them, again with the assumption of ever-rising prices.

This environment can itself be productive of stress. In *The Hour Between Dog and Wolf* (2012), John Coates gives a vivid picture of traders in the financial markets in the period leading up to the Global Financial Crisis.[225] This fast-paced business requires split-second decision-making and an appetite for risk, and is thus one of the few professions that benefit from high testosterone. Success can bring enormous prestige and multi-million-dollar bonuses, but such an environment also tends to increase stress.

In this environment, once again, stress rose past the tipping point and the market crashed. Coates' study shows how this impacted on the market traders. As the market plunged, traders' testosterone

fell and cortisol rose, creating problems opposite to those of the boom. Stressed traders stopped being irrationally optimistic and became so risk-averse that they failed to see clear opportunities for gain. Buying slumped and the crunch was even worse than it should have been. Even a drastic cut in interest rates by the US Federal Reserve had no great impact, because the problem was hormonal and psychological rather than rational.

Biohistory suggests that the general population experienced the same hormonal and psychological changes, also driven by stimulus-seeking behavior as a result of falling adult C. And, once again, it proposed that the key rise in stress was that which happened *before* the crash.

Theory suggests that the decline in the birth rate might slow slightly in the decade ahead, as a result of the 2008-9 downturn, though the crisis was so short and the downward trend is now so extreme that fertility is unlikely to rise. It also suggests that the decline after the mid-2030's should be especially dramatic.

From this viewpoint an economic recession can be seen as a kind of nationwide—or even worldwide—stress attack. And that is why government actions, no matter how soundly guided by economic principles, have so little effect. The basic problem is not economic or even cultural but biological.

An understanding of recession cycles explains why the economic impact of Covid was relatively mild and short-lasting. Though stressful in its immediate impact, there was no decrease in adult C to cause a search for stimulation and excitement, resulting in a long-term rise in stress.

In fact, state-imposed lockdowns may have reduced perception of crowding and had an entirely opposite effect. Thus, world economies recovered rapidly after infections declined, harmed only by inflation set off by government over-spending. Not even sharp rises in interest rates, to counter inflation, could bring about recession. Biology is better than economics in explaining recessions.

Putting together the effects of recession and different parenting styles, we can summarize the features of both infant and adult C

	Infant C	**Adult C**
C-promoters most effective in	Infancy	Late childhood (6-12)
	Hard working	Hard working
	Market Oriented	Family and children
	Nuclear family	Community

	Machine skills	Larger political units
	Flexible thinking	Consensus minded

But to understand differences between societies, we need to look further than C and C-promoters. That is the subject of the next chapter.

9. Aggression and War

"Cry havoc, and let slip the dogs of war." – Shakespeare, Julius Caesar, Act 3, Scene 1

In previous chapters we examined the biological mechanism known as C, an epigenetic setting that makes the dopamine system more reactive. People with low C tend to be hard-working, disciplined, more monogamous and fertile, and form larger political units.

We will now look at another epigenetic mechanism associated with traits such as self-confidence, energy, and aggression. It can also be linked to high levels of testosterone.

One immediate effect of C-promoters is to reduce testosterone, but high C peoples are not generally low in testosterone. Nor are low C societies high in it. As an obvious example, C is falling rapidly in the modern world. Traditional religions and the sexual mores they support are in rapid retreat, as is the work ethic. This trend will be discussed more fully in the final chapter.

And yet, levels of testosterone are falling fast. Between 1999 and 2016, young US men experienced a decline from 605 to 451 ng/dl (nanograms per deciliter), a drop of 25%. [226]

Aggression and testosterone go together. Men with high testosterone tend to be aggressive, and make effective but ill-disciplined soldiers. Groups with very high C, such as Orthodox Jews and Amish, tend to be peaceful. But high C societies can also be quite aggressive. There may be multiple reasons for falling testosterone in recent decades, but Biohistory proposes this factor to be one of them.

Victorian England: High C and Warlike

As an example, the British of the Victorian era had exceptionally high C, as indicated by the levels of industriousness, discipline, intellectual achievement, invention and productivity. Most of all by a remarkably late age of puberty, which averaged 16.5 in 1840, and as late as 17 in some European countries.[227] This was supported by the Victorian moral code, which is a byword even today for its strict standards of child discipline and sexual restraint.[228]

People with high C such as the Amish tend to be relatively unaggressive, but this was not the case for the people of Victorian Britain. The courage of British soldiers at this time was extraordinary by any standards, as indicated by accounts of the Crimean War in the 1850s. This war is perhaps best known for the incompetence of the British generals, but it is also an astonishing account of raw human courage and vitality.

One outstanding engagement was the charge of the Heavy Brigade at the battle of Balaclava, in which about eight hundred British cavalry charged uphill into three to four thousand Russian

cavalry. There was no space for pistols or carbines. The men hacked at each other with swords or, when these broke, in some cases fought with their bare hands, yelling and cursing with rage that could be clearly heard on the heights above. The enemy broke, and then fled.[229]

Warlike courage is also typical of other high C peoples such as the Romans of the third and second centuries BC. In fact, a people's level of aggression seems to be relatively independent of their level of C. Consider two societies with relatively low C but at opposite extremes in terms of their level of aggression.

The Yanomamo: Low C and Warlike

The first is the Yanomamo, already considered in chapter two as an example of a low C society with no political organization beyond the village level and practicing only part-time shifting agriculture. They were also ferociously aggressive, feared by their neighbors and engaging in incessant warfare amongst themselves.[230]

One ritualized form of conflict among the Yanomami was the chest-pounding duel, where men endured powerful blows to the chest without retreating. Although governed by social rules, these contests could result in serious injury and occasionally death. Broader disputes could escalate rapidly into chaotic club fights involving much of a village.[231]

There was also outright war. Raiding between villages was constant, usually justified by some past grudge. Even if there had been no actual offense to justify revenge, they might attack on the belief that the other village had been using sorcery against them. Fear and suspicion of outsiders was endemic within Yanomamo society and not without some cause—it has been estimated that 25% of all deaths among adult males were due to violence.

According to research by Napoleon Chagnon, Yanomami men who had participated in killings tended to have more wives and more children than men who had not. Chagnon suggested that success in warfare and the reputation for toughness or ferocity could increase a man's status and reproductive opportunities.[232]

The Tchambuli: Low C and Peaceful

Consider by contrast the Tchambuli, a New Guinea people at a similar state of economic and political development. As described by Margaret Mead, males in this society were in stark contrast to the Yanomamo:

> All that remains to the individual Tchambuli man, with his delicately arranged curls, his handsome public covering of a flying-fox skin highly ornamented with shells, his mincing step and self-conscious mien, is the sense of himself as an actor, playing a series of charming parts—this and his relationship to the women. His relations to all other males are delicate

> and difficult, as he sits down a little lightly even in his own clansmen's house, and is so nervous and sensitive that he will barely eat in the houses of other clans ….[233]

Rather than winning females by ferocity and fear, Tchambuli males competed with each other on the basis of charm and looks! They were so lacking in aggression they were forced to maintain their headhunting traditions by *purchasing* captives from neighboring tribes. Later studies suggest that this overstated the case, that the Tchambuli did make war at times and that many men beat their wives.[234] But the Tchambuli do appear to have been less overtly warlike than neighboring groups, at least according to early ethnographic accounts. Mead noted that, in the period before sustained European contact, they had been displaced from their fertile lakeside territory by more aggressive neighboring peoples.[235]

Harsh Environments and Warlike Aggression

It is significant that the Tchambuli lived in affluence, by pre-industrial standards. Historically, many warrior peoples emerged from regions with harsh climates and difficult terrain. These include the Elamites and Persians from the mountains or Iran, the Aramaeans and Arabs from the desert, and mounted nomads of the Eurasian steppe. Again and again, they have swept down to raid and rule the more peaceable peoples of the settled lands, only to lose their warlike aggression and be raided and ruled in turn by a fresh wave of invaders.[236]

People living in such lands will often tend to be short of food, but their shortages are very different from those of animals living in a tropical rain forest, such as gibbons. They are occasional and severe, rather than chronic and ongoing, alternating times of famine with relative plenty. In this sense, their environment is much like that of baboons, with occasional severe stresses.

Severe stresses can also be environmental. Such environments tend to be very cold or very hot or alternating between the two, as is common in deserts. Cold and heat are also stressors. This understanding will help when we come to look at the physiology behind this factor.

Warlike Nomads and Khaldun Cycles: introducing V

The incursion of warlike barbarians has been most famously described by the Muslim scholar Ibn Khaldun. He described what are known as 'Khaldun cycles', in which vigorous nomadic peoples invaded and conquered the settled lands, before becoming softened by wealth until overcome by new barbarians.[237]

Success in war depends on more than just aggression. It requires the ability to fight as a group. This applies equally to Yanomamo warriors, nineteenth century British soldiers or desert nomads. Individual violence, simply attacking anyone nearby, would be a poor way to defeat powerful

enemies. Ibn Khaldun especially emphasized the importance of social cohesion in successful conquerors.[238]

Aside from C, Biohistory posits another physiological system which causes animals and people to be fight effectively, especially in small groups. Biohistory refers to this mechanism as 'V' for vigor, and it involves not only warlike aggression but confidence and the urge to expand and migrate.

It is quite independent of C. Societies can be high or low on either.

	C low	C high
V low	Tchambuli	Amish
V high	Yanomamo	Victorian Britain

In the next chapter, we will investigate what V is, and how it is generated.

10. Promoting V

"What does not kill me makes me stronger." — Friedrich Nietzsche

This chapter will consider what V is, and how it is generated. In the broadest terms, Biohistory proposes that V is a product of intermittent stresses, including severe hunger and attacks by predators or enemies, interspersed with periods of lower stress. This is quite distinct from chronic stresses caused by overcrowding or low social status, that allow no chance for relief. It is also quite distinct from the mild food restriction that gives rise to C.

As with C, animal models can help provide a clear picture, and a good model for high V is baboons. Baboons, like the warlike tribes of desert and mountain, live in areas where famines are a regular occurrence. Appropriately, they are perhaps the most ferociously aggressive of all primates, and thus a good example of high V.

Consider their reaction to leopards:

> [If] the baboons are able to isolate a leopard in a bush, tree, or aardvark hole, they immediately surround it, screaming, alarm-calling, and lunging at it, seemingly without fear. Although male baboons, with their size and enormous canines, are much better equipped than females to fight a leopard, the mass mobbing involves baboons of every age and sex. Juveniles, adult females, even mothers with young infants join to form a huge, hostile mob that tries to corner the leopard. The attack continues even after some baboons have received slashes on their arms, legs, and face that open up huge wounds.[239]

Leopards may even be killed by such attacks. Baboon males also fight savagely amongst themselves when contesting for dominance in the troop. But when the hierarchy is stable, as is most commonly the case, they are able to act very effectively in concert. Troops even move in a highly organized fashion. They set off in a coordinated manner with males—especially the alpha male—somewhat more likely to take the initiative,[240] and with the most vulnerable troop members protected in the center.[241] When the troop is faced with danger, the dominant males race forward to face it, provided they have reason to believe some vulnerable infants are theirs. Just like the human societies most successful in war, baboons are both highly aggressive *and* well-organized.

Baboons are also low C, which helps to make them bolder, but this does not account for their ferocity nor their organization. Domesticated animals are low C in that they are highly sexed, breed fast and provide little care of young. But they are also strikingly unaggressive, which is vital to survive the intense crowding of the farmyard.

Baboons are not only aggressive but intolerant of crowding. Early last century a colony of mainly male hamadryas baboons was established at Whipsnade Zoo in England. They became intensely stressed and most were killed in vicious conflicts, especially the vulnerable females and young.

Status differences were extreme and yet the status hierarchy was unstable, all behaviors associated with stress in human societies.[242]

Thus, while domesticated animals are high C and low V, baboon are high C and high V.

V adapts to harsh environments

In chapter two we saw that C is increased in animals by mild, chronic food shortage, and it adapts behavior to environments where food is chronically short. V, on the other hand, is an adaptation to dangerous environments where food supplies are highly *variable*.

Consider the savannah habitat where most baboons live. As discussed in chapter two, food is plentiful for the most part, but in times of drought local food supplies can disappear. Then, baboons face starvation. The only way to survive is to migrate to areas where some may be available. And what this requires is aggressive, tightly organized bands which are energetic enough to make the journey. A high V temperament provides this.

The other danger baboons face is from predators. Most monkeys live in trees or at least in forested areas where they can easily escape from predators. But baboons are ground dwellers who live with the constant threat of attack by lions and leopards. The level of resulting anxiety is illustrated by this account of baboons crossing a dangerous water channel:

> Water crossings … are fraught with anxiety. Long before they enter the water, the baboons sit at the island's edge, nervously grunting and looking out towards the island they hope to reach. Any movement on the water's surface elicits a chorus of alarm calls and brief flight. Once they seem satisfied that the coast is clear, adults begin to cross. Reluctantly, the juveniles follow, some grunting nervously, others moaning or screaming, and others running to leap on their mothers' backs, anxious to get a ride … The whole spectacle is chaotic and amusing to the human observer but deeply distressing for the baboons, who are out of their element and vulnerable to any predator that lurks in the water or along the too-well-travelled path.[243]

Actual attacks are even more traumatic, and analysis of feces shows that female baboons experience a dramatic rise in stress hormones after a close relative is taken.[244]

The aggressive and well-organized high V character of baboons not only makes migration feasible in times of famine but is a way to deal with predators. What both these dangers—famine and predators—have in common is that both are severe but also occasional stressors.

Intermittent Stress Increases V

Stress can best be seen as a response that helps animals cope physically with danger—the so-called "fight or flight" mechanism. When faced with a challenge, such as a hungry lion or a rival member of our own species, stress hormones including adrenaline, noradrenaline and cortisol are released

into the bloodstream. These work to shut down bodily systems not related to fighting or running away, diverting resources into muscles and other functions needed to cope with immediate danger.[245]

Normally, this reaction shuts down quickly when the danger passes, but in some cases, stress can become chronic, such as when an individual cannot escape from being harassed by more powerful rivals.[246] In this case the response system becomes weakened, resulting in psychiatric disorders.[247] Dopamine is reduced, leaving people with low motivation and unable to experience enjoyment. Depleted noradrenaline cells can lead to a lack of arousal and enthusiasm.[248] Depressed people commonly combine low levels of noradrenaline and dopamine with chronically high cortisol.[249]

However, short-term stresses—such as those experienced by baboons—have a very different effect. They may actually *increase* the body's ability to manufacture dopamine, noradrenaline and adrenaline, which act very quickly in readying it to deal with danger.[250] A person with an adrenaline/dopamine response to stress is more likely to see it as a challenge. Short-term stresses also bring about a more effective, less harmful cortisol response.[251] Cortisol ramps up when needed but dies down quickly when the immediate challenge has passed, thus avoiding the damaging effects of long-term stress. It is these short-term stresses, which give the body time to recover, that enhance its capacity to cope with future stress.[252]

Furthermore, effective stress regulation may help to moderate aggression, offsetting the negative effects of high testosterone. Research suggests that individuals with strong self-regulation can be assertive, competitive, and capable of controlled aggression without displaying the impulsive or antisocial aggression often associated with chronic stress.[253] Such controlled aggression is what allows high V individuals to cooperate with each other and fight off external enemies. Environmental stresses such as famine and predators thus may produce *exactly* the right behavior to cope with famine and predation.

Authority, Stress, and V

Now we must consider how generations transmit V to one another. There is an obvious advantage to this, in that famine-prone populations need to be able to migrate effectively and fight off predators, even when some individuals may never have experienced either.

As with C, direct epigenetic inheritance is a major factor. The stressful experiences of parents, grandparents and even grand-parents can be transmitted epigenetically through sperm ad ova. But treatment of offspring can also play a role.

One of the patterns seen in the study of primates with different levels of C—such as baboons and gibbons—is the difference in how offspring are cared for. In general, the pattern is that higher C species (e.g. gibbons, adapted for food-restricted environments) produce fewer offspring and give them more attentive care, whereas lower-C species breed much more rapidly and give less parental

care. Similar behavior can be observed in species as diverse as rats and humans, though in humans the main C-promoter for children is parental control (see chapter two).

That is the general pattern, but not the whole picture. Baboons, for instance, do not neglect their infant offspring. Baboon babies are given a great deal of close care and attention by adults during the first year or so of life, particularly from their mothers.[254] But as the infant approaches weaning, usually at around one year of age, maternal care gradually becomes less intensive and the young animal increasingly independent. Mothers typically resume sexual cycling and may conceive again, while juveniles spend more time interacting with peers and navigating troop life on their own.[255]

The juvenile baboon is likely to experience multiple stresses. Not only famine and predation, as discussed earlier, but attack by higher status members of the species. Baboons are highly aggressive, and will often threaten and sometimes attack lower status animals. However, unless in a confined environment such as the Whipsnade zoo population described earlier, they have a chance to escape.[256] These intermittent stresses are likely to produce the toughened stress response characteristic of V.

It is important to note that this would not apply in infancy. The infant baboon is totally dependent on its mother, and from an abusive mother there can be no escape. But, as we have seen, baboon mothers are fiercely protective and dote on their infants.

A general principle, for monkeys as well as humans, is that neglect or punishment in infancy tends to result in lifelong anxiety, including depression and withdrawal, or extreme, uncontrolled aggression. This problem was discovered quite inadvertently when rhesus monkeys were raised without mothers so as to produce healthy animals for research. The project failed, as the animals were so maladjusted as to be useless for experimental purposes. They were unable to relate to others, incapable of normal sexual behavior and liable to self-harm.[257]

But intermittent stress *after* weaning, which includes any experience of powerful authority, may help produce the kind of toughened and enhanced stress response seen in most baboons.[258]

V-Promoting Stress in Humans: Temporary and Avoidable

For humans, the long-term effects of early stress depend on whether the child is old enough to understand the initial stress and can *do something to avoid it*. Infant humans, like infant baboons, are not capable of either understanding or avoidance.

The Mundugumor tribe of Papua New Guinea, studied by the anthropologist Margaret Mead in the 1930s, shows how this undermines social cohesion. Their treatment of even the youngest

infants was rough and neglectful. Infants were kept in a basket hung from a peg and had little contact with their mothers. Older children were subjected to severe and inconsistent punishment. The death of a child was regarded as an annoying mishap rather than a tragedy.[259]

Mead described Mundugumor society as riven by hostility and mistrust at every level—between parents and children, husbands and wives, brothers and neighbors. Fear was a constant, ranging from fear of other people to fear of drowning. The tribe was ferociously aggressive and feared by its neighbors, but in Mead's view lacked internal cohesion.[260] In short, the Mundugumor showed all the features associated with early and chronic stress including fearfulness, extreme aggression, and poor social adjustment.

But when older children are punished for disobedience or some other infraction, a V effect is more likely. The child knows what is expected and can act accordingly. Such control also has a C-promoting effect, so there is a considerable overlap. The distinction is that V requires punishment, and C does not.

Even arbitrary punishment can be V-producing if not too frequent. The Yanomamo may punish their children harshly at times, but they are generally affectionate and indulgent.[261] However, if a child is commonly punished for any reason, then the toughened (high V) stress response is less likely to form.

V is associated with aggression and some level of social cohesion. It is also linked to fast population growth. Fast breeding is a key requirement for any society in a dangerous environment. Baboon populations grow fast when food is available, as do warlike human tribes in deserts and mountains. The Mundugumor, by contrast, appeared to be declining in numbers when Mead came to study them.[262]

Patriarchy

There is one other kind of stress that is effective at promoting V. This is when an individual experiences a moderate level of anxiety in infancy, and then goes on to experience lower anxiety as an adult. This is a very different effect from that of severe stress on nursing mothers or their offspring. Rat experiments show that common effects of severe infant stress include increased fearfulness, impulsive aggression, poorer emotional control, depression-like behaviors, and being more vulnerable to addiction.[263]

But moderate levels of stress can have very different effects. A common experiment is to separate rat pups from their mothers for 10-60 minutes per day during their first 1-3 weeks of life. Reactions vary, but a common result is that offspring show greater resilience in later life. They may show lower corticosterone response to moderate stress, with faster recovery and improved coping behavior. They may also be more vigilant and more persistent in reward-seeking, and show more determined foraging behavior.[264]

Similar results are found when the mother is stressed before conception. Severe stresses have the same negative effect on offspring, while moderate stresses are generally positive. In all of these cases, the rats were not subjected to further stresses after infancy.[265]

Our own experiments showed similar effects, with mild food restriction in mothers before conception, during gestation and while nursing all producing offspring with lower corticosteroid levels as adults. Rats experiencing life-long food restriction, and those whose mothers were not restricted, had higher corticosteroid levels as adults.[266] It is the combination of moderate stresses in infancy, with lower stresses in later life, which are likely to act as a V-promoter.

The most common circumstance in human societies is when an infant male is close to a very anxious mother, and then grows up to be a less anxious man. In other words, when women are more anxious than men. This is achieved by making them subordinate to men. In other words, V (in males) is promoted by patriarchy.

This is the case in all the high V societies described so far. Baboon males are generally dominant over females, helped by the fact that they are a great deal larger.[267] In Victorian Britain, husbands and fathers had considerable authority within the family, while women were expected to focus on domestic and moral roles.[268]

Yanomamo men are probably even more dominant. A wife who is slow to prepare her husband's dinner may be scolded or beaten by hand or with a piece of firewood. More severe punishments for women can include being cut with a machete, shot with an arrow in the leg or buttock, burned with a glowing stick, or even killed (the latter usually for infidelity or even just the suspicion of it). At times, Yanomamo men beat their wives for no apparent reason, other than to "keep them on their toes."[269]

Mead described the Tchambuli, by contrast, as one of the few societies in which women held effective power. Men depend on women for their food, and a man must gain the approval of his wife before making a purchase. This is particularly evident in attitudes towards property, which men must beg from women in return for "languishing looks and soft words."[270]

The role of patriarchy is that it not only creates a high level of anxiety in infancy, but leads to much lower anxiety in adult males. Once a person becomes an adult, the high level of V they have built up through early stress will be reinforced and heightened if that person has a high status in society. High-status people experience less chronic stress, and thus have a more efficient cortisol response.

V-Promoters

V is a product, then, of a specific set of influences which Biohistory refers to as "V-promoters." As with C, V is sustained and enhanced by an effect feedback cycle, whereby behavior caused by high V tends to promote V. For instance, dominance and competitiveness are increased by V, and also cause intermittent stresses which enhance V.

But while C-promoters have the link to food shortage and reduced testosterone in common, V-promoters are all related to authority and stress. These include an anxious mother, intermittent stresses and exposure to adult authority in late childhood, and ongoing stresses but relatively high status as an adult. It also appears to be important that the infant's mother be affectionate, neither punishing or controlling. In this sense, increased control of infants tends to reduce V.

V-promoters in human culture include patriarchy, support of physical punishment through such principles as "spare the rod and spoil the child," and reinforcement of parental authority by admonitions to obey parents.

There is also fasting, but of a particular kind. C is promoted best by regular, moderate fasting, such as eating only one meal a day, as practiced by some Buddhist monks.[271] V is promoted best by more severe, annual fasting that mimics the effect of an occasional famine. A prime example is the Muslim fast of Ramadan, which permits no food or drink in daylight hours for an entire month.[272] In biological terms, this is more like the occasional famine experienced by savannah baboons, as compared to the chronically limited food supplies of gibbons.

Both kinds of fasting have C and V effects, but regular fasting is more of a C-promoter, and annual fasting more of a V-promoter.

The result is a temperament which makes people confident and energetic, aggressive and well-organized. Not all of these characteristics are necessary for a high level of V. The Yanomamo are generally indulgent with children of all ages, though they may inflict harsh and ill-tempered punishment at times. Victorian parents, by contrast, were patriarchal and punitive enough but remarkably lacking in indulgence of infants. But in general, the stronger the V-promoters the higher the level of V.

Success in War

Although much of the discussion so far has focused on individuals, V and C are best understood in terms of social groups. Personality is a complex matter with a multitude of genetic and environmental influences. Therefore, V is best considered as a factor that distinguishes one social group from another, and also one that describes how societies change with time.

At the most basic biological level, V is a set of behavioral and temperamental characteristics that helps animals survive and thrive in dangerous, unpredictable environments. It includes traits such as a high birth rate, aggression, competitiveness, morale, the ability to cope effectively with challenges, and small group cohesion. This makes possible the organization and boldness required for successful migration.

In human societies, the most obvious indicator of V is a taste for war. In general, higher-V societies have a strong advantage in any conflict with lower-V rivals. Among human societies, as mentioned earlier, the highest V peoples are the warlike tribes which have so often invaded the settled lands from mountain, desert and steppe. These are the environments which not only increase V by periodic famines, but create further stresses when the resulting warlike tribes attack each other.

High V not only makes them aggressive and well-organized; it also maximizes population growth. It combines intense care of infants with abrupt weaning, allowing women to become pregnant soon. Thus, high V compensates for the extreme dangers of the environment that gives rise to it. It makes these aggressive, warlike and fast-growing populations prolific and effective migrants.

One culture largely devoted to heightening its V was ancient Sparta. In the account given by Plutarch in his biography of Lycurgus, the Spartan lawgiver, he describes the military training of boys. They were given constant, vigorous exercise, including wrestling and fighting. They were allowed only a single tunic and cloak in the coldest weather. They were left short of food, so encouraged to seal food. They were trained to endure pain, such as in a public ceremony where boys ran a gauntlet of flogging to steal cheeses from an altar.[273]

These are all severe stresses but they are, by nature, intermittent. Wrestling and fighting are occasional activities. Extreme cold would not be experienced all year round. Hunger would only be occasional. Flogging at the altar happened only once a year. Spartan boys were subject to the strictest and most rigorous forms of adult authority, but as adults they had high status compared to their helot subjects, who could be murdered at a whim. This gave them exceptionally high V. Combined with virtually full-time military training, made possible by the labor of helot serfs, they were formidable soldiers.[274]

Victorian Britain

The control and discipline of children in Victorian Britain also produced a high level of V as well as C. From strict nannies and governesses in the home to the rigors of a typical English boarding school, the ruling classes subjected their children to a powerful V-promoting regime:

> Almost unconsciously the public-school boy [a British "public school" is a private boarding school, not a public school in the American sense] absorbed a complete code of behavior which would enable him to do the "right thing" in any situation. It involved obedience to

> superiors, the acceptance of a position in the hierarchy, team spirit, and loyalty … It also involved the traditional British phlegm, reserve, understatement, unflappability, the stiff upper lip, a result of the inculcation of modesty in victory and defeat, the all-male society in which emotion was sissy, the encouragement of restraint in the exercise of power.[275]

The Victorian public school system played a major role in shaping the officer class of the British Empire. A large proportion of army and naval officers also passed through institutions that emphasized strict discipline, physical toughness, obedience, and leadership.[276]

Military effectiveness can be regarded as controlled, marshaled aggression. This is a central characteristic of V. Military drill—including weapons training, tactical exercises, and parade-ground drill—increases V. We might wonder at the purpose of marching in step and presenting arms. How does incessant drill make better soldiers, especially since marching in step is not the way modern armies fight?

But experience has shown drill to be an effective way of building morale and the general effectiveness of soldiers. Robert Graves, in *Goodbye to All That*, describes his time as an instructor and front-line officer during the First World War, observing that proficiency at parade-ground drill correlated with combat effectiveness:

> We [the officers at the Harfleur "Bull Ring"] all agreed on the value of arms-drill as a factor in morale … I used to get big bunches of Canadians to drill: four or five hundred at a time. Spokesmen stepped forward once and asked what sense there was in sloping and ordering arms, and fixing and unfixing bayonets. They said they had come across to fight, and not to guard Buckingham Palace. I told them that in every division of the four in which I had served … there were three different kinds of troops. Those that had guts but were no good at drill; those that were good at drill but had no guts; and those that had guts and were good at drill. These last, for some reason … fought by far the best when it came to a show … I told them that when they were better at fighting than the Guards, they could perhaps afford to neglect their arms-drill.[277]

In fact, drill forces the soldiers to behave in a way typical of high V, which means acting cooperatively within a controlling hierarchy.

In elite combat units, military training also acts as a filter. Such unites select recruits who already have relatively high V. Then they amplify V by the way they treat them. We have seen that V is increased by severe and intermittent stresses, such as famine or predator attack. Traditional military training is designed to inflict just such stresses. An extreme example is the Imperial Japanese army before 1945, where soldiers were not only tightly controlled but could be physically beaten by their superiors.[278]

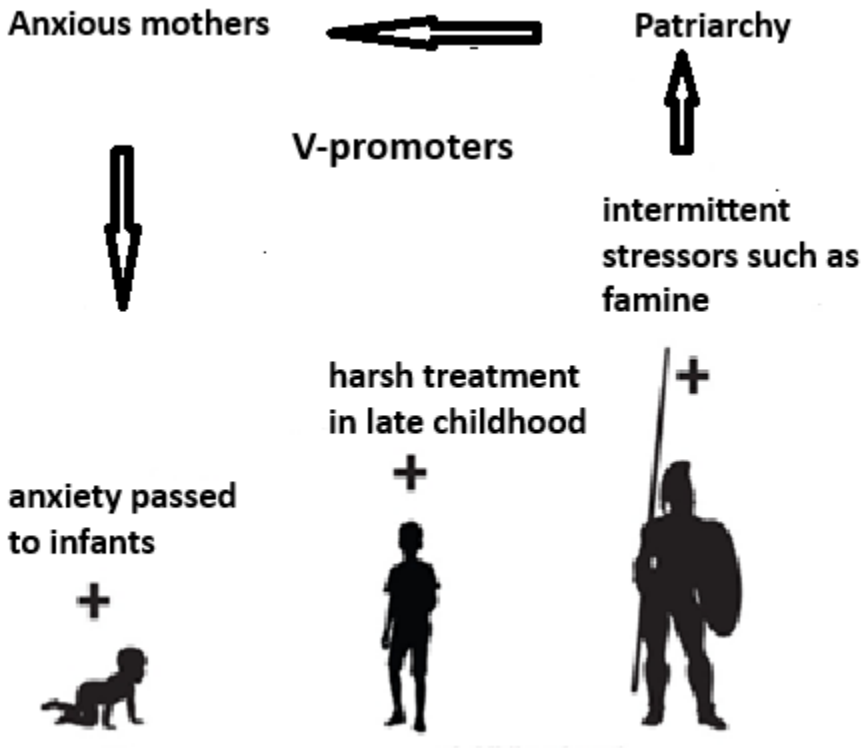
In Western armies, abuse has traditionally taken the form of insults and dressing down by an NCO rather than physical violence, but the biochemical effects would be similar. Any such experience,

especially combined with a program of rigorous exercise, must elevate stress hormones such as cortisol and increase V.[279]

V-promoters

In summary, the principle V-promoters are illustrated in Fig. 9.1 below.

Fig. 9.1. V-promoters. V is promoted by an anxious but indulgent mother, discipline and authority in childhood, and high status plus intermittent stresses in later life.



A civilization's military prowess, and the political, cultural and economic advantages that go with it, are the most obvious and perhaps the most important benefits of high V. But there are others, all of which come under the general heading of "vigor." Widespread high morale is one. The trait that we call the "pioneer spirit" is another. High V animals are willing to migrate in search of resources, and high V humans have a similar boldness.

At the level of the nation or tribe, this may be expressed in the drive to expand, to build an ever-bigger kingdom or empire, or to exploit new territory. In a culture that is at least moderate in terms of C, making possible wider political loyalties, high V may produce migratory hordes of aggressive raiders. Examples are Vikings or Mongols, or the warlike tribes that repeatedly overran China and

the Middle East. In a high C society with settled, highly productive populations and advanced economies, high V invaders can build vast empires.

Part of the reason is that punishment in late childhood has an effect quite different from that of other V-promoters such as patriarchy. This is the subject of the following chapter.

11. Punishment in late childhood

"Whoever spares the rod hates his son, but he who loves him is diligent to discipline him." Proverbs 13:24 (ESV)

Punishment of infants undermines V, tending to result in life-long stress rather than the confident and resilient V character. We saw this in the Mundugumor, whose harsh treatment of infants resulted in a society riven by hostility and with little ability to co-operate. And severe treatment of infant rats also leads to chronic stress.

Punishment of older children, provided it is intermittent and escapable, can act as a V-promoter. But it also has two other very striking effects, not associated with other V-promoters such as patriarchy. One is that it makes people more likely to hold onto traditions. The other is that it makes them more accepting of authority.

Recall that the Manus, with no punishment or control past infancy, were cited by Mead as being unusually flexible and open to change. But there was one exception, the cohort of Manus people who passed their late childhood and adolescence during the harsh period of the Japanese occupation, and which Mead described in this way.

> They had had, in fact, the same early childhood as the older men, but had lacked the kind of late childhood and adolescence in which the older men's habits of companionship and friendliness, and their capacity to feel free, had been born. They were stiff and difficult fathers, with less tenderness and indulgence to their children than the older or much younger men … In the brittle, dogmatic orthodoxy of these young men, there is limited refusal to accept anything new.[280]

This cohort was also far more accepting of authority. There are descriptions from this time of people listening for hours to the cult leader, Paliau, without "batting an eyelid."[281]

China, India and the Middle East

We can see this connection most clearly by looking at the traditional societies of China, India and the Middle East. The childrearing patterns of these societies show a distinct pattern combining indulgence of infants with harsh treatment of older children.

Consider this description of a Chinese family, noted by a European visitor at the close of the nineteenth century:

> He is welcomed to the household with a wild delight, to which it is wholly impossible to do justice. He begins life on the theory that whatever he wants, that he must have; this theory is also the one acted upon by those who have him in charge, to an extent which seems to us … truly amazing. A Chinese mother is the slave of her children. If they cry, they must be

> coddled, most probably carried about, and at whatever expense, if it is possible to prevent such a terrible thing. They must not be allowed to cry continuously.[282]

Taiwanese parents assume that children cannot really "understand" until they are around six years old.[283] But at that age, comes a dramatic change.

> A beating administered by a Taiwanese parent is often severe, leaving the child bruised and in some cases bleeding. Parents prefer to use a bamboo rod to discipline children, but they will use their hand or fist if there is no bamboo available, and if they are really angry, they will pick up whatever is at hand. Crueler forms of physical punishment are also used by a few parents, such as making the offending child kneed on the ridged surface of an abacus or tying the child in a dark corner.[284]

Egyptian practices, well into the twentieth century, were similar. Infants were indulged, fed on demand, and not disciplined or controlled in any way.[285] Then, as in China and at about the same age, came the reversal.

> Connected with producing fear in the children is the violent and bad-tempered manner in which adults administer punishment to them. Punishment … may be in the form of fulminations or curses, or it may be corporal … Corporal punishment is not uncommon either by beating, striking, whipping or slapping … In administering punishment there is no consistency or regularity; for the same offense the child might be beaten harshly, or his offense allowed to pass unnoticed.[286]

In all these societies, the long-established civilizations of China, India and the Middle East, severe punishment begins only after the age of 5 or 6.[287]

These societies showed both the characteristics Biohistory links to punishment of older children. Scholars have noted both a strong adherence to inherited customs and religious traditions, and powerful sense of hierarchy.[288]

Social order in these societies depended heavily on obedience to parents, elders, rulers, and religious authority. Family life, education, religion, and political organization all reinforced respect for rank and inherited social roles. Confucian teaching in particular stressed deference also to emperors and officials.[289] Effective authority needed to be seen as powerful. In both Ottoman and modern Egypt, weak and permissive officials lost legitimacy and respect.[290]

The connection between punishment and hierarchy became evident when East Asians began punishing their children less from the 1960s onwards, especially in the urban middle class.[291] This was also the period when these societies became more open to outside ideas, which led to rapid industrial development.

It was also followed, in South Korea and Taiwan, by a transition to democracy, with direct presidential elections starting in 1987 and 1996 respectively.[292] The activists in both cases were mostly the young, 18-30 in South Korea and 20s to 40s in Taiwan, and largely students and

graduates.[293] In other words, these were exactly the cohorts who had been noted as receiving less physical punishment as children.

Introducing child V

Because the effects of punishment in late childhood are so distinct, yet seem to represent a form of V, Biohistory refers to them as 'child V'. This is in contrast with what may be termed 'adult' V which, though depending heavily on early experience such as anxious mothers, can change in later life. These two variables can be defined as having the characteristics listed in Table 9.1 below.

Table 9.1. Behaviors linked to Adult V and child V

Adult V	**Child V (punishment ages 6-12)**
Warlike	
Confident	Confident
Patriarchal	Patriarchal
	Traditional
	Accepts wider authority

All of the societies that form large states have traditions of physical punishment in late childhood. This applies as much to Europe in the past as to China, India and the Middle East. We have already seen that control in late childhood is also a feature of large-scale societies, but in practice it is difficult to tease these apart. Even the Great Depression of the 1930s, which we have seen primarily as a C-promoter, was undoubtedly stressful to those who went through it.

In later chapters we will consider what happens to such societies in the long term, when people become more lenient with children. But for the moment, it is enough to note that without systematic control and punishment, people simply do not form large states in the first place. As we saw in chapter two, the Yanomamo were high V but rarely controlled their children at all. Politically, they were fragmented into villages that constantly feuded amongst themselves.

In fact, limited discipline of older children is typical of small-scale societies. For example, Margaret Mead described the childrearing patterns of four small-scale New Guinea societies which differed dramatically in some ways. The Mundugumor were harsh and punitive, the Highland Arapesh and Tchambuli mild, and the Manus strictly controlling of infants.[294] But in none of these societies did parents exercise systematic control or punishment in later childhood.[295]

But while discipline in general makes larger political units possible, the effects vary greatly depending on the relative levels of control and punishment. Control with moderate punishment produces high C but only moderate child V. Severe punishment, with or without systematic control, leads to high child V.

It is now time to apply these ideas to the understanding of different kinds of societies.

Nation-States: High Infant C, Moderate Child V

Physical punishment of children was a tradition in European societies until well into the twentieth century, indicating a level of child V that would have helped them form large and powerful states. But the level of early control, infant C, seems to affect the kind of state that was formed.

Approaching the peak of in C in nineteenth century Europe, people coalesced more and more into nation-states. Most, especially in the west, tended to share a single language and ethnic identity. Examples include England, France, Holland, Spain, Portugal and Italy. The reason is that people with high infant C seem to be highly resistant to rulers of different culture and ethnicity.

An early example is the bitter struggle of the Dutch for independence from Spain in the late sixteenth and early seventeenth centuries. At that time, Spain was the pre-eminent super power of the day with the vast wealth of the Americas at its disposal. But the Dutch were in the end successful in gaining their independence.[296]

Even countries subjugated by more powerful neighbors tended to keep their ethnic identify. Poland was partitioned between three powers in the eighteenth century, but the Poles kept their ethnic identity until they could achieve freedom in the twentieth century.[297] A more recent example is the Ukrainian resistance to Russian aggression, even though Ukraine had been at least partly under Russian control for centuries.[298]

A more extreme example comes from the ancient Greeks, another people with high infant C, who showed an enduring attachment to their city-states. The province of Messenia was conquered by Sparta in the eighth and seventh centuries BCE, with the people reduced to serfdom or fleeing into exile in Italy, Sicily, Africa and elsewhere.

But when Sparta was defeated at the battle of Leuctra in 371 BCE., nearly three centuries later, the exiles seized the opportunity to return and re-establish their state. Their ethnic identify was strong enough to survive centuries of Spartan control.[299]

High infant C nations such as the Dutch and ancient Greeks were quite capable of being imperial powers, in the sense of controlling other peoples, but stubbornly resisted becoming part of anyone else's empire.

The preference of high infant C people for those similar in appearance and culture, has deep biological roots. Gibbons, the ultimate high C species, are extremely picky with their mates. This is so extreme that different species of gibbons share the same rain forest, rarely if ever inter-breeding.[300] High infant C also makes humans innovative, as seen in Manus society.

The dark side of this attitude, which reached a peak in the late nineteenth and early twentieth centuries, is racism. This was expressed by pseudo-scientific ideas such as Social Darwinism and eugenics and, most tragically, by the Nazis.[301]

Empires: Low Infant C, High Child V

Most non-European Civilizations show a very different pattern. In the Middle East, China and the Indian sub-continent, vast and cosmopolitan empires were formed which expanded to the entire cultural area and beyond. Boundaries were set by physical obstacles such as mountains, deserts or the sea.

Even though these culture areas were each comparable in size and population to Europe, in the past 2,000 years, none of them developed stable nations *within* the culture area.[302] These only emerged in the post-colonial era under Western influence. What all these societies had in common, as discussed earlier, was a childrearing pattern where parents indulged infants but were harsh with older children, especially between the ages of 6 and 12.

Child V, arising from this experience, makes people more accepting of authority. In China, India and the Middle East, the combination of very high child V with lower infant C, made them highly accepting of authority in general, but less concerned about the ethnic identify of that authority.

This pattern goes back thousands of years. Alexander of Macedon conquered the vast Persian Empires in only three great battles, with local elites either surrendering or defecting to the Greeks.[303] Most of the subsequent wars involved Greek successor states fighting with each other.[304] The peoples of the vast Persian Empire were remarkably accepting of rule by an alien power, as long as it was perceived as powerful.

Compare this with the attitude of the Greeks themselves, in the early fifth century BCE. They stubbornly fought off two vast Persian armies, later freeing the Greeks of Ionia (what is now western Turkey) from Persian rule.[305]

Another example is the Manchu conquest of China in the seventeenth century. The decisive turning point came when the Ming general Wu Sangui allied with the Manchus, allowing them through the Great Wall to seize Beijing in 1644. The Manchus, though vastly fewer in numbers, then took control through a combination of military force and strategic alliances with Chinese elites.[306]

The swift Mughal conquest of India in the early sixteenth century showed the same pattern. Disaffected nobles in the Delhi Sultanate invited Babur to intervene, with some local elites defecting to him and little unified resistance.[307] Two and a half centuries later, the British East India Company was able to quickly gain power in a similar way.[308]

The striking point about all these examples is that large populations quickly submitted to smaller powers. While the Dutch and ancient Greeks were able to fight off much larger and richer Empires.

Another sign of higher child V and lower infant C is that all those civilizations tended to be highly conservative and resistant to change, at least before the arrival of Western influence.

Curiously enough, as we will discuss in a later chapter, the earliest civilizations of China, India and the Middle East do show the characteristics of high infant C and only moderate child V, including stable nations or city states that endured for centuries. Even though we have no direct evidence of how they raised their children.

We have seen how experiences in early life affect character, and that methods of childrearing can explain the political and economic makeup of a society. We can now turn to tracing how they change in historical societies over time.

12. Rise of the West: changes to family and childrearing

"Train up a child in the way he should go: and when he is old, he will not depart from it." — ***Proverbs 22:6***

C is increased by parental control in childhood, by sexual restraint, self-discipline, and moderation in personal habits such as eating. People with high C tend to be hard working. At the highest levels of infant C, they are skilled with machinery and show intense impersonal loyalties.

But European societies were not always high C. In this chapter we will trace the rise of C in Europe, and England in particular. We will look at changes in family patterns and character, and how they were reflected in economic and political change. We will suggest that the rise of the West to world domination in the nineteenth and early twentieth centuries can be best explained as the result of C and especially infant C, rising to heights never before seen in human history.

Changes in Sexual Attitudes and Behavior

Sexual behavior is one of the most obvious indicators of a society's level of C. Just as gibbons in food-restricted environments limit their breeding, human attitudes toward sexuality are determined by the level of C. In the thousand years leading up to the nineteenth century, we see a tightening of attitudes towards sexual behavior, both reflecting and helping to drive the increase in C.

During the early Middle Ages, Church teaching was that sexual activity should be confined to marriage, but actual behavior was far more diverse. Penitential manuals, used by confessors, suggest that a range of behaviors persisted in everyday life.[309] A number of writers expressed the opinion that women were inherently more lustful than men.[310]

But from the twelfth century onward, sexual behavior became increasingly regulated by the Church. Canon law established marriage based on mutual consent and confined legitimate sexual activity to it, while expanding categories of sexual sin such as fornication and adultery. From the thirteenth century, ecclesiastical courts more actively policed sexual conduct, reflecting a shift toward greater legal and social control, even though actual behavior remained more flexible, especially in the country.[311]

It was during this period that clergy were forbidden to marry, and divorce outlawed.[312] By the fourteenth century, loss of virginity in an unmarried woman was seen as an offense against God rather than merely an affront to family honor. Though still, at this stage, punishments for pre-marital sex remained rare.[313]

Attitudes became tougher during the Protestant Reformation. The authorities became stricter about controlling sexual behavior, punishing adultery and sex outside marriage more seriously.[314] By the mid to late nineteenth century, attitudes to sexuality were generally strict and moralistic. Sex was

seen as acceptable only within marriage and mainly for having children. Respectable society expected women to be modest and pure, though men were judged less harshly.[315]

Most significantly, however, was that respectable women were believed not to experience sexual desire. As Dr William Acton wrote in 1857:

> Having taken pains to obtain and compare abundant evidence on this subject I should say that the majority of women (happily for them) are not very much troubled with sexual feelings of any kind. What men are habitually, women are only exceptionally … there can be no doubt that sexual feeling in the female is in the majority of cases in abeyance … and even if roused (which in many instances it can never be) is very moderate compared with that of the male … As a general rule, a modest woman seldom desires any sexual gratification for herself. She submits to her husband, but only to please him; and but for the desire of maternity, would far rather be relieved from his attentions.[316]

Attitudes to masturbation were especially severe. People believed it was both harmful and wrong. Doctors and writers said it could damage the body and mind, causing illness or weakness. Because of this, parents and teachers tried to stop young people from doing it through strict rules and advice.[317]

It had taken a thousand years, but the attitudes of the medieval church had finally conquered civil society. This increase in self-discipline and sexual restraint both reflected and drove the immense rise in C, that peaked around 1850.

This rise in C, like the increase in strict sexual morality, was not the same in all social classes. Middle- and upper-class people believed in strict rules, especially that women should be pure and respectable. Working-class people were often less strict in practice, with more acceptance of sex before marriage. However, the stricter middle-class values were seen as the "right" way, and others were often judged by them.[318]

Increasing limits on sexual behavior were not just a product of rising C but a key driver of it. Behind this was the overwhelmingly powerful impact of Christianity, the cultural technology that made possible the rise of Europe to world power.

The Changing Age of Puberty

Another variable associated with C is the age at puberty. Higher C people and animals reach puberty later, reflecting a biological function of C which is to delay breeding in food-restricted environments.[319] The declining age of puberty over the past century and a half is commonly attributed to improved nutrition, but it was actually much later in the nineteenth century than in earlier times.

In medieval Europe, doctors placed the typical age of puberty at around 12 to 14, only slightly later than what it is today. In late medieval England, adolescents around the age of 14 were treated as approaching adulthood for legal and fiscal purposes, including labor obligations and taxation.[320] But over the centuries the average age of puberty rose, and by the nineteenth century it was as high as 17 in some European Countries. [321]

Many explanations have been given for this increase. The so-called Little Ice Age from 1300 to 1850, when temperatures fell and farming became less productive, is sometimes used as evidence for poorer nutrition. But Medieval Europe suffered widespread famines, especially in the fourteenth century, and yet puberty was not greatly later than it is today.[322]

Also, skeletal evidence shows that people in England were about as well-fed in 1800 as they had been in 1200.[323] Nutrition alone does not explain delayed puberty, but C does. The increasing activation of this underlying physiological system, which mimics the effects of food shortage, had the effect of delaying puberty. The remarkably late puberty of the Victorians also suggests that their C was at an all-time high, far more than in any current society.

Later Age of Marriage

Late marriage is the cultural equivalent of delayed puberty. In high C societies, where puberty is later, marriage tends to be delayed until well after the age of puberty. Once again this has a parallel in the behavior of gibbons, which breed only after securing a territory, normally well after puberty.

In medieval Europe, marriage in early adolescence was common even among commoners. Among the nobility children were often married in childhood for political reasons, though the marriage was not normally consummated until puberty.[324] Margaret Beaufort, for instance, gave birth to her son (the future Henry VII) in 1457 when she was only 13 or 14.[325]

But by the eighteenth century the age at marriage had risen significantly, and a widening gap had opened up between the onset of puberty and marriage. In nineteenth century England, upper- and middle-class women married in their early to mid-twenties, and men in their late twenties to early thirties. Working class people married at similar or slightly younger ages.[326]

The Nuclear Family

Nuclear families based on monogamous pair bonds are one of the most noticeable features of gibbons and other high C animal populations. Humans have a species bias towards pair bonds such that even in low C populations (such as hunter-gathers) most marriages are monogamous, but monogamy is *more* common and polygyny *less* common in high C societies. High C human

societies also show an increased separation between the monogamous couple and the rest of society.

During the Middle Ages, although monogamous marriage was the norm, family groupings were much larger. Households often included not just parents and children, but also relatives, servants, and sometimes apprentices.[327]

Extended families tended to live together in large, multi-generation groups. Social activities, particularly festivals, were also far more communal than they later became. People spent much of their time together in villages, taking part in shared events like festivals, religious celebrations, markets, and communal work. Entertainment, work, and religion were often done as a group.[328]

From the fourteenth to the nineteenth centuries, there was a gradual shift toward the nuclear family in England. Over time, households became smaller, and extended relatives were less likely to live together. This change was linked to economic developments, such as wage labor, and to changing ideas about family life, privacy, and independence. By the nineteenth century, the nuclear family had become the main ideal, especially among the middle classes.[329]

The concept of family had shifted from a primarily economic unit to one bonded by sentimental, emotional ties.[330] At the same time, the divide between servants and their employers grew wider.[331] Although no human culture has ever practiced gibbon-style territoriality, by the nineteenth century the ideal was that the family live alone:

Even religious concepts began to reflect this temperamental and psychological shift towards the nuclear family. The concept of the afterlife as a heavenly host became less predominant. In its place was a cozy paradise where the departed would be reunited with their loved ones and live in eternal domestic bliss. By the mid-nineteenth century, this had become widespread in popular culture.[332]

Inhibition and Reserve

Another well-known aspect of the Victorian temperament is its extraordinary level of inhibition and reserve. It was in this era that the British male acquired the reputation for reserve that persists today. This was not always so. Englishmen in the sixteenth and seventeenth centuries were said to be quick tempered, liable to impulsive behavior and openly passionate. When visiting London in the sixteenth century, the Dutch scholar Erasmus noted the emotional flamboyance of the English: “In a word, wherever you turn, the world is full of kisses.”

A study of diaries from the sixteenth to the nineteenth century indicates a trend from a melancholy Englishman—quick to tears over anything from the fate of the King to a change in residence—towards an overarching sense of optimism and cheerfulness by the mid-nineteenth century. When once it was normal to refer to one’s past with “great sorrow and dolefulness,” and frequently to

burst into tears unembarrassedly, the disposition of men had changed by the nineteenth century where cheeriness became nearly a religious obligation, and a man crying became a serious *faux pas*.[333]

Victorians withdrew into their nuclear families. When they did indulge in communal social events, they tended to be small and quiet soirées and dinner parties, rather than the large, crowded and noisy balls of the eighteenth century. By the Victorian era, the Englishman was typified as "Strong and silent, earnest, matter of fact, sparing in his speech, scornful of theory, unemotional, manly and athletic."[334]

After the Crimean war, stoicism became a matter of national pride. David Newsome commented on the change in attitude as observed in English public schools:

> [From the 1860s onward] excessive displays of emotion came to be regarded as bad form: patriotism and doing one's duty to the Empire became the main sentiments which the new system sought to inculcate.[335]

As with many indicators, there was a considerable divide along class lines, with the working classes being more open and gregarious than the disciplined and restrained middle class.[336]

Once again, this aspect of high C has parallels in animal behavior. Research shows that animals in food-restricted environments tend to be more cautious and vigilant, less exploratory, and sometimes more socially inhibited.[337]

Control of Infants and Young Children

The control of children is a core feature of high C cultures. It is a powerful C-promoter and, as detailed in chapter 6, can have different effects depending on the age at which it applies. Control in early childhood and especially infancy (infant C) is associated with creativity and machine skills, while control at all ages increases self-discipline and the work ethic.

We have seen the intense control of children in Victorian England, but this did not appear overnight. Although medieval childrearing could be severe at times, very young children were often treated indulgently. Stricter discipline began around the age of reason, commonly placed at around age seven.[338]

From the Middle Ages to the nineteenth century, there was a gradual increase in the control and discipline of children in England. In medieval times, children were often treated more like small adults and had greater freedom in daily life. Over time, especially by the eighteenth and nineteenth centuries, parents placed more emphasis on education, obedience, and moral training.[339]

This was especially evident in the treatment of infants. By the eighteenth century, parents and writers began to stress early discipline and habit-forming. In the Victorian period, infant training—such as regulating feeding, sleep, and behavior—became widely accepted, especially in the middle class.[340]

Susannah Wesley, the mother of Methodist founder John Wesley, gave her views on childrearing in the early-eighteenth century:

> When turned a year old (and some before), they were taught to fear the rod, and to cry softly; by which means they escaped abundance of correction they might otherwise have had; and that most odious noise of the crying of children was rarely heard in the house; but the family usually lived in as much quietness as if there had not been a child among them.[341]

In Victorian England, nannies often had a large role in controlling children, especially in middle- and upper-class families. They managed daily routines such as strict feeding times, sleep schedules, and regular walks, and enforced good behavior through rules and discipline. For example, children were expected to sit still, speak politely, and follow routines exactly, with punishments like being sent to the nursery or denied treats if they misbehaved. Nannies also limited children's contact with adults and supervised play closely. This reflects the Victorian middle class focus on order, obedience, and respectability in childhood.[342] It also reflected the respectable working class from which nannies were drawn.[343]

These behaviors indicate a deep-seated need to control and direct which is the essence of very high C, and which reached an all-time peak in the nineteenth century. Note also the extreme emphasis on infant training, the key to the highest level of infant C.

Japan

Similar changes in family and personal behavior can also be seen in Japan, leading up to the relatively high C society which was able to swiftly catch up to European powers after opening up after 1853. This is all the more interesting because Japan had almost no contact with the West before the sixteenth century, and very little after the 1630s.[344] Yet the trends in both societies had a great deal in common, including changes in sexual and reproductive behavior, and family structure.

In early times, aristocratic men often had several wives or partners in separate households. In twelfth-century Japan and afterwards, this became less common, especially among the elite. Over time, with the rise of the samurai class, marriage became more focused on one main wife and a more stable household. When a man had no sons, he could adopt a son in law to continue the family line, reducing the need for multiple wives.[345]

The extended family was powerful in early Japan, with local sub-branches providing labor to the main house in return for economic security. From the fifteenth century onward, the nuclear family

began to replace the extended family. By the Tokugawa period (1603–1867), it had become the norm. This meant a shift to tenancy in the countryside, with each nuclear family now an independent social and economic unit.[346] These trends began first in the towns. but by the nineteenth century had become near universal. [347]

The same pattern applies to sexual behavior. In earlier periods of Japanese history, especially the Heian period (794–1185), women's sexuality was less strictly controlled than in later times. Elite men often had relationships with multiple women, and women could also have more than one partner over their lives without the same level of stigma seen later.

Marriage was not always permanent or formally fixed—relationships could begin and end relatively easily, and husbands and wives often lived separately. A woman's status depended more on her family background and court connections than on strict sexual exclusivity.[348]

Later, and especially from 1600 onwards, society increasingly stressed women's sexual purity, loyalty to one husband, and obedience, linking female chastity closely to family honor and social order.[349] Married women were expected to be modest and obedient, and not openly express sexual desire.[350]

The same pattern applies to control of children. In early Japan children had considerable freedom within extended households and communities. Over time, influenced by Confucian ideas, families placed greater emphasis on obedience, discipline, and respect for authority. Education, moral training, and proper behavior became more important, and children were expected to follow strict family hierarchies. By the Tokugawa period, after 1600, mothers were expected to stress routine, discipline and the shaping of behavior from one year old or even earlier.[351]

The family patterns of Japanese showed a strikingly similar pattern of change to that of Europeans, over time. Nuclear families were more and more separated from the broader community. Sexual activity became more tightly controlled, as were children-from an increasingly early age. The result was a character remarkably high in C, especially the form Biohistory refers to as infant C.

In the next chapter, we will see how changing character brought about major changes in politics and the economy.

13. Changes to Politics and Society

"A republic, if you can keep it." — Benjamin Franklin

All aspects of C considered so far—age of puberty, family, and control of offspring—have parallels in food-restricted animal societies. But strictly human spheres such as law and political loyalty can only be linked to animal behavior by inference. The connecting notion, as discussed in chapter four, is *impersonality*. In this chapter, we will consider how more impersonal attitudes changed society and the economy.

Gibbons have intense personal bonds with their mates and immature young, but less to other members of the species. It might be said that their *external* relations are governed not so much by personal ties, as in a baboon troop, but by attachment to a section of forest. This emotional attachment to territory is by nature impersonal. In humans, impersonal attitudes are reflected in attitudes to people outside the nuclear family.

The effect is that as C and especially infant C increases in human cultures, loyalties become increasingly impersonal. The clan leader or local lord is no longer the focus of loyalty, which can now shift to more distant leaders. In a sense, the civilized nation is a gibbon territory writ large.

Higher infant C does not necessarily mean larger states, because large political units can be a product of child V. The largest European Empire in post-Roman times was that of Charlemagne in the late eighth century, which controlled much of what is now Germany, France, the Low Countries, Switzerland, Australia and northern Italy.[352] This at a time when the level of C, as measured by market activity and trade, was at an all-time low since the fall of Rome.[353]

This Empire broke up in the ninth century, and Germany remained fragmented into a number of largely independent states until the nineteenth century. Higher infant C may actually favor smaller political units, because it makes local loyalties stronger.

The key political effect of rising infant C is that central control *within* states becomes stronger. Ultimately, if infant C is high enough, loyalties may shift to a republic or constitutional polity where the form of law becomes more important than loyalty to any specific individual. Table 12.1 below summarizes the changes in political loyalties as C increases.

Table 12.1. Political systems connected to different levels of C. As C increases, people transfer loyalties to more distant figures and finally to impersonal concepts such as political parties and constitutions.

Infant C	**Loyalty to:**	**Example**
lowest	Face to face	Hunter-gather band

	Local leader	Eleventh-century France (feudal anarchy)
	More distant leader	Twelfth-century France (powerful Dukes)
	King	Sixteenth-century France or England
	Representative Body	Eighteenth-century England
highest	Political Party, Law, Constitution	Nineteenth- and twentieth-century England or America

Although it is possible for cultures with moderate infant C to be democratic, as in many Third World countries today, this is often due at least in part to outside influence. Political systems based heavily on personal loyalty, patronage, and kinship can weaken the rule of law and make democratic institutions less stable. In some developing countries this has contributed to corruption, military coups, and the concentration of power around individual leaders.[354]

It is normally only within societies with high infant C that democracy arises naturally, because it matches the temperament of the people. Preference for impersonality is not the only infant C characteristic that favors democracy. Infant C produces a higher level of integrity within any given rule-based system, which translates into a more efficient, effective democracy.

The preference for impersonality is not confined to forms of government. It also affects attitudes to social order and the law, resulting in nations with relatively efficient bureaucracies.

Rising infant C also explains changes in national boundaries, which were subject to radical change in the Middle Ages. For example, between the eleventh and early sixteenth centuries, English kings ruled significant sections of France. The exact amount depended on marriage, inheritance, and the fortunes of war.[355]

Similarly, borders within Europe changed frequently as a result of wars, alliances and royal successions.[356] These shifts reflected the tolerance of people with lower C for leaders of a different culture or language.

But as infant C rose, national boundaries solidified. For one European nation to conquer and incorporate another country became increasingly difficult, due to the development of national loyalties. This trend was most advanced in northern and western Europe. Eastern Europeans were for a long time more tolerant of "foreign" rule, as in the case of the Austro-Hungarian Empire.[357] But even here, peoples such as the Poles maintained a stubborn cultural loyalty through centuries of subjection.

The eighty-year Dutch war of independence against Spain during the sixteenth and seventeenth centuries, as discussed earlier, shows how ferociously people with high infant C will resist foreign

rule, even against extraordinary odds. Holland was a tiny maritime republic and Spain a super-power flush with American gold and silver, but the Dutch could not be permanently subdued.[358]

Rise of the Market Economy

Infant C is also the aspect of temperament most linked to the market economy. The linking factor is, again, impersonality. In low C cultures, economies are based on personal contact between individuals who know each other.

For example, indigenous aboriginal societies share their resources and have loose, collective notions of ownership. The main factor determining whether a person has access to a commodity is their personal relationship with the person who controls it. For example, among the Mbuti the meat from a hunt is divided according to principles of relationship and mutual help.[359]

In Melanesia, economics are based on the so-called "big man" system, where a high-status individual controls resources and distributes them to the population through feasts to enhance his status.[360]

Market economies, by contrast, are relatively impersonal. Although personal contact is involved at many levels, from commodities and stock trading to high-street retail, there is no necessity for any social bond between people who trade with each other, and much trade is between people who may not even meet. Moreover, the entire system tends to be based on an impersonal standard currency, with a value set by economic mechanisms rather than traditions.

This was not the case during the Middle Ages, when levels of infant C were moderate. Though economic exchange was largely through markets, prices were set and competition limited by social entities such as the guilds and local officials, and notions of a 'fair price' set by the costs of production.[361] The market in labor was also limited by the practice of serfdom which tied peasants to the land. However, as C rose over the centuries, the market economy became more central to economic life and more divorced from non-market forces. Serfdom in England, for example, largely disappeared between the late fourteenth and early sixteenth centuries.[362]

By the nineteenth century, as infant C reached an unprecedented peak, the social controls on the distribution and trade of goods had all but disappeared. Laissez-faire economics, promoted by thinkers such as Adam Smith, dominated Western Europe.[363] The guilds—or at least their power—had gone.[364] Other medieval regulations, such as restrictions on usury, had also vanished.[365]

The development of the market economy was also aided by high levels of honesty, associated with high infant C. Trust, reputation and contracts had become increasingly important.[366]

Attitudes Toward Work

Animals in food-restricted environments spend a great deal of time searching for food even when not hungry, something also seen in the exploratory behavior of food-restricted rats. In the same way, humans with high C have a natural inclination for routine work and are more willing to forego socializing and leisure activities to perform it. Economic necessity or prestige may still drive them, but long hours of work are *easier*.

People in the Middle Ages were not especially hard working. Mondays were frequently treated as holidays, and the calendar was full of saints' days on which work was forbidden. In medieval England, roughly a third of the year was taken up by holidays. Southern European countries were even more relaxed, with holidays eating up about five months of the year.[367]

By the nineteenth century, working hours had increased enormously, and holidays were drastically reduced.[368] In 1840 the number of hours worked per year by an average manufacturing worker was between 3,105 and 3,588. This is more than 10 hours per day, 6 days per week.

That was the peak, and was followed by a reversion to a more medieval work ethic. By 1987 the average number of hours worked in UK manufacturing had fallen to barely half that.[369]

The Victorians were not only willing to work hard but more willing to save for the future and invest in skills and knowledge that had no immediate benefit but which would pay off in the future. For example, literacy rose dramatically between the sixteenth and nineteenth centuries, well before the rise in wages generated by the Industrial Revolution, and well before universal, state-sponsored education.[370]

Charity and Practical Morality

One of the characteristics of high infant C is that it causes people to behave in ways determined by rules and customs, rather than personal sympathies. This applies as much to morality as to laws and government. In the matter of charity in particular, there was a dramatic change in approach between the Middle Ages and the Victorian era.

In the Middle Ages, charitable giving was a central duty, especially for the clergy. The Church taught that giving to the poor was a way to gain spiritual merit and help secure salvation. Clergy were expected to lead by example, distributing alms, supporting hospitals, and caring for the needy. Charity was not just kindness—it was a religious obligation.[371]

Over time, this attitude changed. After 1500, Protestant thinkers placed less emphasis on charity as a way to gain spiritual merit and more on discipline and moral reform of the poor. By the seventeenth and eighteenth centuries, charity became more organized and controlled, with laws to manage poverty. In the nineteenth century, charitable giving was still important, but it was

increasingly shaped by ideas of respectability, self-help, and distinguishing between the "deserving" and "undeserving" poor, rather than purely religious obligation.[372]

For many Victorians, the moral requirements for receipt of charity were severe. The deserving poor had to attend church, stop drinking alcohol, and abstain from inappropriate sexual activity. Lengthy, exhausting interviews were conducted to ascertain the moral worth of a potential recipient. The content of religion also changed, with a far greater emphasis placed on the virtues of self-help, character and moral improvement. Many reformers came to believe that indiscriminate charity could encourage dependency rather than virtue.[373]

The workhouses were the ultimate embodiment of the Victorian attitude to the poor. Grey, depressing institutions, they hammered home the message that any form of work was better than living off the state. The workhouse fostered an ethos of moral rehabilitation. Food was plain, life was monotonous, and all reading material other than the Bible was banned, as were dice and alcohol.[374] Prayers were twice daily and there was little time off.[375]

Most controversial of all was the separation of families when they entered the workhouse, a powerful deterrent to seeking state assistance. Men could not apply alone but had to bring their entire family, who were then separated into dorms and exercise rooms.[376] The Victorian belief in the value of work and moral rehabilitation was so strong that even when inmates had no useful work to do, they were assigned meaningless tasks to keep them busy. In 1884 Great Yarmouth Union workhouse took action to prevent inmates from loafing about:

> [The inmates] were put to work in a shed divided up into fourteen cubicles, five and a half feet square (one man to each cubicle, which was locked) shifting shingle with a shovel through a hole ten inches square. They had to move a ton an hour. They worked a nine-hour-day with one hour allowed for lunch. The shingle was then carted back to its place of origin.[377]

It is worth noting that all these requirements—the relentless focus on work, the restriction of sexual activity, the plain and limited food, the role of religion—are C-promoters. They reflect both the rise in C and the behavior that drove it to such a high level.

Science, Technology, and Innovation

One key effect of rising infant C in Europe was to have a profound impact on the world. This is that huge surge in innovation and technology known as the Industrial Revolution.

An aptitude for machinery is one of the key characteristics of high infant C. As noted earlier, the Manus people of the Admiralty Island, though stone-age tribesmen in dugout canoes, were uncannily skilled with machines when given access to them. The Japanese of the mid-nineteenth century, though locked in a feudal political system, showed an uncanny grasp of technology when

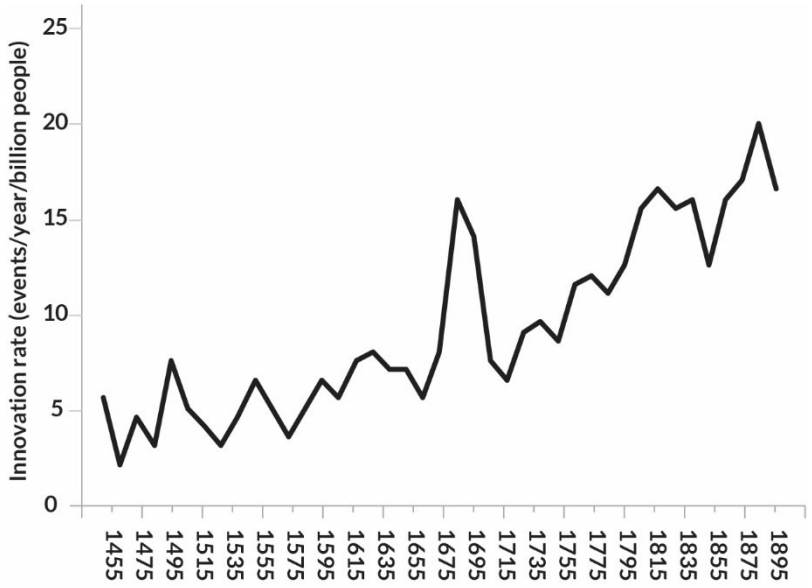
shown the way.[378] Both of these societies, like Europeans, began controlling children at a very young age. And both were like Europeans in being unusually open to change.

From Isaac Newton's scientific advances to the revolutionary new steam engine of James Watt, the advances in science, technology and the applied arts that took place between the seventeenth and nineteenth centuries were without parallel in human history. The new theories of gravity, bacterial infection, the steam engine, the steel constructions of civil engineering and of the new maritime age—all these things remade the Western world.

In Victorian England, there was strong pride in technology and industrial progress. Many people believed that inventions like railways, steam engines, and factories showed Britain's power and success. Technology was seen as a sign of national progress, wealth, and civilization. Events like the Great Exhibition of 1851 celebrated British industry and innovation, reinforcing the idea that technological advancement was something to be proud of.[379]

If major innovations in science and technology between 1455 and 2004 are plotted graphically against population size, as in Fig. 12.2 below, we can see the steepness of the rise.[380] This kind of assessment is bound to be subjective, but the pattern shown by the graph closely matches lists drawn up by a variety of researchers.[381] All show a rise in innovations to a peak in the nineteenth century.

Fig. 12.2. Innovations in science and technology relative to population size.[382] Based on 8,583 key scientific and technological innovations, plotted against population.



Japan

Political and economic changes in Japan followed much the same pattern, though economic changes were slower before opening to the West.

In the seventh and eighth centuries, when the government had tried to turn Japan into a "modern" society like that of Tang China by setting up local administrations on Chinese models. This had only limited success, as local aristocratic and clan power remained strong.[383] The C of Japanese at that time was simply too low to support such institutions.

Only in the sixteenth century did local lords, called daimyo, begin setting up centralized administrations in what were, by then, effectively independent States.[384] These administrations continued and became even more advanced in the succeeding Tokugawa period (1603-1857), while the new central government enacted various policies to keep the daimyo under control, such as insisting they travel to the capital each year.[385] When the Tokugawa regime was overthrown in 1857, a strong central government was set up.[386] Unlike in the eighth century, Japanese C was high enough by then to support a more impersonal form of government.

The same pattern applied to the economy. In the eighth century, the imperial government tried to introduce coinage as used in Tang China at the time. This failed, just as the political reforms had. Coinage never caught on, and barter remained the rule. Trade also was undeveloped, and there were no cities apart from the capital.[387] This is an excellent example of a low infant C society simply not having the temperament for trade or the use of money, no matter what the government might decree.

Instead, as infant C increased between the twelfth and fifteenth centuries, people spontaneously shifted from barter to cash. And because there were no government mints, they used imported Chinese coins.[388] This period also witnessed the rise of professional moneylenders, commercial cities and vigorous overseas trade.[389]

Commercial growth continued during the Tokugawa era, with a shift from subsistence to cash crops and the growth of local industries such as cotton spinning and weaving. Even farmers and members of the lower class became increasingly literate, just as was happening in Europe at this time.[390]

By the time Admiral Perry sailed into Edo Bay in July 1853 with a demand that Japan open up to foreign trade, the infant C of the Japanese was such that they could readily accept and make use of Western science and technology. Within only a few decades, Japan had undergone one of the fastest industrial transformations in world history.[391]

The eighth century reforms had failed in setting up a fully market economy, but one aspect was an unqualified success. Chinese Buddhism, adopted first by the court, came to dominate Japanese life

and culture.[392] Its effects were later reinforced by the import of Neo-Confucianism from China in the twelfth and thirteenth centuries, favored by rulers as promoting order, hierarchy, loyalty and obedience. It was especially important in the Tokugawa period, after 1600.[393]

The cultural technologies of Buddhism and Neo-Confucianism served the same function as Christianity in Europe. Strict controls on behavior, and especially of sexual behavior, were both an effect of rising C and a key driver for raising C.

The steady rise of infant C to the nineteenth century, is what allowed Japan to industrialize so rapidly after opening to the West. It also made possible an astonishingly fast recovery from the devastation of the Pacific War. This is the true basis of the "Japanese economic miracle."

In animal populations, high levels of C are associated with limits on population growth. By contrast, both Europe and Japan experienced rapid population growth in their periods of highest infant C. This can be best understood as a result of large, stable states with hard-working populations, and industrial wealth making possible a decline in the death-rate.

Based on this measure, the peak of infant C seems to have come somewhat later in Japan than in Europe. European countries experienced their most rapid population growth in the nineteenth century. In Japan, population rose fastest in the early twentieth century.[394]

Buddhism and Neo-Confucianism served the same function as Christianity in Europe, containing powerful C-promoters that brought C and especially infant C to an all-time high. But there was another factor driving the rise of C in both Europe and Japan, and that is the subject of the following chapter.

14. The Civilization Cycle in England

"Rule, Britannia! Britannia rules the waves." — James Thomson

We have seen that rising C in Europe and Japan was driven by the C-promoting effect of religious traditions. But there is another possible cause for this rise, which is an exceptionally high level of V, and especially of the form Biohistory calls child V. In Europe, this rose to a peak in and around the sixteenth century, before falling away.

In this chapter we will trace the rise and then fall of child V in England. To track this, we will consider not only direct evidence of high V such as patriarchy, but also the level of stress in society. Indications include all the behaviors seen in highly stressed Whipsnade baboons—status hierarchies that are steep but also unstable, brutal treatment of inferiors, suspicion and fear.

Patriarchy

The most direct evidence for peak V in the sixteenth century can be found in attitudes towards women, given that patriarchy is one of the key indications of high V. In the thirteenth and fourteenth centuries, women were increasingly downgraded both legally and theologically. In 1317, for instance, they were barred from the throne. By the sixteenth century, their legal entitlements had declined to such a state that they required their husband's consent for any legal act to be valid.[395]

In the early seventeenth century, however, preachers began to stress companionship in marriage, linked to a general sense of greater equality. The rise in woman's status would continue into the nineteenth and early twentieth centuries when country after country gave them the right to vote.[396]

Some people might consider control of a woman's sexuality as inseparable from her subordination, but in fact they have quite different effects. Low status for women is a V-promoter, as it causes anxiety which is transmitted to infants. Control of women's sexuality is a V-promoter but also a C-promoter. Thus, it is quite possible for women's status to improve while sexual mores tighten, as happened between the seventeenth and nineteenth centuries.

Punishment of Children

An indication of child V is the practice of punishing children, which also peaked in and around the sixteenth century in England. During the Middle Ages, particularly in the twelfth and thirteenth centuries, authorities on social ethics advised against the beating of children. But from the fifteenth century onward, that changed radically, with a pronounced trend toward greater punishment.[397]

Flogging became more prevalent, reaching an extraordinary level of ferocity in the sixteenth and seventeenth centuries.

In 1612, the Puritan schoolmaster John Brinsley elaborated on the bible passage "spare the rod, spoil the child" in his dialog on education, *Ludus Literarius*:

> Finally, as God hath sanctified the rod and correction, to cure the evils of their conditions, to drive out that folly which is bound up in their hearts, to save their soules from hell, and to give them wisdome, so it is to be used as God's instrument to these purposes. To spare them in the cases is to hate them. To love them is to correct them betime. Do it under God, and for him to these ends and with these cautions, and you shall never hurt them: you have the Lord for your warrant. Correction in such manner, for stubbornnesse, negligence and carelessnesse, is not to be accounted over-great severitie, much lesse crueltie.[398]

At home and in schools, beating with rods, birches, or sticks was common, especially for disobedience or poor learning. Children might be whipped, caned, or struck on the hands or body. Other punishments included being forced to kneel for long periods, sometimes on hard surfaces, or being made to stand still in uncomfortable positions.

In schools, children could be required to wear signs of shame (such as labels marking them as lazy or foolish), or be publicly humiliated in front of others. At home, parents might use scolding, threats, or withdrawal of food and privileges. These punishments were widely accepted and seen as necessary for moral, religious, and social training, rather than as cruelty.[399]

In 1582, at the age of 11, William Bedell (later a churchman and martyr of the Reformation) was attacked by an enraged schoolmaster:

> [He was] knocked down a flight of stairs and hit so violently … that blood gushed out of his ear, and his hearing was in consequence so impaired that he became in process of time wholly deaf on that side.[400]

Such severe punishment of children was generally accepted, and it was rare for such masters to be dismissed.[401] It was so commonplace that beatings were not confined to schoolchildren. Even undergraduates were flogged until the mid-seventeenth century.[402]

Over time, punishments for children and students in England became less severe and less physical. From the late seventeenth century, new ideas about education and childhood began to stress reason, discipline, and guidance rather than constant physical punishment. By the eighteenth and nineteenth centuries, there was growing criticism of excessively harsh schoolmasters, and some were condemned or even dismissed for brutality. Although corporal punishment continued, there was an increasing belief that discipline should be more controlled, moderate, and humane.[403]

Judicial Punishments

If children were treated with such severity, it can hardly be surprising that criminals suffered even worse. This was not so in earlier times. Prior to the thirteenth century, use of torture in judicial processes was opposed by the Church and rarely used.[404]

After that it became more common, especially in the sixteenth century. The main forms of torture used included the rack (stretching the body), the Scavenger's Daughter (compressing the body into a painful position), and manacles (hanging a prisoner by the wrists). These methods were used to force confessions or extract information.[405]

Men convicted of high treason could be hanged, drawn and quartered. The victim was hanged by the neck and then cut down, often before death. Then disemboweled, castrated, and his body cut into parts. One well-known victim was William Wallace, executed in 1305 for resisting English rule over Scotland.[406]

Such executions drew large crowds, sometimes numbering in the thousands, many out of curiosity or as a form of public entertainment. Others saw them as a serious moral lesson, reinforcing loyalty to the king and as a warning against treason.[407]

People could also be burned alive as a punishment for heresy, with the first known victim being William Sawtrey in 1401. During the reign of Mary (1553-1558), nearly 300 Protestants were burned as heretics. The victim could take more than half an hour to die, if the fire was badly made or deliberately arranged to extend their suffering.[408]

The following account is of the burning of Bishop John Hooper in 1555, after two earlier attempts had failed for lack of enough dry wood.

> After the second fire was spent, he wiped both his eyes with his hands, and beholding the people, he said with an indifferent, loud voice, "For God's love, good people, let me have more fire!" and all this while his nether parts did burn; but the fagots were so few that the flame only singed his upper parts.
>
> The third fire was kindled within a while after, which was more extreme than the other two. In this fire he prayed with a loud voice, "Lord Jesus, have mercy upon me! Lord Jesus receive my spirit!" And these were the last words he was heard to utter. But when he was black in the mouth, and his tongue so swollen that he could not speak, yet his lips went until they were shrunk to the gums: and he knocked his breast with his hands until one of his arms fell off, and then knocked still with the other, while the fat, water, and blood dropped out at his fingers' ends, until by renewing the fire, his strength was gone, and his hand clave fast in knocking to the iron upon his breast. Then immediately bowing forwards, he yielded up his spirit.[409]

Public whipping became increasingly widespread in the sixteenth century, even for quite minor offenses. A law was passed in 1531 under which unlicensed beggars were to be "stripped down to the waist and whipped," while the punishment for vagabonds was to be "tied to the end of a cart naked and be beaten with whips throughout the market town or other place until bloody."[410]

During the seventeenth century, the acceptance of violent punishment gradually lessened. Torture became less widely used, the last recorded cases being in the 1650s; though "pressing" with weights (as a punishment for refusing to plead at one's trial) continued until the eighteenth century, but that too eventually died out.[411]

Capital punishment also declined. In London and Middlesex between 1609 and 1799, the average annual number of executions fell from 140 to just 33, despite a significant increase in population. By 1830, the number of people executed throughout the whole of England had fallen to 51.[412]

Formality and Marked Status Differences

Another indication of high child V is an increase in status differences and an acceptance of powerful authority. These increased from the late Middle Ages to the sixteenth century.

Class distinctions increased during this period, as did the formality of social relations. Feasts in noble houses embodied both features. Guests came to be seated according to a strict plan determined by social rank, including gaps between the different grades. Feasts were marked by formal ceremony, and even conversation was bound by rules (or even forbidden altogether).[413]

At one dinner attended by Elizabeth Woodville, queen consort to King Edward IV, the entire court was required to kneel in silence while she ate.[414] The donning and doffing of hats became a pervasive feature of social life, the removing of a hat being seen as a sign of lower status. Disputes over precedence were common and often resulted in violence, such as gentlemen fighting over the right to "hold the wall," a favored position when the contents of chamber pots were commonly hurled from upstairs windows.[415]

The relationship between generations within a family grew ever more deferential. A man, regardless of his age, was expected to kneel to receive his father's blessing, and to stand in his father's presence until invited to sit.[416]

The increase in the scale and importance of social differentiation affected the practice of religion, and the role of Christianity in English society. In the Middle Ages, clergymen had felt free to criticize the behavior of the rich and the noble, and political conflict between church and crown was a constant feature of the English state. But by the sixteenth century, preachers taught humility and obedience to the crown.[417]

People with high child V are willing to accept, and are more likely to obey, arbitrary and even brutal authority. Thus, the rise of child V in the period leading up to the sixteenth century gave the Tudor monarchs a power not seen before or since in England. Earlier kings had been constrained by their barons, who had considerable power through the local support they enjoyed from the populace. But Tudor kings and queens enjoyed almost total power, dictating religious policy and executing ministers with little regard for law or justice.[418] Henry VIII took this to an extreme by executing two of his wives.

Respect for hierarchy and deference began to ebb in the early seventeenth century. The Puritans were particularly active in this respect, and egalitarian political movements such as the Levellers gained significant traction as the country moved towards Civil War in the 1630s and 1640s. Parliament came into increasing conflict with the monarch, refusing to tolerate the kind of autocratic rule that had been the norm a century before.[419]

By the eighteenth century, social formality had reduced. The aristocracy mixed quite freely with wealthy commoners. Children, though increasingly controlled in their behavior, were no longer required to show the same ritualized formal deference to their parents as in previous generations, and deference was no longer required from adult offspring. There was some retention of formality in rural areas, but even there it had declined by 1900.[420]

As child V continued to fall in the nineteenth century, Britain and Europe became gradually more democratic. In Britain, the Reform Act of 1832 marked a major change toward democratic rule and popular accountability, with almost all men able to vote by 1918.[421] People had lower child V than their forebears, and were less willing to accept the power of kings and aristocrats.

Unstable Hierarchies: Conspiracies and Treason

In the past thousand years, English governments have tended to become more stable and effective, reflecting the rise of impersonal loyalties associated with high C. Impersonal loyalties undermine the power of feudal barons, and limit their ability to rebel against the monarch. The one exception to this trend was a reversion to feudal anarchy in the fifteenth century, a pattern to be discussed in my book ‘Lemming Cycles’.

But there is a form of behavior that follows a different pattern. This is the extent to which hierarchies are unstable, with frequent conspiracies and suspicious rulers. These, like steep status hierarchies are characteristic of societies under stress, and they show the same peak around the sixteenth century.

Consider the fate of English monarchs. From the Norman Conquest until 1327, English kings suffered setbacks but had never been deposed or killed. In that year, however, Edward II was unseated by his wife and her lover, then imprisoned and murdered.

From that point on, the throne became increasingly unstable. Richard II was dethroned and killed by Henry Bolingbroke in 1399. Henry's grandson Henry VI was dethroned twice and then put to death in 1471. His successor Edward IV was briefly ousted in 1470. Edward's son was deposed in 1483 and then murdered along with his brother. Finally, Richard III was defeated and killed at the battle of Bosworth Field in 1485.

In the next century and a half no monarch was deposed or killed, but conspiracies were a feature of the age. For instance, John Dudley took control of the government during the reign of Edward VI, and attempted to change the succession when Edward died in 1553 by placing Lady Jane Grey on the throne. He failed and was executed, as was she the following year. Elizabeth I (1558-1603) faced constant threats of assassination, foiled only by the efforts of her brutal and efficient spymaster, Sir Francis Walsingham. It was one such conspiracy that led her to execute her cousin, Mary Queen of Scots.[422]

When James I came to the throne in 1603, he immediately faced two major conspiracies, the Bye plot and the Main plot. Then, in 1605 came the Gunpowder Plot, in which Guy Fawkes and his co-conspirators attempted to blow up both the king and parliament. James' son Charles I was deposed and executed in 1649, and his grandson James II was deposed and exiled in 1689.[423]

After 1689 politics also became much more stable. No monarch or prime minister in Britain was again to be overthrown by violence, unless one counts the assassination of Spencer Perceval in 1812, which was a personal grudge rather than a political coup.[424] And certainly none were executed. Personal relationships in general also became more stable. Concepts of manliness in the eighteenth century became less dependent on bearing arms or committing violence if offended.[425]

Bad Temper and Suspicion

People under stress tend to be suspicious of each other, to expect evil of others and to plot against them, one result being political instability as described earlier. Suspicion is a behavior already observed in the highly stressed Mundugumor, and was a characteristic of Englishmen in and around the sixteenth century. In 1485 it was said of Englishmen that they were "reckless and ruthless, guided by temper, with higher ranks arrogant and all prone to expect evil of their fellows."[426] The population of early seventeenth century London has been described as volatile in the extreme, with people showing fear, grief or anger at the slightest cause.[427]

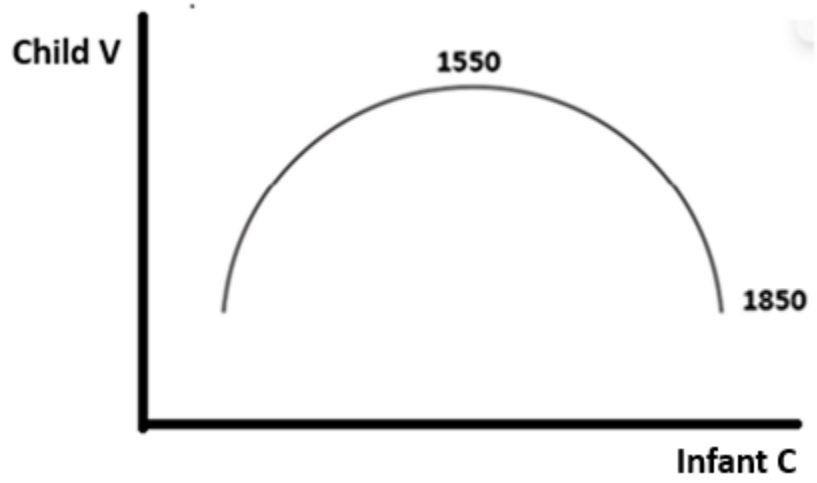
Advice given by fathers to their sons – evidenced in letters written between the fifteenth and seventeenth centuries – indicates a cynical and pessimistic view of human nature. Young men were counselled to be secretive and mistrustful even within their families.[428] The Tudor era was also a time in English and European history when witch-hunts were at their absolute height. Hundreds of innocent women were tried and burned on suspicion of Satanism.[429]

By the nineteenth century there were increasing signs of calm, far removed from the passionate hysteria of the sixteenth century. An entirely new concept of masculinity was emerging to replace the prickly 'man of honor': the 'man of dignity' who was reasonable, prudent and with command over himself.[430]

In the nineteenth century, Englishmen acquired a reputation for a "stiff upper lip." The new standards of restraint applied to all men, and there was a particular emphasis on treating women with deference.[431] The socially disruptive behavior of the sixteenth century had been replaced with the sober and controlled conduct of the Victorian gentleman, reflecting an enormous overall reduction in stress.

Thus it is that child V, with its associated high level of stress, reached a peak in the sixteenth century and then declined, falling slowly during the seventeenth century and then faster in the eighteenth through to the nineteenth centuries, as indicated in Fig. 12.1.

Fig. 13.1. The civilization cycle in England. A high level of child V around 1550 was accompanied by a rapid rise in infant C. As child V fell to the nineteenth century, infant C reached a peak and then began to fall.



The best way to understand this pattern is to propose that C is driven not only by C-forming traditions such as limits on sexual behavior, but by the stress associated with high levels of child V. The higher the stress level, the more rapid the rise in C. This is something we plan to test in the laboratory.

What makes this all the more likely is that exactly the same pattern can be seen on the other side of the world, in Japan.

15. The Civilization Cycle in Japan

"A strong spirit makes a strong nation." — Japanese maxim

The history of Japan shows a strikingly similar pattern. Together with a long-term increase in C and especially infant C, there is evidence of a rise of stress and child V to the sixteenth century, and then a fall. Being so far removed from Europe, it makes a good independent case study. There is no obvious reason why both societies, for example, should have been most ferocious in their punishments at the same time, when there was virtually no contact between them before the 1540s, and relatively little after the 1630s.

During the late first millennium CE, Japan seems to have been relatively low in child V and stress. Imperial law codes in the eighth century CE were mild. Japanese culture was heavily influenced by Indian Buddhism and there was a reluctance to impose severe physical punishment.[432]

An indication of low stress is that Japanese rulers and social hierarchies were relatively secure. The Emperor was the nominal ruler but in practice a single family – the Fujiwara – held power from the ninth until the eleventh century. During this time women enjoyed a comparatively high status, a common feature in societies with low V. They controlled their households and were generally influential, especially among the lower classes.[433]

From the eleventh to the sixteenth century, punishments in Japan became noticeably harsher. As power shifted from the imperial court to samurai military governments, society became more violent and unstable. Warfare, rebellion, and competition between warlords led to a greater reliance on severe punishments to maintain order and authority. These included executions, exile to remote regions, and confiscation of land or property.[434]

Methods of execution included slow deaths from crucifixion and burning alive. Such events could take on a ritual or theatrical quality, and attracted a large number of spectators.[435]

Punishment of children could include physical discipline, such as hitting or striking, as well as harsh verbal correction. Training was often severe, especially among samurai families, where boys were prepared for warfare and duty.[436]

As in Europe, fifteenth and sixteenth century Japan was riven by suspicion and mistrust. Daimyo were mistrustful of their subjects and kept a close eye on them, dictating to an extreme degree what they could and could not do. Outsiders were also kept under close scrutiny, or simply not permitted to enter fiefs at all.[437]

This was a reaction to high levels of treachery and rebellion.[438] In the century leading up to the 1560s, all but one of the great ruling families were either destroyed or reduced to insignificance,

often by rebellious vassals.[439] A number of foreign visitors noted the prevalence of treachery during this period.[440]

Consistent with these signs of rising V, the status of women in Japan declined from the eleventh century. Women lost many legal and economic rights, were expected to be more obedient to their fathers, husbands, and even sons, and had less independence.[441]

Falling Child V

Just as in Europe, many of these trends began to reverse in the seventeenth century, following Japan's unification. Out of the constant upheaval emerged a single ruling lineage, the Tokugawa dynasty, which reigned for 265 years from 1603 to 1868. Central authority was largely stable and accepted, and there were few attempts to overthrow the state. Stability within the state also improved, and senior ministers were relatively safe from suspicion. Many served the shogun and retired peacefully.[442] Judicial punishments remained severe but were less arbitrary than before.[443]

Children also began to be treated less harshly. In the fifteenth century it was assumed that they would be beaten, but by the eighteenth century, parents were warned against anger when dealing with children.[444] The one key departure from this pattern is that women in the Tokugawa period had even fewer rights and less independence than before.[445]

Further changes came with Meiji restoration in the 1870s, which began the wholesale modernization of Japan, Older, more public and severe punishments—such as crucifixion and other forms of public execution—were abolished. Penalties became more focused on imprisonment, fines, and regulated execution, rather than public spectacle.[446]

All this suggests that Japan, like England and Europe, experienced a sharp rise in child V and stress to the late fifteenth and sixteenth centuries. There is some evidence of a decline after this, though less markedly than in Europe.

We now have a picture in which a rapid rise of C in both England and Japan was accompanied by a peak of child V around the sixteenth century.

What Drives the Civilization Cycle?

The reasons for rising C in the cycle are twofold. The first is the effect of advanced C-promoting cultural technologies: Christianity in Europe, Buddhism and Neo-Confucianism in China and Japan. The second is that child V seems to act as a powerful C-promoter, likely as a result of the accompanying stress.

When child V is exceptionally high, as it was in and around the sixteenth century, C and especially infant C rises. When it falls below a certain level, C stabilizes and then begins to fall. Note that the decline of child V was slower in Japan than in Europe, which could explain why the peak of infant C came some 75 years later in Japan, in the early twentieth rather than the late nineteenth century.

The rise of child V to the sixteenth century was also driven by belief systems containing powerful V-promoters including patriarchy, deference and respect, and female chastity.

One likely reason for the decline in child V is that high V depends on mothers being indulgent to infants. The traditional peasant societies of China, India and the Middle East all showed this combination of infant indulgence with harsh treatment of children between the ages of six the twelve.

When infant C was low, as it was in Europe and Japan a thousand years ago, child V was able to increase rapidly, driven by V-promoting cultural technologies.

As C rose, so did the tendency to control infants. This began to undermine child V. The higher the level of infant C, the faster the decline in child V. Eventually, child V fell far enough that C was undermined and began to fall.

Thus it is that the dramatic rise of child V and stress in Europe and Japan around the sixteenth century is far more than a historical curiosity. It can be seen as a major driving force behind the rapid rise in infant C, which thus made possible the rise of Europe to world power, and to the later rise of Japan to a brief hegemony over East Asia.

Also, as will be discussed in future chapters, the continued fall of child V is one of the reasons why civilizations collapse. To introduce this topic, we will turn to Rome.

16. The Roman Republic

"*The health of the republic is the supreme law*." — Cicero

In this chapter we will apply the pattern of the civilization cycle to Rome, which allow us to trace the rise and then fall of C, and the consequences this had for the Roman State.

Rome, with its brutal blood sports and mass slavery, was no Garden of Eden, but what followed was no better. Armies marched back and forth, leaving disease and starvation in their wake. In 600 C.E., the population of the Roman West was only about half what it had been five centuries earlier.[447]

The study of Europe and Japan showed that the rise of a civilization can be understood as a rapid rise in infant C, driven not only by cultural C-promoters such as sexual abstinence, discipline, and religious observance, but by a surge in child V peaking around the sixteenth century. As child V fell, the level of infant C first reached a peak (in the nineteenth century in Europe and the early twentieth century in Japan), and then began to fall.

Rome allows us to apply this process to an entire civilization, starting with peak infant C. It shows how the civilization cycle continues as infant C starts to fall, and how this interacts with wealth and urbanization to drive the collapse.

The Benefits of higher infant C

The tale of Rome begins with its emergence as an organized urban community in the eighth century BCE.[448] Though a minor people largely devoted to subsistence farming,[449] the culture from which they arose had been strongly influenced by earlier civilizations to the east such as the Greeks. These civilizations provided not only technologies such as metalworking and writing, but cultural technologies such as female modesty and the guarding of their chastity.[450] In our understanding, such customs served to raise both C and V.

Romans were also strictly monogamous, as were the Etruscans and Greeks.[451] Monogamy is an effective C-promoter in that it allows a man to have legitimate children with only one woman. This focuses his attention on those children, rather than competing for further wives, both behaviors that promote sensitivity to dopamine. This was in contrast to other peoples in the western Mediterranean such as the Gauls, whose chiefs commonly had multiple wives.[452]

This was a culture more advanced, in every sense, than the earlier one that had carried farming across Europe during the past few-thousand years. Its more powerful C and V-promoters made possible higher levels of C and V, and thus a more advanced civilization, than any previous culture in Western Europe. All of these influences were felt in the small city-states of central Italy, one of which went by the name of Rome.

Rome showed signs of high infant C very early in its history. A republican government, which the Romans achieved in 509 BCE and sustained for five centuries, requires strong impersonal loyalties because it involves support of an institution or code of laws, more than to an individual leader. Key institutions set up at this time included the Senate and the Consulship, for which Romans had an enduring respect.[453] They were also strongly attached to the rule of law.[454]

The superb discipline of the Roman army, and later achievements in architecture and engineering, are further evidence of high infant C.[455] This was not at the level of nineteenth-century Europe, which was driven by the still more powerful cultural technology of Christianity. Rome never industrialized and its political system was more personal in that it always emphasized patron-client relations.[456] But Roman C was higher than anything previously seen in the West.

The rise of the Republic

Early Roman history also shows signs of high child V. Roman justice was harsh and brutal both under the kings and in the early Republic. Romans could be flogged, hanged, or beaten to death, though they had more protection against arbitrary power under the Republic.[457] Fathers had complete power to beat or even kill their children, though this was limited by the third century BCE.[458]

With regard to political instability, another hallmark of child V, three Roman kings were assassinated or deposed.[459] By contrast, there is no reference to consults being assassinated before the late Republic.[460] This suggests that the peak of child V may have been in the sixth century BCE.

As in Europe and Japan, declining child V was at first accompanied by a continuing rise in infant C, most clearly indicated by the rise of impersonal institutions and controls. In 509 BCE, as mentioned earlier, the Romans threw out their kings and developed more representative institutions. Roman law was first written down a half-century later, with the creation of the "Twelve Tables" in 449 BC. Among its provisos was a prohibition on making laws against individuals and severe penalties for offenses against property.[461] The purpose of the Twelve Tables was to ensure uniformity in the application of the Republic's law at the local level, and is a strong indicator of rising infant C.

The peak of infant C can be placed around 250 BC, at which point the Republic had been in existence for two and a half centuries. An indication of high C is fast population growth, so it is significant that multiple colonies were sent out from Rome in the third century, more than in any other era.[462] Roman citizens served willingly and ably as soldiers in the early and mid-Republic, more than in later times.[463] Later writers spoke admiringly of the seriousness and self-discipline of early Romans, not unlike the 'stiff upper lip' of men of Victorian England.[464]

Perhaps the epitome of Roman character in this period can be seen in Cato the Censor (234–149 BC), as described by Plutarch.[465] Although he lived after the peak of C, Cato was famous in his time for personifying the ideals of the earlier Republic. As a young man, before moving to Rome to pursue politics, Cato served as a soldier and gained a reputation for military excellence. In between campaigns he worked on his farm where he dressed and acted as a simple laborer, sharing duties with his slaves.

Cato's military aptitude and capacity for hard work were not his only high C traits. Later in his career, as governor of Sardinia, he acquired a reputation for strict integrity, reducing the costs of administration while living in austere simplicity. He administered impartial justice and severely enforced the laws against usury, banishing the guilty.

Even at the height of his political career, Cato lived in an austere manner. He ate his breakfast cold, dressed simply, lived in a modest home, drank the same wine as his slaves and refused to plaster the walls of his cottages. He was regarded as an archetype of the traditional Roman character—austere, frugal, harsh, self-disciplined, honest, disinterested and impersonal when administering justice, dogmatic and a lover of order.

Cato believed that farming, unlike commerce or usury, produced virtuous citizens and brave soldiers with high moral values. This was a reasonable observation. C and V are promoted by austere living, routine hard work, and rural life. Such people make better soldiers and are more likely to hold on to traditional values.

Senators were forbidden to engage in trade, though many circumvented the law by the use of agents.[466] Urban living brings not only wealth but individualism and commercial competition, which undermines C. This is likely why elites commonly look down on trade and stay attached to their landed estates. A pattern seen in the Roman Senatorial class, and to the landed aristocrats of Europe in later centuries.

All of this suggests that Cato, in common with the Romans of earlier generations, had high C as well as C-promoting habits. While eccentric in his extremes and regarded as old fashioned by the early second century, he represented the practices and values of the early to mid-Republic.

Biohistory proposes that the political character of a society reflects the temperament of its members. In effect, the Roman Republic had the character it did because until the mid-third century Romans tended to be much like Cato, with the beginning of a decline already evidence by Cato's time..

Another indication is that by the third century BCE, children were being treated less harshly than in early times, an indication of falling child V.[467] This in itself would undermine C.

After 200 BCE the decline was further driven by the enormous wealth brought by conquests following the Punic Wars of the mid to late third century.[468] The Roman writer Sallust had no doubts on the enervating effects of wealth, as he observed:

> When Carthage, the rival of Rome's sway, had perished root and branch, and all seas and lands were open, then Fortune began to grow cruel and to bring confusion into all our affairs … Hence the lust for money first, then for power, grew upon them; these were, I may say, the root of all evils. For avarice destroyed honor, integrity, and all other noble qualities; taught in their place insolence, cruelty, to neglect the gods, to set a price on everything …
>
> As soon as riches came to be held in honor, when glory, dominion and power followed in their train, virtue began to lose its luster, poverty to be considered a disgrace, blamelessness to be termed malevolence. Therefor as the result of riches, luxury and greed, united with insolence, took possession of our young manhood. They pillaged, squandered; set little value on their own, coveted the goods of others; they disregarded modesty, chastity, everything human and divine; in short, they were utterly thoughtless and reckless.[469]

It is a strange irony that Roman historians may have had a clearer sense of the real drivers of history than many modern historians, more than 2.000 years later.

In the early second century BCE, as mentioned earlier, Cato's sternness and integrity were already considered old-fashioned. Powerful aristocrats came to be known more for generosity and charming manners than for austerity and reserve, suggesting a switch to more personal, lower C attitudes.[470]

There is further evidence of falling C in the second century. Fewer colonies were planted. There were fewer peasant farmers, and an increase in estates tilled by slaves.[471] The rise of slave estates was driven, at least in part, by the relatively high cost of labor. Compared to Egypt at the same time, Italian laborers were paid more and had a higher standard of living, including the consumption of meat.[472]

The Greek rulers of Egypt at this time used slaves in such areas as household services, mines and quarries, but relatively little for agriculture. Farm work was most often performed by tenants, wage laborers, and peasants.[473] So the rise of these estates in Italy is an indication that people were losing their taste for manual labor. It might also suggest that the birth rate had fallen since the third century, though the population of Italy continued to grow until the first century CE.[474]

Even when the urban poor were given land, as by the reforms of Gaius Gracchus later in the century, many sold them and drifted back to the city.[475] As C declined, fewer Romans had the taste for the routine of farming. Another consequence was the shift towards a professional army, as fewer smallholders were available to serve in increasingly lengthy wars.[476]

Restraints on sexual behavior began to loosen. Divorce, uncommon in the early Republic, became acceptable by the first century BCE. By the following century among the propertied classes, it was almost routine.[477]

One obvious consequence of this change in temperament and economic behavior was a growing gap between rich and poor.[478] The elite were able to take advantage of new opportunities by buying up land, lending money and plundering the newly conquered provinces. But the great mass of Romans, less suited to productive work than their ancestors, became increasingly dependent on government-subsidized handouts of food.[479]

There were also signs of a continued fall in V in the second century BC. Women gained more power and were able to manage their own financial affairs and control property.[480] The law codes were relaxed and army discipline became more lenient.[481] Business boomed even as the work ethic declined.

Still moderate infant C and the decline in the more traditional child V increased creativity. Latin literature experienced a golden age in the first century BC. Writers and poets of the period such as Livy, Virgil, Cicero, Catullus and Caesar have been read and revered for more than two thousand years.

The decline of child V, which is associated with hierarchy, also gave birth to a more democratic sentiment. At the end of the second century BCE the popular party, led by Tiberius and Gaius Gracchus, gained notable victories over the Senate, especially with regard to land redistribution. Although the Gracchus brothers were both murdered, when Julius Caesar gained power in the mid first century BCE it was as leader of the popular party against the Senatorial aristocrats.[482]

Many of the developments associated with the early stages of declining child V-free thought, creativity, democracy, freedom for women—can be regarded as positive, and there are obvious parallels to the modern West. But there were more ominous signs.

From Impersonal to Personal Loyalties

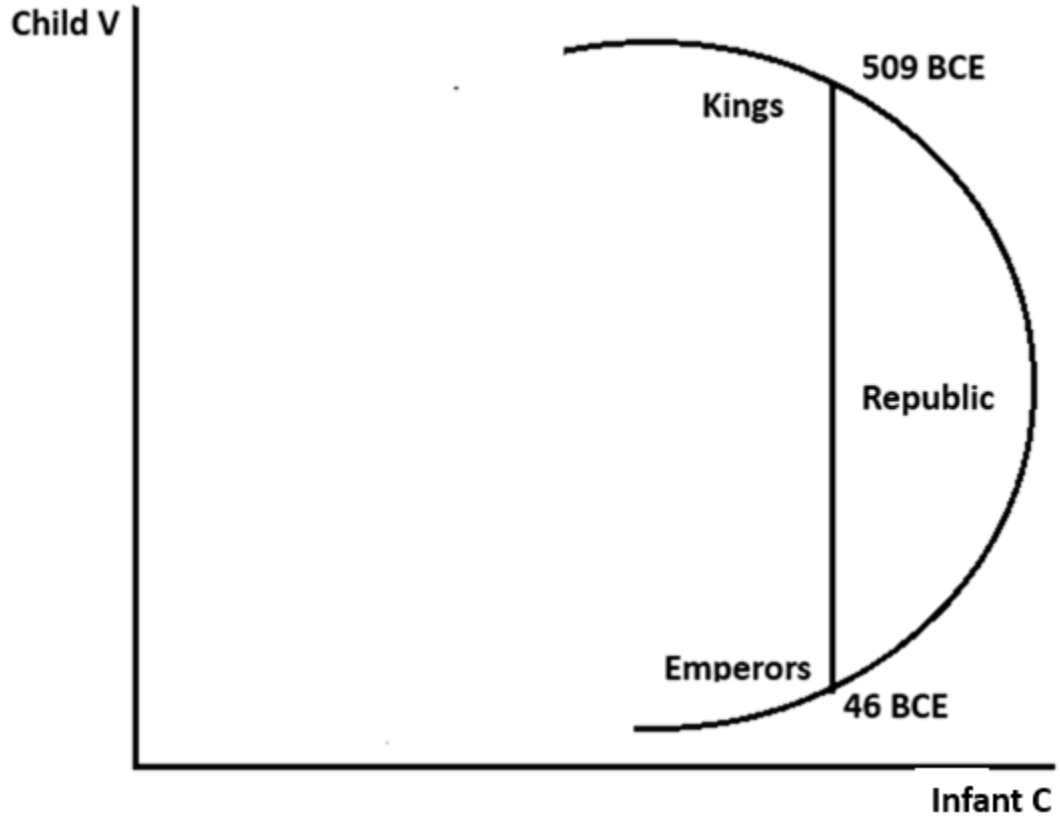
One of these was a decline in the impersonal values that underpinned the Republic. By the beginning of the first century BCE the loyalty of soldiers was turning from state to commander, which opened the way for successful generals such as Marius and Sulla to seize control.[483] Sulla's march on Rome in 88 BCE was a pivotal moment in the fall of the Republic. It was an unprecedented action, and such a breach of republican principles that almost all his commanders

refused to follow him.[484] In effect, their loyalties were still impersonal enough to give priority to the rule of law.

But, and this is what mattered, the ordinary soldiers were now more loyal to Sulla than to the Republic. As a result, after a further incursion in 82 BCE he was able to dominate the city, killing thousands of his political opponents. Between these two events his rival Marius had also dominated the city with soldiers personally loyal to him.[485]

But the key problem facing the Republic was the continuing fall in infant C. Laws and institutions are impersonal and will only be strong when people's loyalties are also impersonal. When infant C falls below a certain level, republican forms of government can no longer be maintained. The plotters who killed Julius Caesar in 44 BCE thought they were restoring the Republic, but killing one man did nothing to change popular attitudes. When loyalties become sufficiently personal, the only question is which man is able to attract a greater following and thereby take control (see Fig. 15.1).

Fig. 15.1. Rise and fall of the Roman Republic. Republican government requires a high enough level of infant C.



The role of personal loyalties in the quest for power can be seen in the life of Mark Antony, a typical politician of the first century BCE. Plutarch's description of him is in marked contrast to his observation of Cato:

> Antony grew up a very beautiful youth but, by the worst of misfortunes, became friends with Curio, a man abandoned to his pleasures. To make Antony dependent on him, Curio plunged him into a life of drinking and dissipation, resulting in so much extravagance that at an early age he went two hundred and fifty talents into debt.
>
> Antony's generous ways, his open and lavish gifts and favors to his friends and fellow-soldiers, did a great deal for him in his first advance to power. And after he became great, the same generosity maintained his fortunes, when a thousand follies were hastening their overthrow …
>
> Antony did not take long to earn the love of his soldiers, joining them in their exercises and for the most part living amongst them, and making them presents to the utmost of his abilities. But with all others he was unpopular enough. He was too lazy to pay attention to the complaints of injured parties. He listened impatiently to petitions, and he had an ill name for familiarity with other people's wives.[486]

In this one man can be seen all the signs of lower C—extravagance, drinking, laziness, and sexual indulgence—but also a personal charm that endeared him to his soldiers and came close to winning him control of the Roman world. A greater contrast to Cato can scarcely be imagined.

But with such men, and the personal loyalties they attracted, did the Republic come to an end.

17. The Roman Empire

"*Luxury and avarice corrupted the simplicity of early Rome*." — Sallust

This chapter will trace the continuing decline of C in the Roman Empire, from the time one man rule was established by Octavian in 27 BCE. He kept the Senate nominally in charge, but took absolute power for himself.[487] The Empire brought political stability after decades of turmoil, aided by a new V year around 0 CE. But the new regime did nothing to halt the decline in C, most notably in the elite. Augustus believed there had been a decay in the character of the aristocracy, and expressed it in this speech to Roman aristocrats in 9 CE:

> Mine has been an astonishing experience: for though I am always doing everything to promote an increase of population among you and am now about to rebuke you, I grieve to see that there are a great many of you [who are childless]. We do not spare murderers, you know … yet, if one were to name over all the worst crimes, the others are naught in comparison with this one you are committing. Whether you consider them crime for crime or even set all of them together over against this single crime of yours. For you are committing murder in not begetting in the first place those who ought to be your descendants. You are committing sacrilege in putting an end to the names and honors of your ancestors; and you are guilty of impiety in that you are abolishing your families … overthrowing their rites and their temples. Moreover, you are destroying the State by disobeying its laws, and you are betraying your country by rendering her barren and childless. Nay more, you are laying her even with the dust by making her destitute of future inhabitants.[488]

Augustus enacted legislation to try and turn back the clock, but was no more successful than Brutus and Cassius had been in their attempt to restore the old Republic by killing Julius Caesar. Comments by Tacitus (55-120 CE) on the early Empire showed how the more old-fashioned Roman citizens regarded the new age. It is a familiar refrain:

> Promiscuity and degradation thrived. Roman morals had long become impure, but never was there so favorable an environment for debauchery as among this filthy crowd. Even in good surroundings people find it hard to behave well. Here every form of immorality competed for attention, and no chastity, modesty or vestige of decency could survive.[489]

Parents in the early Empire were less likely to punish their children, but also showed less interest in them and exerted less control. The children of the elite were often left in the care of slaves.[490] The historian Tacitus lamented the effect this had on the family:

> In the good old days, every man's son, born in wedlock, was brought up not in the chamber of some hireling nurse, but in his mother's lap, and at her knee. And that mother could have no higher praise than that she managed the house and gave herself to her children. Again, some elderly relative would be selected in order that to her, as a person who had been tried and not found wanting, might be entrusted the care of all the youthful scions of the same

> house. In the presence of such a one no base word could be uttered without grave offence, and no wrong deed done …
>
> Nowadays, on the other hand, our children are handed over at their birth to some silly little Greek serving-maid … The parents themselves make no effort to train their little ones in goodness and self-control; they grow up in an atmosphere of laxity and pertness, in which they come gradually to lose all sense of shame, and all respect both for themselves and for other people.[491]

New Elites from the Provinces

The decline of Roman character was such that if the political and economic power of the Roman Empire had depended only on Italians, it would have been in serious trouble by the first century CE. One indication of this is that Italian trade was already in decline.[492] But the genius of Rome was its ability to assimilate provincials. As declining C made Italians less capable, political power shifted to men from the provinces, who had been more recently acculturated and thus less affected by falling C.

The great writers of the late first century CE, unlike those of the first century BCE, were no longer Italians. Seneca and Lucan were from Spain, and Tacitus from Gaul.[493] The economic and administrative life of the Empire was also increasingly in provincial hands. The efficient bureaucracy of the Emperor Claudius (41–54 CE), for example, was run by ex-slaves, with the key men likely from Greece or the Eastern provinces.[494] Such men were not only competent but had no local power base, and so owed total loyalty to the emperor.[495]

The same pattern can be seen in the emperors, though with a delay. Until Nero in 68 CE, they came from ancient Roman families. Vespasian and his sons (69–96 CE) were from provincial Italy. Trajan and his three successors (98–180 CE) were from Spain and Gaul, and the successful emperors of the late third and early fourth centuries from mountainous Illyria.

The army showed the same pattern. In the first century CE many soldiers were still Italians, though with increasing recruitment from Gaul, Spain and the Balkans. In the second century, few recruits came from Italy. By the third century, the army was dominated by men from the frontier regions, especially Illyria. By the fourth century, many soldiers were barbarians from beyond the frontier.[496]

The Roman culture of the Empire, like that of the West in the twentieth and twenty-first centuries, reflected declining C. This made it attractive to provincials, not only because of its prestige but also because it minimized the role of C-promoters which require people to act in ways that may be at odds with their temperaments. People accepting it would quickly lose child V rigidity, while inheriting infant C epigenetically from their parents. This combination made them effective administrators, writers and even emperors.

But after a generation or two they lost infant C and sank into insignificance, allowing other groups from poorer areas to become prominent in turn. The decay of character is especially evident in the heirs of Emperors who grew up with wealth and power. The austere and hard-working Augustus was eventually succeeded by debauched libertines such as Caligula and Nero. The hard-working and self-disciplined Marcus Aurelius by the arbitrary and capricious Commodus (180–192 AD). None of these successors had much taste for the routine of administration.[497]

The more competent Emperors, by contrast, were those not born to the purple. Augustus, Vespasian, Trajan, Hadrian, Antoninus Pius and Marcus Aurelius, all came to power by force of arms or because their predecessors failed to produce surviving sons.

Increasingly Personal Loyalties

Meanwhile, though on a slower timescale, C was declining throughout the entire Empire. We have seen that loyalties were already becoming more personal in the late Republic, allowing leaders like Marius, Sulla and Caesar to seize power.[498] Then the Republic died and the Empire was born, but for a time the old republican institutions—the Senate, the local bureaucracies—maintained some force. Magistrates were elected in Rome until the time of Tiberius (14–37 CE) and in most other cities until the second century.[499] But by the early third century CE the Roman state was an undisguised absolutism.[500] When Septimus Severus died in 211 CE his last words to his sons were: "Stick together, pay the soldiers, ignore everyone else."[501]

As loyalties became more personal still, even the emperor was too distant and impersonal to serve as a focus, so the power of local leaders increased. One result was the growth of large estates that were in many ways immune from government control. Local magnates defied the law by evading taxes, keeping prisons, seizing debtors and arming retainers.[502] In some cases even provincial governors were helpless to stop them.

The remaining authority of the emperor came to rely more and more on his actual presence and less on the laws and institutions of previous times. A distant emperor in Rome could no longer demand respect. Now he had to be physically present to exert his authority. In the fourth century the Empire was effectively split, with each half having an Augustus or senior emperor, and a Caesar or junior emperor.[503]

After a brief recovery early in the century, for reasons to be discussed in my book 'Lemming Cycles', the Empire collapsed. But political changes, the increase in personal loyalties, was only a part of the problem.

Demographic and economic decline

Another issue was demography. We have seen that the peak of C in Europe was associated with rapid population growth, and so it was in Italy. The population of Italy grew rapidly during the

Republic but by the first century CE had reached a plateau of around 6.5 – 7.5 million.[504] This cannot be explained by emigration, since the people departing were likely in rough balance with new arrivals, such as slaves.[505] For those who would explain population growth purely on economic grounds, this represents a puzzle. Italy during the first century CE was peaceful and prosperous, with no major epidemics. Why was there no further growth?

The only possible reason is that the birth rate had fallen not only in the elite but in the broader population. It is even more striking that the population of the East, notably Egypt, was still growing in the first century.[506] This is another indication of falling C, especially in the West.

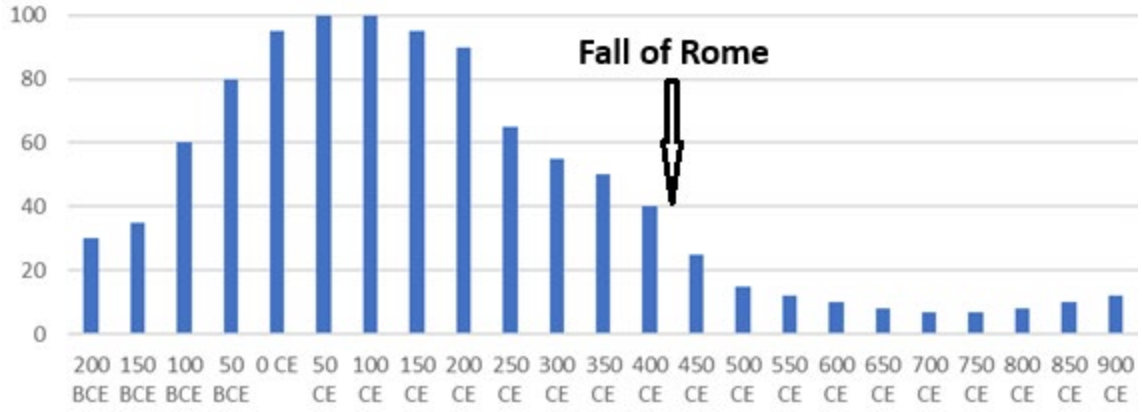
From the late second century, the Empire's population was in decline. This is evident from archaeology and also from imperial edicts complaining of depopulated lands, lack of taxpayers, farmers abandoning holdings, and difficulty recruiting soldiers. Laws tried to prevent peasants leaving their lands.[507]

The reasons include mass epidemics and the political turmoil which was itself a product of falling C, but there are some peculiar exceptions to this pattern. The Eastern Empire experienced the same epidemics and political chaos but suffered far less population decline. And large numbers of barbarians from beyond the frontier settled in the depopulated Empire. In other words, their numbers seem to have been growing while the Romans declined.[508]

Loss of adult C results in a reduced interest in having children, an attitude evident in the Roman elite in the late Republic and early Empire, and also in the modern age. Though this is less clear in the general population, who were far less affluent, it may have contributed to the fall in population. The contrast with the East is especially marked, as will be discussed in the following chapter.

Falling C is even more clearly indicated by economic decline. Industrial activity in the ancient world can be tracked by concentrations of lead in the Greenland icecap (Fig. 16.1), which show a steady fall from the late first century BCE.

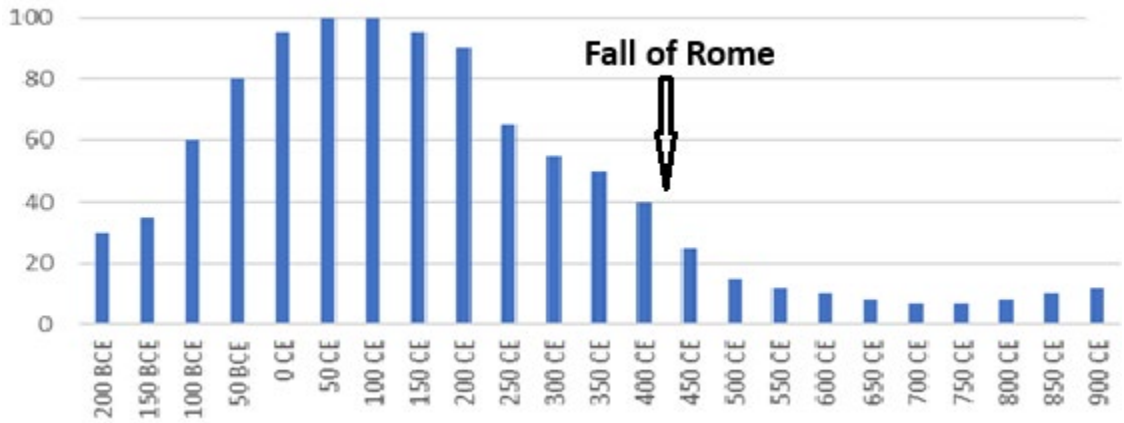
Fig. 16.1. Deposits of lead pollutants in the Greenland ice cap.[509] Concentrations are relative to peak emissions in the late first century BCE.



Trade also declined in the second, third and fourth centuries CE.[510] In the later Empire there was an emphasis on small-scale manufacturing for the local markets, and large estates were becoming more self-sufficient.[511]

Another indication is the declining use of money, as evidenced by recovered coin hordes (Fig 16.2)

Fig. 16.2. Coin horde recoveries.[512] Relative to the Roman peak



Note that in both these indicators suggest that the major decline in C took place before the Empire collapsed. One result was that taxes began to be levied in kind, even under a strong ruler such as Diocletian who made every effort to restore the currency.[513] It was the same problem as faced by Japanese rulers of the seventh century, who had tried to introduce coinage on Chinese models but failed. Currency simply cannot work as well in a low C society.

Diocletian and some fourth century rulers showed typically lower C attitudes by restricting the market economy. Diocletian encouraged guilds and tried to control prices and the movement of labor.[514] All this is exactly what we would expect from a loss of the impersonal attitudes and flexibility associated with higher infant C.

Creativity followed the same pattern. We saw in chapter six that original thinking is especially characteristic of infant C, though inhibited by the more traditional thinking of child V. There was an initial burst of creativity in the last two centuries BCE, following the initial decline of child V, but after that it went into freefall as infant C declined. Thus, Latin literature went from the golden age of the late Republic to the silver age of the first century CE to the creative wasteland of the later Empire, in which there were few if any writers of note.[515] As infant C declined, superstitious thinking became more prevalent.[516]

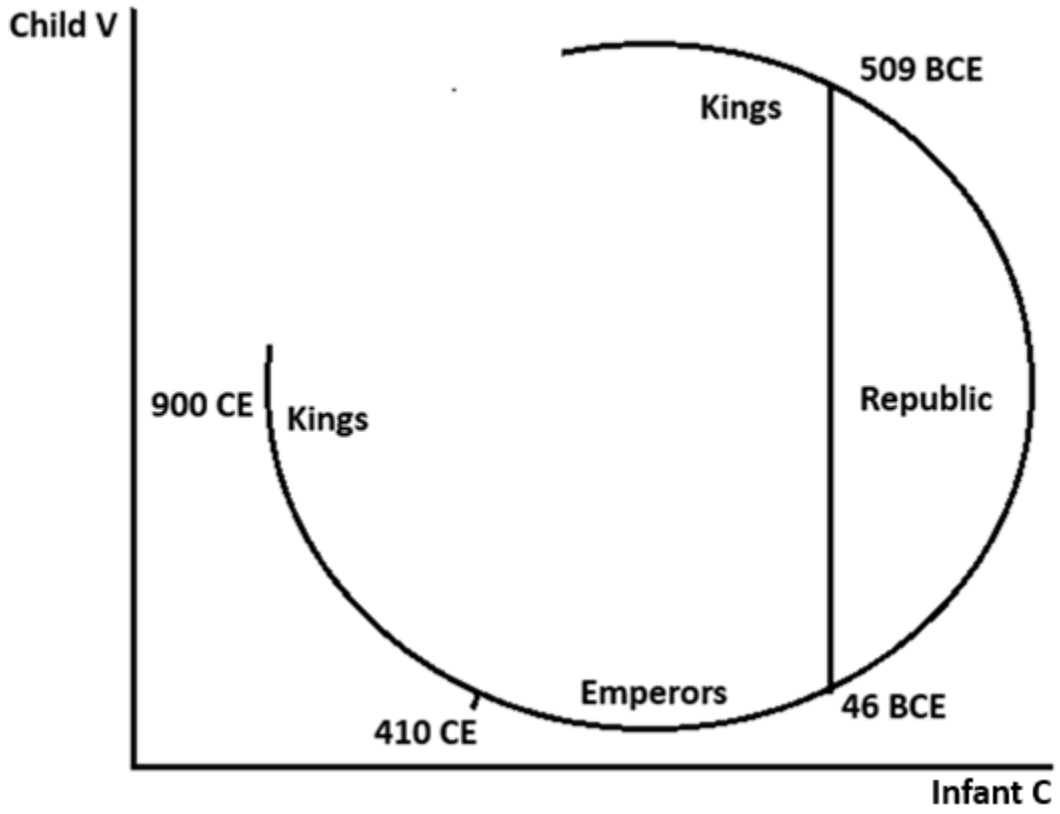
The Civilization Cycle in the Roman Empire

The Roman Empire completes our understanding of the civilization cycle. In Europe and Japan, a prolonged rise in C was accompanied by a *rise and then fall* in V and stress which, along with religious C-promoters, had driven the rise in C. The Roman Empire shows the next stage of this pattern in which C falls, accompanied by a *fall and then rise* in V and stress (see Fig. 21.2 below).

Declining V and stress in the late Republic continued into the early Empire, despite the reputation of some emperors. Though Nero (54–68 CE) is a byword for cruelty, especially for his persecution of early Christians, his actions were in some ways surprisingly humane. He restricted the size of bail and fines, stopped patrons from reducing their freedmen clients to slavery, and acted to make taxes less oppressive to the poor.[517] After the great fire of Rome he paid for relief efforts out of his own pocket, and spent days personally searching the ruins for survivors.[518] Unimportant men who insulted him were usually no more than banished.[519]

This trend toward lowered stress would become even more pronounced by the second century. Between 98 and 180 CE a series of humane and capable emperors did still more to alleviate harshness in the law.[520] Masters were no longer allowed to kill their slaves, castrate them or sell them to brothels without good cause.[521] The lives of citizens were guaranteed to a much greater extent, and even men guilty of conspiracy might not be executed.[522] And political stability, a key indication of low stress, was high. While six emperors were killed in the first century CE, none suffered this fate between 96 and 190 CE.

Fig. 16.3. The Roman Civilization cycle. As C continues to fall, the decline in child V slows, and then begins to rise



There were other indications of lower V and stress in the early Empire. The freedom and power of upper-class women seem to have been greatest in the first two centuries CE.[523] By the late first century some writers were opposing the beating of sons, and fathers no longer had power of life and death over their children.[524]

But from this low point, stress began to rise. From the late second century, torture began to be used in some criminal trials. By the fourth century torture, flogging and such cruel deaths as burning were routine.[525] Deference and status differences became more marked and the ruler surrounded himself with pomp to emphasize his distance from other people, as opposed to the comparatively affable emperors of the second century.[526]

The political system became more brutal and less stable. Commodus (180–92) and Caracalla (211–17) revived the reign of terror, with mass executions of political opponents, something not seen for almost a century. At the same time the position of emperor itself became more dangerous.[527] Commodus and most of his third century successors were killed in office.

The civilization cycle is symmetrical. Child V and stress were at an all-time high in sixteenth-century Europe and Japan, and Rome around the sixth century BCE, and in both periods C rose rapidly. Child V and stress were at a low point in the Roman Empire of the second century, and C

at this time fell rapidly. The fall was assisted by peace and prosperity and by the collapse of traditional religious beliefs.

But as infant C fell to a very low level and harder times began, child V and thus stress began rising again. And they would continue rising until the sixteenth century. This rise was aided by the growth of Christianity. With its powerful and effective V and C-promoters, including strong restraints on sexual activity, Christianity was a far more advanced religion than that of the early Romans. Very characteristically it arose in the Middle East, where the long experience of civilization had produced the most advanced cultural technologies.

But even Christianity, with its powerful C-promoters, could not save the Empire. This was, partly because its ascetic tenets were not widely adopted at this period, but mainly because low levels of child V and stress were still driving down C. It was only in the tenth and eleventh centuries that the level of child V again grew high enough for C to begin its long rise to the nineteenth century, aided by the much wider and deeper influence of Christianity.

The Fall of Rome

But before this happened, there would be a long period of chaos. Rome had endured for more than a thousand years, and for almost half this time had ruled much of the world. It brought unprecedented wealth and prosperity, magnificent cities, huge advances in technology, and a sophisticated literature and culture. Its language, the dialect of a small Italian city-state, had become the native tongue of millions. Tourists and merchants could travel thousands of miles in relative comfort and safety.

And now it was gone. Populations collapsed to a fraction of their former levels, ridden with disease as rampaging armies marched back and forth across the land. Literacy all but vanished outside the monasteries, and much of the ancient learning was lost forever.

And yet, as we have seen, the fall of the Roman Empire was not a singular event that occurred in the early fifth century CE. Rather it was a long process that had begun more than six hundred years earlier. A high level of child V had combined with powerful C-promoters, taken from the Etruscans and Greeks, to raise infant C to a peak in the third century BCE. But V had been falling since around the sixth century, and by the third century CE it was no longer high enough to maintain C. Combined with the wealth brought in by foreign conquest, C began its long decline.

The fall of Rome was deferred for many centuries by the Roman talent for assimilation, bringing in peoples with higher V and C as administrators, poets and soldiers until their own V and C was sapped in turn. Eventually, child V reached a low point in the third century CE and began to rise, but this was too little too late. Even when combined with the powerful C-promoters in Christianity, C continued to fall.

One consequence was a rise in large estates that paid little or no tax, with landowners exercising local authority over labor, justice, and production. Some maintained private armed retainers for protection. This began in the third century CE and became widespread in the fourth, weakening the State and contributing to the collapse.[528] The underlying cause was a decline in impersonal loyalties and a growth in personal ties, resulting from a decline in infant C.

But the seeds of Rome's fall were sown even *before* it reached the peak of its power and influence. And as will be seen in future chapters, the same can be said of the modern West.

The Eastern Empire

We have said that the Roman Empire "fell" in the fifth century CE, but this is not totally accurate. Certainly, the Roman Empire in the West collapsed into chaos, but the East did not. The Eastern Empire enjoyed much greater political stability in the late fourth and early fifth centuries, with less of the civil conflict and usurpation that weakened the West at the time of the barbarian invasions.[529] Population even seems to have grown there in the late fourth, fifth and early sixth centuries.[530] And while Greece and the Balkans were overrun for several centuries, the provinces from Anatolia (modern Turkey) to Egypt were not. The Byzantine Empire was to continue as a major force in world politics for another thousand years.[531]

If Rome collapsed because of a long-term fall in C, then it seems that C must not have declined to nearly the same extent in the East. The reason for this is the subject of the next chapter.

18. Byzantium: Surviving the Collapse

"*Endurance is nobler than strength*." — John Ruskin

The last chapter examined the fall of Rome, showing how a collapse in V and C undermined that once great civilization. This chapter will look at an equally important question—why this did not happen in the east. The Eastern Empire actually survived the fall of Rome in the fifth century CE, and persisted for another thousand years until taken over by strong successor states.

The answer can be found in infant C, that aspect of temperament arising from parental control in early childhood and especially infancy. When early civilizations develop or borrow strong C-promoting traditions, infant C rises to very high levels. This makes these societies unusually creative and wealthy, with highly disciplined armies that may defeat far more numerous enemies. Examples include the takeover of the Persian Empire by the Greeks under Alexander, and the rise of Rome to dominate the Mediterranean.

But high infant C undermines V, which together with wealth and a willingness to challenge existing ideas, causes V and C to collapse. After the collapse they recover, but in a more stable form. C-promoters are just as strong or stronger, but do not result in such high levels of infant C. Ordinary people do not become affluent, and V and C are thus less likely to collapse.

Wealthy urban elites may decline, but they can be replaced by higher C people from the countryside, whose birth rate is high enough that their numbers will rise to the carrying capacity of the land. Only when the entire population becomes affluent, as in modern China, is C liable to collapse. But this is an historical oddity.

In the past, when a civilization collapsed it changed to this more stable form, with lower infant C. The reason Biohistory proposes is that the process of collapse causes people to become more indulgent of infants. This means that infant C does not rise so high, V is less easily undermined (since indulgence of infants is a key driver of V), and the people are more conservative and less inclined to become wealthy. The resulting societies are thus less likely to experience a decline in V and C.

We saw in chapter ten that extreme indulgence of infants, combined with harsh treatment of older children, is characteristic of the long-civilized areas of China, India and the Middle East. Now we will see how this same pattern, more advanced in the Eastern Empire, contributed to its long-term survival.

Why did the Eastern Empire survive?

The late Roman Republic and Empire experienced a prolonged fall in C which caused loyalties to become increasingly personal and then local, until by the fourth century CE it was no longer possible to hold the Empire together. Despite many attempts to restore unity, it was repeatedly divided into eastern and western halves. The final division, with separate emperors and governments, came in the mid-fourth century. From this point the Western Empire collapsed while the East did not. The reason seems to be that the decline of C and V was faster in the West.

Early evidence can be found in patterns of agriculture. As noted in chapter fifteen, much of agriculture in the western provinces came to be concentrated in large estates worked by slaves. This was particularly the case in Italy, Sicily, southern Spain, southern Gaul, and the area of North Africa that is modern Tunisia. The Eastern Empire, by contrast, largely relied on tenant farmers and free labor.[532]

One contributing reason is that wages were generally higher in the western empire, especially during the first and second centuries C.E., something we have noted already in the late Roman Republic Wages in Italy, for example, were two to four times higher than in Egypt.[533] This would have made slaves relatively more economical in the west.

Higher wages imply a shortage of workers, either because of a lower birth rate or because people were abandoning farms to move to the city, or both. Consistent with this is that western populations declined far more than in the east during the political chaos of the third century. In the fourth century eastern populations recovered, while the west was in serious decline.[534] Also, trade and the use of money remained robust in the East, compared to the West.[535]

Why would C fall less in the east?

Part of the reason is that infant C was never as high in the Eastern Empire as it was in Italy. People with the highest levels of infant C are capable of impersonal loyalties which support republican institutions of the kind that arose in Rome and in Greece. up to the fourth century BCE. But the peoples of Anatolia, Syria and Egypt had no such institutions. Prior to their absorption into the Roman Empire, they had been ruled by kings.

This is in itself a puzzle, given that infant C is a product of C-promoters, and the strongest C-promoters were from the Middle East, an area with a long history of civilization. Christianity originated there and so did the religions with which it competed, including the Egyptian Isis cult and Mithraism from Persia. The same pattern can be found in Japanese history, where the cultural technologies underpinning C and V arose from the older centers of civilization—Buddhism from India and Confucianism from China.

This is as we should expect. C-promoters are driven by the needs of civilization, and the oldest centers of civilization had time to develop more powerful and effective forms. Societies with the strongest C-promoters could form larger states with harder-working and more productive farmers. Over thousands of years of competitive struggle, it was inevitable that more powerful C-promoters and V-promoters should arise. We discussed this process in chapter four.

But why then did the highest levels of infant C appear in civilizations such as ancient Greece and the Roman Republic, which were far distant from these ancient heartlands? Our proposed answer is that the Greeks and Romans responded to C promoters with a higher level of infant C, and the eastern cultures did not.

Infant C and the Rise of Greece and Rome

Infant C is a trait found most strongly in adults who experienced parental control in early childhood and especially infancy, as discussed in chapter six. People with high infant C tend to be flexible and creative, with (at the highest levels) an aptitude for science and machinery. They have strong impersonal loyalties, which can be directed towards codes of law and republican institutions. This makes possible for strong and enduring city-states and nation-states.

They also have an attachment to hereditary status, even when the ruler has lost all real power. In the modern world, these are characteristics of Europeans and Japanese. These are also the societies where control of children traditionally starts in recently, or it did until recently.

High infant C was a key factor in the rise of Roman power. Strong institutions and laws meant a lack of dynastic struggles and civil wars, and consistent policies that did not depend on the personal whims of rulers. Competent engineers build roads and aqueducts. Loyalty to the State meant that even successful invaders, such as Hannibal and Pyrrhus, could not break Roman power. By contrast, Alexander had conquered the entire Persian Empire in three great battles.

Reverence for hereditary status was a source of strength. Some families held power in the Roman Senate for five-hundred years. Both Julius Caesar and several of his assassins, including Brutus, were from families which had helped found the Republic nearly half a millennium earlier.[536]

Military Benefits of high infant C

High infant C also gave the Greeks and Romans exceptional military discipline. A key weapon of a Greek hoplite was his shield, fastened to the left forearm in what was known as the ‘Argive grip’ which made it more effective in battle. But it covered only his left side and required fighting in strict formation, with each man protected by the man on his right and thrusting under or over the shield wall with sword or spear.[537]

Their enemies fought in a more open order, with each man protecting himself with his own shield and swinging his weapon. This non-Greek style of fighting is portrayed in the film '300', with semi-naked warriors hurling themselves individually into the fray. Ironically, it is the Greeks shown fighting in this way, while in reality they would have stayed locked in formation while their enemies fought in loose order.

The key advantage for the Greeks and Romans was that they heavily outnumbered their foes at the battle front, where it counted.[538] Greek and Roman soldiers were no braver than their opponents and their arms could easily have been duplicated, but the ability to fight in this disciplined formation required a certain kind of temperament.

All these features – creativity, city-states, republican forms of government, respect for hereditary status, and discipline in warfare - can be explained by a high level of infant C. It was this which allowed the Greeks to conquer the Persian Empire, and the equally disciplined Romans to take control of the Mediterranean.

Decline of the Western Empire

But this high level of infant C also helps explain why the Western Empire collapsed, at least as it applies to Italy. High levels make a civilization brilliant but also *unstable*. Infant C is associated with independent thought and rejection of traditional ideas. This can produce dramatic results in terms of technological development and wealth creation. But it also makes it more likely that people will abandon C and V-promoters.

This is exactly what happened to the Manus people after European contact, as described in chapter six. They had been highly successful as traders before European contact, but then abandoned their traditional beliefs – and the strict sexual code attached to them – almost overnight.

Infant C also promotes commerce and makes societies wealthy, which tends to undermine their V and C and thus make them vulnerable to decline. And commerce is in itself a C-reducer, by encouraging a focus on competition rather than on group norms. In addition, control of infants tends to undermine V directly since it conflicts with infant indulgence and thus reduces V, as discussed in chapter nine.

Provincials in western provinces such as Gaul and Hispania never had high C at the level of Italy or the eastern provinces. which is why their pre-Roman political units were so small. This was because they lacked the powerful traditions which support C and V, and which underpinned the large states traditional in the east. The likely effect of Roman occupation in the west was a decline in child V, as a result of prosperity and from the influence of Roman culture, which had become far more indulgent of children by the late Republic.

This initially made them more open to new ideas and good at business. But the effect was only brief, as the loss of child V undermined their moderate levels of C. The same thing is happening in much of the third world today, under the influence of western culture, the first sign of trouble being the world-wide decline in birth rates.

For both these reasons C was falling fast in the west, leading in the later Empire to shrinking populations, declining markets, and political weakness.

Survival of the Eastern Empire

This was far less of a problem in the east, where even the most powerful C-promoters did not increase infant C. Instead, they developed high levels of what Biohistory terms ‘adult C’, the form of C that can change in adults but is largely set in late childhood. Such peoples are hardworking and fertile, but less likely to become wealthy or show unusual creativity.

Instead, loyalties remain personal and codes of law weak. As discussed in chapter nine, they do not tend to form stable nation-states or city states. Instead, large Empires control the entire culture area, interspersed with periods of chaos. Rulers who lose power lose status also. In the modern world and for thousands of years, these have been characteristics of India, China and the Middle East. Such peoples were indulgent of infants but fiercely controlling of older children.

This pattern has broken down to some extent in the modern world, under Western influence. Middle Eastern countries form nation states, and countries such as China have become wealthier and more innovative. But that is a product of prosperity bringing about a collapse in child V, not any increase in infant C, and early signs of trouble can be seen in fertility collapse, reflecting a fall in adult C.

This then provides an answer as to why C remained higher in the Roman east than in the west, making possible not only stabler populations but stabler political systems. Peoples in the east combined powerful C-promoters with a tendency *not* to control infants. This maintained adult C, without the more brilliant but unstable infant C. And without infant C undermining it, V also remained at a higher level. But this was not so in the West.

But what caused this to happen? That is the subject of the next chapter.

19. Introducing S: the Stability Factor

"*Evolution is a game of tiny changes with enormous consequences*." — Richard Dawkins-inspired principle

This chapter will consider why the eastern provinces of the Roman Empire, despite powerful C- and V-forming traditions, did not control infants and thus develop the high infant C culture of Greece, Rome, and the modern West. For lack of any other explanation, we must look to genetics.

Biohistory is above all an epigenetic theory. At the genetic level, our species is astonishingly uniform. In fact, chimpanzees in a few square miles of rain forest show more genetic variation than the entire human race.[539] C and V are epigenetic traits, passed on through parental sperm and ova or set by environmental influences, especially in childhood.

And yet, when it comes to explaining why some societies are so much more likely to indulge infants than others, genes provide the only answer. Something in the course of human civilization, and especially when civilizations collapse, changes genes in a way that makes people more likely to indulge children. And this has major impact on society.

The cultural systems that support C and V, including patriarchy and restrictions on sexual behavior, can travel from culture to culture very fast. As indicated in the last chapter, the Romans presumably adopted such practices from the Etruscans who settled to the north of them and from Greek settlers in the south. Within a couple of centuries, Roman culture had emerged with both patriarchy and female chastity at very high levels.

The spread of Christianity was even faster. In only three centuries it conquered the Roman world and then spread to the barbarians. The Vandals and Goths who invaded the Roman Empire in the fifth century were already Christians, though different in beliefs and practices from their counterparts in the Empire.[540]

But the pattern of behavior that controlled older children but not infants did not even cross the Aegean Sea from Anatolia (modern Turkey) into Greece in classical times. Peoples of the east formed cosmopolitan Empires. The Greeks, for many centuries, stayed attached to their city states.

The only area of Anatolia that formed city states was Ionia, on the western coast, which had been settled by Greeks from the eleventh century BCE.[541] These had submitted reluctantly to Persian rule, but threw it off with Athenian help after the failure of Xerxes invasion in 479 BCE. Though they were not necessarily that much better off, because they were then made to pay tribute to Athens.[542]

Infant C, and the rise of Europe

An even more striking example is what happened to Europe after the fall of Rome. Take Sicily and southern Italy, as an example. They were settled by Greeks between 750 and 600 BCE., forming a number of city states including Syracuse, Tarentum, and Croton which persisted for hundreds of years. They fiercely resisted attacks by powerful states such as Carthage and Rome, and were known for their creative brilliance. Pythagoras is still known for his achievements in mathematics. Alcamaeon was a pioneer of anatomy, who identified the brain rather than the heart as the center of thought.[543] These are clear hallmarks of a people with high infant C.

A very different society appeared after the fall of Rome. No city states or nation states emerged. Instead, these areas submitted with relatively little resistance to Byzantines, Lombards, Arabs, Normans. Germans, French and Aragonese.[544] The economy remained backwards, compared to North Italy, with little development of industry in recent times.[545] These are all signs of a people with low infant C.

Compare this with north Italy, where city states such as Florence, Venice and Milan emerged in the tenth century and persisted for hundreds of years. They fought for and gain their independence from the Holy Roman Empire in the eleventh and twelfth centuries, though largely overcome by France and Spain in the sixteenth century.[546]

North Italy in the fifteenth and sixteenth centuries enjoyed immense commercial success. Venice was a center of trade, Florence of banking, and Milan of manufacturing. This was also a time of creativity and intellectual brilliance. Leonardo da Vinci is known for his achievements in anatomy, engineering and mechanics, as well as in painting, Michelangelo for painting and sculpture. Scholars led the revival of classical learning through study of Greek and Roman texts.[547] And later, the north was where industry developed.[548] These are all hallmarks of a people with high infant C.

What makes this contrast all the more striking is that both north and south Italy followed the same religious system, that of the Catholic church, with its powerful C-promoters. They spoke similar dialects, and were not that far apart. Florence is only 480 km from Naples, just a few days' walk. And yet this difference in character has persisted for almost two thousand years.

The German Impact

Looking back through history, there is one key difference in the history of each area. North Italy was settled by a Germanic tribe, the Lombards, but far fewer Lombards settled in the south.[549] And it is the area of Lombard settlement that we see the rise of a society with higher infant C.

The same pattern can be seen throughout Europe. The first areas to industrialize included lands such as Germany, the Netherlands and Scandinavia, never colonized by Rome. They also included

provinces of the Empire with the highest proportion of Germanic settlers, including Britain and north eastern France.[550]

Areas where the native populations had not been displaced and where the population descended from the peoples of the Roman Empire, such as southern Italy and Sicily, remained economically backward.

In other words, based on the evidence of politics and economics, a high level of infant C appears to be associated with civilized peoples who *have not previously experienced the collapse of a civilization*. By contrast, peoples who have undergone a civilization collapse have lower levels of infant C, even when their cultures include powerful C-promoters.

This makes sense if we consider the intense genetic selection pressure on people in a collapsing civilization. when the birth rate is in free fall. A genetic change that promoted indulgence of infants would reduce the level of infant C compared with adult C, maintaining V at a higher level. Such people might be poorer, but they would have more children. Carry this for several generations, and the genetic profile of the entire community will change.

Note that selection pressures are very different in times of prosperity and growth when C is high. In such societies, higher infant C promotes commercial success and independent thought, and could lead to more surviving children.

It is quite plausible that such a genetic trait could increase dramatically in a few hundred years, since other genes are known to have changed under the selection pressures of civilization. For example, the intelligence of Ashkenazi Jews appears to have risen significantly over the course of about five centuries due to the selection pressure caused by their mercantile role.[551] Less intelligent people either failed to have so many children, or perhaps ceased to be Jews. There is also evidence that farming has accelerated the pace of genetic change a hundredfold in areas such as disease resistance and the ability to digest lactose.[552]

Biohistory refers to this genetic change as the stability factor, or ‘S’. Low S peoples are those who have never been through a civilization collapse, and will tend to control infants when C rises. They show the hallmarks of high infant C including enduring political allegiance to their city or state, impersonal loyalties and values, innovation, and early industrial success. This distinction is illustrated in Fig 18.1

Fig. 18.1. Low S and high S

High S peoples are those who have experienced such a collapse, and are less likely to control infants when C rises. They are more accepting of alien rulers, are more personal in their loyalties, more traditional and less likely to industrialize early. Given powerful C-promoters, they have high adult C and tend to be very hard working. This also contributes to business success, especially in areas like South-East Asia or the modern west, where C is either lower or sinking fast. Even more so when prosperity reduces child V and makes them more open to change, as in Singapore or modern China.

But they will simply not develop the ultra-high levels of infant C as found in traditional Europe.

The Benefits of Stability

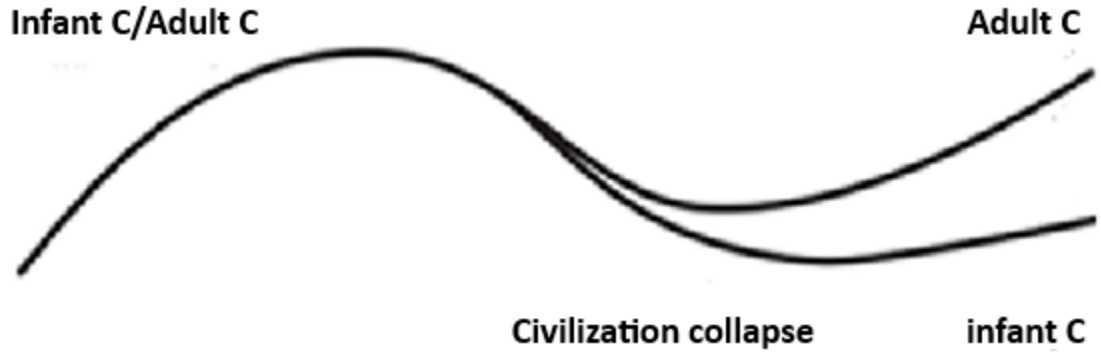
The benefits of the S factor can be seen in the Roman Empire. The higher S peasants of the East stayed on their farms and bred children, while the lower S peasants of Italy flocked to the cities and had fewer. The result was that the people of the East maintained enough C and V to maintain strong central government and a relatively robust market economy. Those in the West did not.

The benefits of higher S appear quite early when C begins to decline. In twentieth-century Italy the birth rate dropped earlier and faster in the industrial north, where more low-S Germans had settled, than in the agricultural south. Though it must be remarked that once a people become wealthy enough, even high S is no defense. The Sicilian fertility rate is now down to 1.37 children per woman, well below replacement level though still higher than the 1.28 fertility rate of northern

Italy.[553] And, as mentioned earlier, low S has been no bar to the collapse of fertility in modern China.

This analysis also makes it clear not only how but *when* the level of S begins to rise. It is not experience of civilization as such, since nineteenth-century Britons had been civilized for almost a thousand years and remained clearly low S. But as soon as affluence sets in and C and V start to fall, the advantage shifts to higher S. A graph of how this might look is given in Fig. 18.2 below.

Fig. 18.2. Change from a low-S to a high-S society following civilization collapse. During a civilization collapse, people with the genes for higher S are more likely to indulge infants. This gives them lower infant C and higher child V, so they retain traditional values and tend to have more selection. Thus, high-S genes spread in the population.



Why Does This Genetic Change Matter?

Biohistory is an epigenetic rather than a genetic theory. Patterns of control and punishment of children at different stages of life result in epigenetic changes which influence economic activity, creativity, attitudes towards religion and scholarship, forms of government, the size of political units, and much more. So why the focus on high versus low S? If all S does is determine how people treat their children, should we not simply focus on the actual behavior and the epigenetic changes that result from it? This was essentially the approach taken in chapter six, when infant C was considered one of a number of epigenetic variables.

S matters because it *cannot* be changed epigenetically and thus follows a different pattern of evolution. It is not affected by culture and does not spread through religions and philosophies. This difference explains many of the key questions of history, such as why the Eastern Roman Empire did not collapse with the fall of Rome. It shows why industrial civilization developed in Europe and especially northern Europe, and not in the Middle East or India, even those these last areas

equally powerful C-promoters. The reasons are rooted in the epigenetic effects of infant control, but understanding S explains why some people are more likely to control infants..

In certain important ways, S acts contrary to other trends in human history. A popular view is that humanity is moving towards ever greater achievements in knowledge, power and economic activity, threatened only by ecological factors such as climate change or the exhaustion of key resources such as oil and tropical forests. But rising S puts a check on human progress by acting to curb, in the long term, both creativity and economic growth in order to make a society more stable. This means that if and when Western civilization collapses, the successor civilization will be poorer and less brilliant, but also more stable.

Let us now summarize the differences between low and high S societies.

Low-S Societies

Europe is the classic low-S culture, which is what made possible the rise of infant C to unprecedented heights in the nineteenth century. This in turn made possible the Industrial Revolution, along with the extraordinary creativity and organization that enabled Europe to dominate the world. It now seems that Europeans, and especially those of Germanic descent, had very low S because they had never been through a civilizational collapse. Thus, when C increased as a result of C-promoters embedded in Christianity, the result was strict control of young children and a surge in infant C.

As suggested earlier, the best way to explain this is that people's emotional reactions depend on their level of S. Low-S people can be tougher with infants and young children because their genetically determined emotional reaction causes them to be less indulgent to infants than are people with higher S.

As indicated in chapter eleven, this was a Europe-wide pattern and one reaching back to at least the fifteenth century. The contrast between the childrearing behavior expected of European and American parents early in the twentieth century, and that of Chinese and Egyptian parents, could hardly be more extreme. In China and Egypt, as detailed in chapter ten, a child was barely considered able to understand right from wrong until five or six years old.

In Europe, strict discipline started from the first year of life. Societies with high infant C can be readily identified by such features as republican institutions, stable nation-states within the culture area, and unusual wealth and creativity.

Low S and Respect for Hereditary Rank

As mentioned in the last chapter, another feature of what Biohistory calls low S societies is a respect for hereditary rank. This can also be seen in modern low S societies such as Europe and

Japan. Many European nations have constitutional monarchies, in which the monarch has no actual executive power. Great Britain is perhaps the best known but Belgium, Denmark, Liechtenstein, Luxembourg, Monaco, Holland, Norway, Spain and Sweden all have powerless but highly regarded monarchs. Significantly, these nations (apart from Spain and Monaco) are in areas of northern Europe that were overwhelmingly settled by Germanic peoples after the fall of Rome, and thus have low S since none experienced civilization collapse.

The supreme example of a low-S non-European society is Japan, which had an unbroken line of figurehead monarchs for well over a thousand years. The Japanese have been so attached to powerless rulers that the shoguns, who originally received their authority from the emperor, retained their positions in eras when they were reduced to the same powerless status. This was especially so in the Kamakura period (1185–1333 AD) when Hojo regents ruled in the name of the puppet shogun, who ruled in the name of a powerless emperor.

European and Japanese respect for hereditary rank has allowed people from noble families to retain power even when new forms of government have developed. The European and Japanese civilizations have been characterized by influential and long-lasting aristocratic families which managed to co-exist with powerful and centralized states.

The British aristocracy still held considerable sway in the nineteenth century, including families that had been prominent in national affairs for five hundred years and more, still occupying the upper ranks of government long after the development of democracy. Most nineteenth-century British prime ministers were members of the aristocracy or closely tied to aristocratic families.[554]

Even into the twentieth century parliament was dominated by men from aristocratic families such as Winston Churchill, who lacked a title but came from the family of the Duke of Marlborough. We have seen this same pattern in the Roman Republic.

The long-civilized areas of China, India and the Middle East were also ruled by hereditary monarchs for thousands of years, but these rulers were usually killed or at least dethroned when they lost power. Emperors of as the Ming and Qing dynasties held power for centuries, but none were retained as figureheads. A Chinese ruler was revered only so long as he was believed to be powerful. When the power left him, so did the reverence. Monarchs who reign but do not rule are quite rare in historical terms, so it is all the more significant that we find them *only* in societies with low S—in other words, societies which control their very young children.

This respect for hereditary status, even in the absence of real power, will be an important indication of low-S civilizations in the past. It is especially useful because it appears hundreds of years before the peak of infant C.

Western civilization has been enormously successful over the past two centuries, a success stemming directly from the early control of infants which increases infant C. This explains a

number of the peculiarities of its distinctive features—its creativity and technological brilliance, its democratic nation-states, and its strong respect for hereditary rank. This success was made possible by powerful C- and V-promoting cultures imported from the earliest centers of civilization in India, China and the Middle East. However, early control of children—and the wealth stemming from it—also makes such civilizations unstable.

By contrast, the oldest centers of civilization have gone through what appears to be a genetic change that makes people more indulgent of infants and thus less likely to control them. The result is low infant C and high child V, producing societies less brilliant but more stable, and tending to form cosmopolitan empires rather than nation-states.

The following chapters will show that the earliest civilizations of India, China and the Middle East were originally low S, similar to those of Northern Europe and Japan. They will follow the processes by which the experience of collapse transformed them into the more stable high-S societies of the present day.

20. Greece

"*Wonder is the beginning of wisdom*." — Socrates

In the previous chapter we saw that when civilizations collapse, people with a genetic predisposition to indulge infants (high S) are better at maintaining traditional values, because they tend to have lower infant C and higher child V. This means that they tend to have more children and high-S genes spread. The result is that when a new civilization rises it is more conservative and with less of the local and hereditary loyalties associated with high infant C. It thus tends to form cosmopolitan Empires rather than city-states.

In the following chapters we will see that civilizations throughout the world started with low S and then changed to high S after going through a collapse. We will start with Greece, the clearest example of a society with high infant C in the ancient world, and then apply the lessons learned to the early history of India and China, showing how they too went through a similar phase early in their history.

An Enlightening Journey

A keen tourist born around 530 BCE, with sufficient wealth and a taste for adventure, could have made a very significant journey. Starting in India as a youth, the tourist might have come across two men. One, Mahavira, was setting down the canonical texts for what would become the religion of Jainism. The other, Siddhartha Gautama, the son of a local prince turned monk, was spending his life wandering around the states in which northeast India was divided, teaching ideas that would go on to dominate Asia for thousands of years. He would become known to history as the Buddha.[555]

Travelling to China, he might have met a would-be administrator who was moving from place to place among the states into which China was then divided, seeking a post worthy of his talents. Though unsuccessful in his main ambition, this man gathered along the way a number of students to whom he imparted his ideas. Known to us as Confucius, he became the founder of a tradition which has shaped and dominated Chinese culture to this day.[556]

Finally, moving to Athens as an old man, the tourist might have met Socrates, one of the founders of Western philosophy.[557]

It is a remarkable fact that these extraordinary figures all lived and taught within the lifetime of a single individual. We are accustomed to seeing the present day as a time of innovation and change, compared to the more static and unchanging past. For the West this has some validity, but for the oldest centers of civilization in India, China and the Middle East there is a strong argument that their most creative time was in the distant past. For India and China, that time was in and around the sixth century BCE.

Today, the oldest centers of civilization are characterized by their abilities to resist decline and collapse, suggesting high levels of S, the stability factor. This genetic trait causes people to be more indulgent to infants and younger children than to older ones, thus suppressing the creative infant C and promoting the conservative child V. S is a genetic trait found most strongly in people whose ancestors have undergone a civilizational collapse.

The final destination on our tourist's epic journey of the fifth century BC, is ancient Greece. This was the first European society to show clear signs of high infant C. The Greeks of the sixth to the fourth centuries BCE showed all the hallmarks, to an extreme extent. Their city-states were fiercely independent and their civilization creatively brilliant in a way which has scarcely been seen before or since. They were commercially successful and formed the first known democracies, together with other forms of government that rested on impersonal institutions and codes of law.

We also have direct evidence that the peoples of ancient Greece tightly controlled their children from a very young age, similar to nineteenth century Europeans but in stark contrast to the modern peoples of China, India and the Middle East.

Plato expressed the view that

> …until the age of three has been reached by boy or girl, scrupulous… obedience to the instructions just given will be of the first advantage to our infantile charges. At the stage reached by the age of three, and after the ages of four, five, and six, play will be necessary, and we must relax our coddling and inflict punishments—though not such as are degrading.[558]

Aristotle had a similar opinion, even though he was writing at a time when Greek C was declining and parents less likely to be strict.

> The legislator must mold to his will the frames of newly-born children … To accustom children to the cold from their earliest years is also an excellent practice … and children, from their natural warmth, may be easily trained to bear cold. Such care should attend them in the first stage of life.[559]

He believed that children's physical and moral training should commence very early:

> He must also prescribe a physical training for infants and young children. For their moral education the very young should be committed to overseers; these should select the tales which they are told, their associates, the pictures, plays and statues which they see. From five to seven years of age should be the period of preparation for intellectual training.[560]

Spartans were especially known for tough treatment of infants. Caregivers were expected to avoid overindulgence, accustom babies to simple conditions, and encourage resilience rather than comfort. Plutarch describes Spartan nurses as being admired in other Greek cities for raising children who were less fussy, more disciplined, and physically robust than others.[561]

This is in sharp contrast to the attitudes expressed by Indians, who observed English infant training in the nineteenth century. They saw parents as being distant and overly regulated, especially for their reliance on schedules and reduced physical closeness.[562] Being indulgent of infants themselves, they were repelled by British practices. The Greeks clearly did not think in this way.

Like the peoples of China and India at this time, the Greeks of classical times had never gone through a major civilization collapse, which would raise S by favoring people with lower infant C. They fought off the Persians, and thus did not experience a mass migration of high-S peoples into their lands at that time.

Greek Creativity and City-States: High Infant C, low child V

Another feature of ancient Greeks is that they seem to have had not just high infant C, but low child V. Child V is the characteristic that makes people accepting of powerful authority, and also more conservative in their thinking.

This helps to explain how the Greeks combined intense local loyalties with a resistance to powerful authority. The result was that peculiar political form, the Greek city state. Most were oligarchies, controlled by wealthy families, but some-most notably Athens-were democracies.[563]

This same combination also made them intensely creative. Ancient Greece, especially in the 5th–4th centuries BCE, saw a remarkable cultural flowering across many fields. In philosophy, figures such as Socrates, Plato, and Aristotle developed systematic thinking about ethics, politics, and knowledge.[564] In science, thinkers like Hippocrates promoted rational, observation-based medicine, while mathematicians laid foundations for later developments.[565]

In literature and theatre, epic poetry was followed by lyric poetry and the great Athenian dramas of Aeschylus, Sophocles, Euripides, and Aristophanes.[566] In the writing of history, Herodotus and Thucydides created new ways of recording and analysing the past.[567] In art and architecture, the Greeks achieved lasting influence through naturalistic sculpture and buildings such as the Parthenon, using refined styles like the Doric and Ionic orders.[568]

They were also, for the same reasons, successful traders, forming colonies around the Mediterranean and into the Black Sea.[569] Hard working, good at the impersonal business of trade, flexible and creative. And their high infant C made them, like the Romans, formidable soldiers. It took only forced unification by Macedon for them to overcome the vast Persian Empire.

The only exception to Greek creativity was Sparta, which was notoriously different from other Greek states. The Spartans evidently had higher child V due to their exceptionally harsh treatment

of older children.[570] This made them great soldiers but lacking in creativity. Spartans were more conservative than other Greeks.[571]

The combination of infant C with low child V explains why city-state civilizations are so creative as well as skilled at commerce, a phenomenon also seen in northern Italy during the Renaissance, and Holland in the sixteenth and early seventeenth centuries.

Judging by demography, C seems to have reached a peak in the sixth century BCE, when the population of mainland Greece grew from an estimated 1.5 to 2.5 million. By the fourth century, there were clear signs of falling C. Population was static, or even declining in some areas.[572] Women were having fewer children.[573] There was a shift to the cities and a fall in rural populations, with many smaller villages shrinking or even abandoned.[574]

Contemporary Greeks were acutely aware of these changes. Xenophon, an Athenian historian and soldier of the early fourth century, lamented that people were having too few children. This was especially true for the wealthy elites, competing for status in an increasingly unequal society.[575]

Later in the century Demosthenes, an Athenian orator and statesman, was concerned about the declining number of citizens. He also laid the blame on growing passion for wealth and status, causing parents to have fewer children so they spend more resources educating them for future success. He urged Athenians to have more legitimate children.[576]

By the end of the century, Greece was united by Macedon and the greatest age of Greek culture was at an end. In the second century BCE, it fell with relatively little resistance to the expanding power of Rome. Child C was no longer high enough for the Greeks to resist alien rule.

A Moderate Rise in S

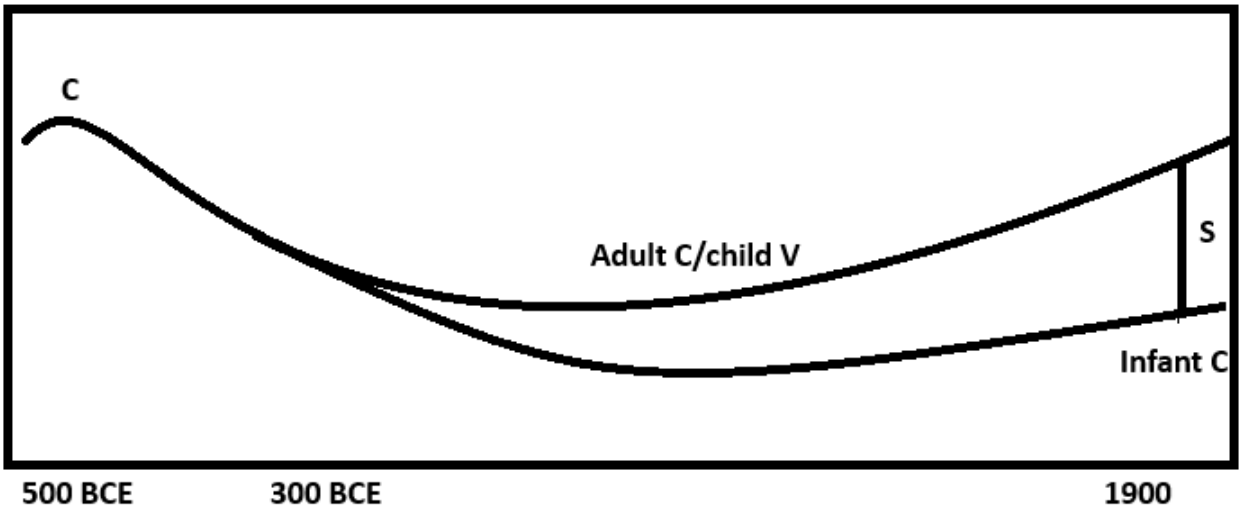
Collapsing civilizations tend to develop rising S, but for Greece this was modified by relatively large incursions of lower S barbarians when the protection of Rome weakened, notably Slavs from the sixth century CE.[577]

Greece in the twenty-first century is therefore a moderate-S society, with levels of infant C higher than in India or China but below those of northern Europe. Infant C was high enough that the Greeks rebelled more often and more successfully than other provinces of the Ottoman Empire, and with widespread popular support. In Egypt, Mesopotamia and Syria, by contrast, rebellions tended to be led by short-lived efforts led by local elites or governors.[578] This kind of nationalism is characteristic of high infant C.

On the other hand, Greeks did accept alien rule and did not become an industrial powerhouse like Britain or Germany. This, plus higher levels of corruption than in northern and western Europe suggests lower infant C.[579]

A tentative outline of character changes in Greek history is shown in Fig 19.1 below

Fig 19.1: Changes in adult C, child V and infant C in Greek history.



Why Were the Ancient Greeks so High in Infant C?

The Greeks of classical times had unusually high levels of infant C, compared with other peoples in the ancient world. One key reason is that they could copy powerful C- and V-promoters from the Middle East, where they had been developing for thousands of years. For example, the veiling and seclusion of women had become widespread by the middle Assyrian period, between the fourteenth and eleventh century BCE.[580] It became even stricter during the first millennium BCE, especially among the elites.[581]

This was the practice adopted for respectable women in Athens.[582] It was by no means obvious, since it makes no economic sense to limit women's activity in the outside world. But people tend to copy cultures that have enjoyed long-term success. But there may be another reason to explain the Greeks' relatively high infant C.

A simple answer may be that it all depends on distance from the sea. Before the age of railways, sea transport was far cheaper than land transport. Trade was thus very much easier and more profitable for peoples living near the coast or, to a lesser extent, on navigable rivers.

In sheer military terms, a people with very high infant C but lower child V are at a disadvantage. Forming smaller political units, they are less able to band together and fight off enemies. This is why the Greeks, though far more effective soldiers than the Persians, came close to defeat in the early fifth century because they lacked unity.

But if a people with high infant C and lower child V live near the sea in an area with potential for trade, they have huge advantages. Their wealth can buy warships, superb weapons, and massive city walls. They can hire mercenaries or pay their citizens to stay longer in the field. When under siege, they can resupply from the sea and wear down enemies who are more numerous but poorer in a per capita sense.

The defeat of Xerxes' invasion in the early fifth century BCE shows how this worked. The Persians were defeated at sea and stymied by a wall at the Isthmus of Corinth. They ravaged Attica and took and burned Athens, but the Athenians retreated to Salamis and could support themselves for a time without farming. In the end, the Persians simply could not afford to keep an army indefinitely in Greece, or to send another invasion force. They could not even keep control of Ionia, on the coast of modern Turkey.[583]

Greek geography clearly made resistance easier, but it also favored the development of a temperament with high infant C and lower child V. The indented Greek coastline meant that most Greeks lived close to the sea and many were on islands. When they settled other lands, it was always in coastal areas: Ionia, the Black Sea, Sicily, southern Italy, and southern Gaul.

Not only were they near the coast, but the Mediterranean Sea was peculiarly suited to trade at that time. It lapped many different civilizations and peoples with widely varying resources and skills. Ships could travel long distances without going far from land. The Mediterranean was dangerous enough, but far less so than the Atlantic or the South China Sea for the ships of that era. Thus, given the technology of the time, the Greeks were better suited than any other ancient people to benefit from trade.

Access to the sea changes character

Let us consider how such an environment could affect the way people treat their children. Consider a coastal Greek population in (say) the ninth or eighth centuries BCE. As in all societies, people bring up their children in different ways. In some, control starts earlier. In others, it starts later and there is more punishment in late childhood. The childrearing patterns that spread will be those which cause the next generation to be more successful.

In such an environment, families which controlled earlier and punished less would be more likely to flourish. With higher infant C and lower child V they might become traders, invest in a trade venture, grow crops or make products that could be exported or consumed by traders. As a result, they might average four surviving children, who would tend to bring up their own children in a similar way.

Neighbors who were less controlled as infants, but punished more in late childhood, would be less likely to succeed. With lower infant C and higher child V, they would be more conservative and

less likely to take advantage of new opportunities. Subsistence farming would seem safer and more appealing. With fewer reserves in hard times, only one or two of their children might survive.

These in turn might bring up their children as they were reared. But they might also be encouraged to imitate the childrearing behavior of their more successful neighbors, punishing less and controlling earlier. It is a natural human, and indeed mammalian trait, to imitate those with higher status. Thus, over several generations, group temperament would move towards higher infant C and lower child V. Which in turn would affect social and political behavior.

This is why societies which live on trade so often form city-states, usually with republican forms of government. Examples include not only ancient Greeks and Phoenicians but north Italy during the Renaissance, the Hanseatic cities that dominated Baltic trade between about 1400 and 1800, and the Dutch of early modern times. People with high infant C and lower child V tend to be very good at trade but less good at forming large states.

Many ancient Chinese and Indians lived along navigable rivers, but they were further from the sea and had less trading opportunities than the Greeks. In such an environment, flexible thinking would be less likely to produce wealth. By contrast, people with a conservative temperament might be less likely to rebel against authority or engage in risky new ventures. They might have more surviving children and relatively higher status. Elites would tend to be military rather than commercial, with merchants looked down on or even despised.

The ideal temperament for those conditions would be one with somewhat lower infant C and higher child V: more traditional and less commercial than in ancient Greece. Thus it is that their Empires, when they developed, were defined by land masses rather than coasts.

The Romans were an intermediate case. Italians were further from the sea than the Greeks, on average, but with better trading opportunities than the Indians or Chinese. Though less single-minded than the Greeks, they were strongly oriented towards trade and thus the sea. Their Empire, when it developed, rarely extended more than about 700km from the Mediterranean, and these were areas with good river transport.[584] Incursions into Germany were a failure. There was simply not enough commercial value in it to justify conquest and occupation.

Africa

India and China had at least moderate potential for trade, with good harbors and navigable rivers. Sub-Saharan Africa had neither. African coasts have few good harbors, and rivers that fall steeply and are thus ill-suited to navigation.[585] Their environment was ill-suited to the development of C. The exception to this was the east coast, where rich trading opportunities made possible a higher C temperament and thus the rise of city-states such as Zanzibar.[586]

Africa has other characteristics that limited the rise of C. Without the big seasonal changes found in the Mediterranean and Europe, it was uniquely suited to the development of virulent endemic diseases such as malaria and sleeping sickness. This, together with generally poor soils, kept population low.[587]

Sparser populations have less to gain from trade, and tend to rely more on hunting and stock raising and less on farming. For both these reasons they have less need for a high C work ethic, so families that worked less and fought better might have more surviving children. This is why populations in harsh environments such as central Asia and the Scottish Highlands tend to remain low C. And so, apart from the northern coast and the Nile valley, did Africans.

Virulent disease also made it harder for invaders to bring in their own higher C customs, which is one reason why Middle Eastern Empires from Assyria onwards did not extend into sub-Saharan Africa.[588] In more recent times, it was also why Europeans colonized distant India and Indonesia centuries before nearby Africa. It was only the development of modern medicine which made possible the scramble for Africa in the late nineteenth century.[589] In earlier times, the Sahara was another barrier to contact and conquest.[590]

All this suggests that much of world history is influenced by geography, as well as the availability of plants and animals suited to domestication.[591] Economic opportunities, including the potential for trade and farming, help determine which kind of temperament is best suited to survive and flourish in each area.

21. India

"*To conquer oneself is greater than to conquer thousands in battle*." — Dhammapada

As Greece was going through its golden age of creativity, something similar was taking place in India. In this chapter we will consider a civilization in the Ganges plain with very similar features. We will also see how it collapsed and then gradually changed into a more stable and conservative high S culture. This brought adult C and child V to an exceptionally high level, while keeping infant C at a moderate level.

By the sixth century BCE, a low-S civilization was flourishing in north eastern India. It comprised 16 states covering the Ganges plain, north to the foothills of the Himalayas, and north-west into modern Punjab. Many of these states kept their identities for several hundred years, and some had republican forms of government, which is typical of low S civilizations with relatively high infant C. [592]

This was a time of prosperity and growth. Trade expanded, cities grew, and money was beginning to circulate. There was innovation in thought, with a widespread reaction against traditional beliefs involving ritual and animal sacrifice.[593] As mentioned earlier, the founders of both Buddhism and Jainism lived at this time.

Others schools of thought were deterministic (believing that the future was predestined and nothing could change it), or totally materialistic (believing in no gods at all).[594] Both Buddhism and Jainism emphasized virtues such as moral integrity and self-control which are powerful C-promoters.[595]

However, infant C does not seem to have risen as high as it did in ancient Greece. The republics were controlled by aristocrats, without popular assembles or elected magistrates.[596] Also slavery, an indication of the ultra-commercial high infant C character, was far less prevalent, likely involving less than 5% of the population.[597]

But infant C was high enough for this civilization to be unstable. At the end of the fourth century BCE, it coalesced into the Mauryan Empire which soon came to control most of the subcontinent. By the third century BCE there were increasing signs of pacifism, a sign of falling V. The Mauryan Empire reached its peak under Ashoka Maurya, who reigned from around 269 to 232 BCE, but then collapsed.[598]

Over the next 400 years, a series of invaders took over north-west and western India, forming states that by the second century CE also controlled at times the Ganges region, the heart of the previous civilization. Apart from the Greeks in the second century BCE, these invaders were of pastoral or semi-pastoral origin with relatively small armies.[599]

Defeat and conquest by small forces is an indication of lower V. Acceptance of alien rule also indicates lower infant C, as does the less stable boundaries of these successor states, compared to the pre-Mauryan era.[600] Peoples with high infant C have more intense and durable loyalties to their states, and fiercely resist alien rule. People with lower infant C are less concerned with the ethnicity of their rulers.

At the same time, the collapse was far less extreme than that of the Roman Empire. Population, trade and cities seem to have grown during the Mauryan period and up to the third century CE, as did the use of money.[601]

A Gradual rise in S

The ongoing history of India suggests a gradual rise in S, without any further collapses in C or V. Population continued to grow after the Guptas united much of north India in the fourth century CE, ruling until the sixth century, though use of money and urbanization seems to have declined towards the end. This was also a great age of key advances in science and mathematics, plus developments in literature and architecture. The Gupta period is considered the classic age of Indian culture.[602]

One of the most prominent figures was Aryabhata (born 476 CE). He made major contributions to mathematics and astronomy in his work *Aryabhatiya*. He proposed that the Earth rotates on its axis, explained solar and lunar eclipses in scientific terms rather than mythological ones, and developed methods for calculating planetary positions. In mathematics, he worked with place-value notation, approximated the value of π, and made advances in algebra and trigonometry, including the use of sine functions.[603]

The overall picture is of less extreme collapse than Rome, leading to a moderate fall in infant C. This society remained innovative, but now lacked the intense loyalties of high infant C societies, that resist alien rule and can maintain borders and national identities for centuries. This suggests in turn a moderate rise in S. To counteract this, there was little genetic impact from (presumably) low S invaders. The incoming groups were tiny, compared to the native populations.

This is in sharp contrast to Europe. The barbarian invaders of the Roman Empire were farmers rather than pastoralists and thus relatively numerous, entering lands that had been severely depopulated. Also, much of Europe remained outside the Empire. Thus, the genes of most Europeans remained distinctly low S, allowing infant C to rise to much greater heights in the nineteenth century. Apart from areas where few barbarians settled, such as Sicily.

In India, infant C seems to have continued to decline from the seventh century, especially in the north. Shifting and unstable political regimes gave way to the Delhi Sultanate of 1206-1526, founded by Turkish and Afghan rulers who united northern India. This was followed by the Mughal regime of 1526-1707, of Turkish and Mongol ancestry.[604]

After the Mughals collapsed, India was gradually acquired by the British. They overcame several serious challenges to their rule, including the Maratha Wars of 1775–1818, the Sikh Wars of 1845–49 and the Indian Mutiny of 1857–58, all of which were put down by armies composed largely of native troops.[605] This does not mean that Indians in general were happy with foreign rule, merely that their opposition was not fervent enough to make such rule impossible.

Weak resistance to foreign rulers, and empires that expand to the limits of the culture area, are characteristic of societies with low infant C.

Another indication is that Indian thought became less innovative and more closely tied to traditional learning systems, especially religion and astrology. Although new ideas continued to develop, particularly in mathematics and astronomy, progress was gradual rather than involving major breakthroughs like those of the Gupta and early post-Gupta period.[606]

The overall picture is of a decline in infant C, making possible a more traditional and stable society which had less resistance to alien rule. This was less the case in southern India, which was less affected by external invasions from Central Asia. Strong regional kingdoms such as the Cholas (c. 9th–13th centuries) developed stable and sophisticated administrative systems, with effective taxation, local governance, and naval power. After the Cholas, other regional powers such as the Pandyas and Hoysalas continued this pattern of local rule.

From the 14th century, the Vijayanagara Empire (c. 1336–1565) became the dominant power in the south. It provided a long period of relative stability and acted as a counterbalance to northern sultanates. Even after its decline in the late 16th century, political authority in the south remained in the hands of regional successor states rather than being fully absorbed into northern empires, although the Mughals later extended influence into parts of the Deccan.[607]

This difference between north and south has persisted into modern times, bearing in mind that infant C boosts the economy but undermines V and (eventually) adult C, so tends to reduce fertility. In recent decades, southern India has generally achieved higher economic development though with lower birth rates than northern India. Southern states such as Tamil Nadu, Kerala, and Karnataka have stronger industrial and service sectors, higher literacy, and better health outcomes. They also have low fertility rates, often at or below replacement level.

By contrast, many northern states such as Uttar Pradesh and Bihar have lower income levels, remain more dependent on agriculture, and have higher (though declining) birth rates.[608]

The question must then be asked as to *why* S continued to rise, given that India did not again experience the collapse in C and V that is presumed to have triggered its original increase.

One reason may be political. In a low-S society with strong feudal and then national loyalties, such loyalties were no hindrance to success and survival. But once S had risen during the collapse, and

the balance shifted towards cosmopolitan empires, intense local loyalties could be dangerous and even suicidal. Given the bloody vengeance inflicted by rulers on rebellious subjects, people who submit to the strongest power around may be more likely to survive and have children.

Another may be that in times of unusual prosperity, when more children survive to adulthood, the higher birth rate of high S peoples is no longer offset by the economic benefits of higher infant C, which in less affluent times would help their children to survive. This is certainly the case today, as discussed below.

Rising adult C and child V

We have focused so far on the shift from a low S population with relatively high child V, to a higher S population with relatively low child V. But an even more crucial change has been a strengthening of C- and V-forming traditions, causing a rise in adult C and child V. We can track this to some extent through changes in religious and cultural traditions.

An increasingly austere form of Hinduism gained ground, rolling back the Buddhist wave of earlier centuries. Brahmanical Hinduism, far more than Buddhism, lowered the status of women. And subordinating women is the single most effective way of maintaining V and thus adult C, since it transmits anxiety to their infants (V) and controls their sexual behavior (C and V). Islam, the archetypal high V religion, served the same function in much of northern India.

After the Gupta period, the status of women in India generally became more restricted, though this varied by region and social group. Social rules increasingly emphasized women's dependence on male family members, and practices like early marriage became more common. Women's access to education and public life declined, and their economic rights were often limited in practice.

Attitudes toward female chastity also became stricter, with greater stress on women's sexual purity, fidelity, and control of behavior, especially within marriage and family honour. In some areas, especially in northern India, customs like purdah (seclusion) became more widespread among elites.[609]

The strengthening of C- and V-forming traditions is also reflected in the shift from Buddhism to Hinduism across India, and from Hinduism to Islam in the north. Though all three faiths emphasize chastity, patriarchy and fasting, each does so to a different degree.

Buddhism is the mildest of the three. The monastic life offers women an alternative to marriage and there is no tradition of purdah. Fasting is generally moderate, such as monks not eating meals after mid-day, and it is not extreme or obligatory for lay people.[610]

In Hinduism, women's roles are more closely tied to family life, with increasing emphasis on sexual purity and fidelity. Chastity is linked to family honor and social order. Purdah was not

originally central but became more common among upper classes in some regions, especially in northern India. Fasting is widespread and important, often linked to religious vows, festivals, and personal devotion. Women in particular observe fasts for family welfare and marital well-being.[611]

In Islam, chastity is strongly emphasized within a framework of marriage and moral law. Purdah and veiling have become widespread in many Islamic societies, especially among elites, though practice varies. Fasting is a central religious duty, especially during the month of Ramadan, when adult Muslims abstain from food and drink during daylight hours. This applies to both men and women, with some exemptions.[612] In other words, Islam has the most powerful and effective C- and V-promoters.

Birth rates show the same pattern, given that C- and V-forming traditions tend to increase fertility. In India, Muslims tend to have the highest fertility and Buddhists the lowest, though the gap between Hindus and Muslims has narrowed in recent years.[613]

Higher child V also tends to supress innovation and thus business success, which may explain why Muslims tend to have lower incomes than Hindus, though Hindus show wide variation across regions and classes.[614] Consistent with this is that Muslim majority Pakistan has a higher birth-rate and a lower per capita income than India.[615]

The same differences can be seen between north and south India, even among Hindus. North India is more patriarchal, with women having lower literacy rates and earlier marriage. North India also has a higher birth rate and lower average incomes.[616]

Regions and religions with the strongest V-forming traditions, especially those subordinating women, have higher birth rates and lower incomes. Those with weaker traditions have lower birth rates and higher income. The one exception to this pattern is that Buddhists today have weaker C-forming traditions but tend to have low incomes, though likely because most Indian Buddhists are converts from the Hindu untouchable classes, who have traditionally been poor and marginalised.[617]

Regardless of religious and regional differences, over the past 2,000 years Indians have adopted powerful C- and V-forming traditions that have made India more politically stable in recent centuries, with longer periods of Empire and shorter of division. Higher adult C also given Indians an intense work ethic that has made them economically successful in lower C societies such as East Africa and Fiji.[618]

Recent Changes

In recent decades, relative prosperity and western influence have reduced child V, bringing economic growth and democracy but also a declining birth rate. This is the same process that we observed in the Roman west, which led in the end to economic decline and demographic and

political collapse. This same process can be expected to take place in India as wealth undermines C and V, though the more traditional north is likely to be less affected.

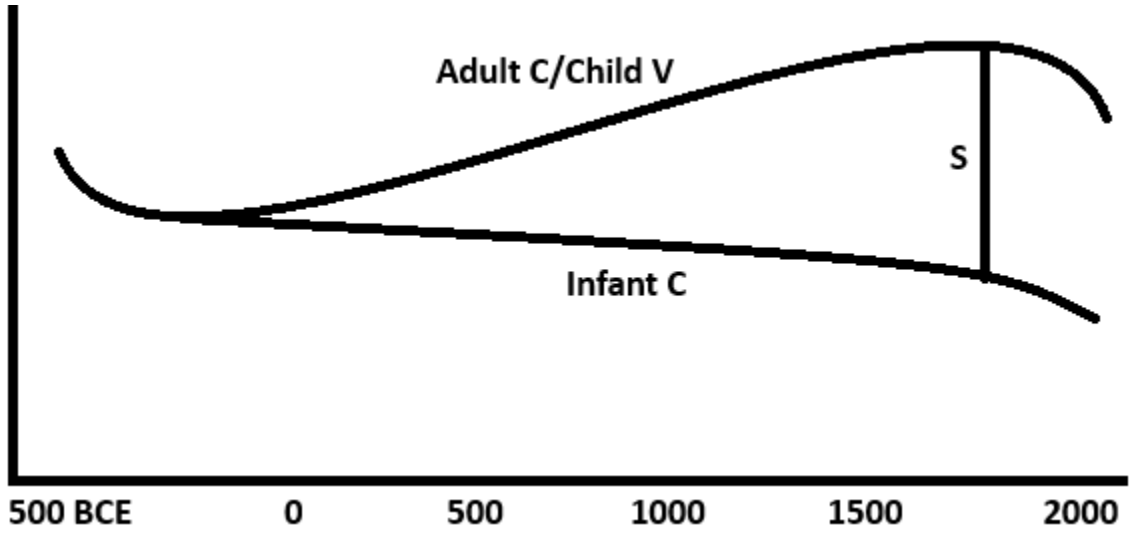
In fact, northern cultures with their stronger V and C-promoters now have a comparative advantage. In previous centuries, the greater wealth of the south might compensate for the higher birth rate of the north, in that fewer southern children were born but fewer would die. This was the explanation we discussed earlier, in trying to explain the ongoing rise in S. Whether this applied in the past is uncertain, but it certainly applies to the modern day. Now that most children live to adulthood, as a result of prosperity and modern health care, the more rigorous higher S cultures of the north can be expected to spread.

The economic prospects for India are not good. As adult C falls under the impact of prosperity, the birth will continue to fall until economic decline sets in, as a result of a falling work ethic. This will be especially marked because the educated classes of the city are those most responsible for building wealth, and who are experiencing the biggest fall in C. An indication of this is that Indians with a tertiary education have around half the fertility rate of those with no education, and far lower than that of any other group. This especially applies to the education of women.[619]

On current trends, what we should expect is a return to the more tradition-minded and patriarchal social systems of the past, including Islam and the more austere forms of Hinduism, and reversion to an impoverished peasant society. The only way to halt such changes would be to reverse the decline in C, which is the subject of the last chapter of this book.

An outline of these changes is given in Fig 20.1.

Fig 20.1: Changes in adult C, child V and infant C in Indian history.



China, as we will see, has an even more problematic future.

22. China

"*The strength of a nation derives from the integrity of the home*." — Confucius

As low S civilizations were flourishing in ancient Greece and India, something very similar was happening in China. In this chapter we will trace the same pattern as in India. We start by tracing the rise of a civilization with all the signs of infant C: creative, with stable local states and a powerless but revered overlord. This will be followed by collapsing C and the rise of a more stable, high S civilization, with increasingly strong adult C and child V until the present day.

The earliest Chinese civilization occurred under the Shang dynasty, which ruled towards the end of the second millennium BCE.[620] Around 1046 BCE it was overrun by invaders from the Wei River area in the northwest. The invaders settled and established the Zhou dynasty, which controlled what is now north China. For a few centuries they prospered, until in 770 BCE their capital was sacked and the center of Zhou power relocated eastwards.[621]

From this date, the power of Zhou emperors declined. Even before 770, local rulers probably had a great deal of independence. By the fifth century BCE, they became effectively independent.[622] But it is a clear sign of low S respect for hereditary status that the powerless Zhou emperors were revered as Sons of Heaven.[623]

For example, in 632 Duke Wen of Jin had become the most powerful ruler in China. To confirm his status, he accepted the role of hegemon in a show of ritual submission to the powerless Zhou King, prostrating himself twice with his head touching the ground.[624]

The emperor may have ceased to rule—except in his own small principality—but he continued to reign until well into the third century BCE. This pattern, never seen again in China, is typical of the reverence for hereditary rulers associated with higher infant C, made possible by low S.

A significant characteristic of low-S societies is that hereditary aristocrats tend to play an unusually prominent role when C is moderate and loyalties still personal, compared to the more fluid and fast-changing elites in high-S societies. This was certainly the case in ancient China where, until the sixth century BCE, the great majority of prominent men were from great or royal families. There was a particular feeling that noble lines, which were responsible for ancestral sacrifices, should not be extinguished even when they lost power.[625]

The period between the eighth and third centuries BCE was a time of endemic warfare, but although larger states tended to absorb smaller ones, some retained their identity for hundreds of years.

National loyalties were so strong that they could even survive more than a century of foreign conquest. For example, the state of Chu was repeatedly attacked and at times partially overrun by

rival states, especially Qin. Yet it retained its identity from the 8th to the 3rd centuries BCE. Even after major defeats and territorial losses, Chu re-emerged as a major power and preserved its distinct cultural traditions, administration, and ruling lineage until its final conquest by Qin in 223 BCE.[626]

From the seventh century BCE there are signs of rising C and especially infant C in China. States became increasingly centralized, with elaborate and often draconian law codes. This made possible much larger armies, which contributed to the growing ferocity of warfare.[627] Due to their acceptance of impersonal authority, people with high infant C are relatively easy to organize and discipline by ethnically similar rulers, as in the Roman Republic or the modern West. So it was in China.

This went hand in hand with economic development. In the 7th and 6th centuries BCE, markets were still relatively local and tied to aristocratic centres. Exchange existed, but it was often based on tribute, redistribution, or barter, with limited use of money.[628]

The Peak of C

From the 5th century BCE onward, as states became more centralized and competitive, markets expanded rapidly. Governments encouraged agricultural surplus and trade to increase tax revenue and support larger armies. Towns grew into commercial centres, and regular marketplaces became more common, linking regions through trade in grain, salt, iron tools, and textiles.[629] Use of coins grew rapidly between the 5th and 3rd centuries BCE, with different states issuing their own metal currency.[630]

Population growth accelerated. It was moderate in the seventh and sixth centuries, faster in the fifth and fourth, and reached a peak in the fourth and third centuries BCE, slowing somewhat in the second century.[631]

Another sign of high infant C is that from the fifth to the third centuries BCE, intellectual activity expanded dramatically in what is often called the “Hundred Schools of Thought”. Competing states actively sought new ideas to strengthen their power, leading rulers to patronize thinkers from many traditions—Confucian, Daoist, Legalist, Mohist, and others. This period saw open debate and competition between philosophies and practical application of ideas in government and military reform. There was relatively high tolerance for diverse viewpoints, compared to future centuries, an indication of high infant C.[632]

In 221 BCE the Qin united China to be followed, after a widespread revolt, by the more durable Han dynasty. This suggests a decline in local loyalties, characteristic of falling infant C. All of these measures indicate a peak of C around the late fourth or early third centuries BCE. It is likely that the peak of infant C was not as high as in ancient Greece. No Chinese State developed republican institutions, and there were no trade-based city states.[633] Slavery, the product of a

society with ultra-high infant C, remained much less important than in Greece or Rome.[634] The likely reason, as discussed in the past two chapters, is that the geography of China was less suited to trade. Rivers might be navigable, but most of north China was far from the sea.

The peak of child V is harder to place. Judging by unstable hierarchies, it might fit best the fifth and fourth centuries BCE. This was the time when rulers were most often deposed by powerful subjects. For example, in the fifth century the state of Jin was divided into three when elites overthrew the reigning dynasty. In the early fourth century, the Tian lineage took over Qi, being formally recognized by the Zhou King in 386 BCE. By contrast, later rulers were less often deposed.[635]

On the other hand, ferocity of punishment, another indication of child V, seems to have peaked in the fourth and third centuries.[636]

Declining C, and disintegration of the Empire

C continued to decline in the second and first centuries BCE., though far less drastically than in the Roman west. In sharp contrast to Rome, population growth continued through the four centuries of Han rule, interrupted mainly by political instability. [637]

Markets continued to develop during the early Han period, but by the second century CE they were in decline. Use of coins fell, and there was an increased reliance on local exchange and payments in kind.[638]

Another sign of falling C was the rise of tax-free estates. Originally, the Han state relied on a system of registered peasant households who paid taxes and provided labor and military service to the government.[639] However, from the first century BCE powerful elites began to accumulate land, often buying it from small farmers who fell into debt. This continued throughout the next two centuries.

By the first century CE, some began maintaining armed followers to protect their property and enforce authority. By the late second century CE the estates had become semi-independent economic units, increasingly exempt from taxation. [640] This contributed to the weakening of central authority, leading to its collapse in the early third century.[641]

This is also what happened in the later Roman Empire, as described in chapter sixteen. In both cases, it can be explained by a decline in impersonal loyalties to a distant Emperor, and a rise in personal loyalties to a nearby leader.

Another parallel to the Roman collapse is the fall of child V and stress to a low point, followed by a rise. The draconian punishments of the Qin dynasty (221-206 BCE) were relaxed by the Han rules. They reduced penalties, abolished some mutilation punishments, and emphasized moral

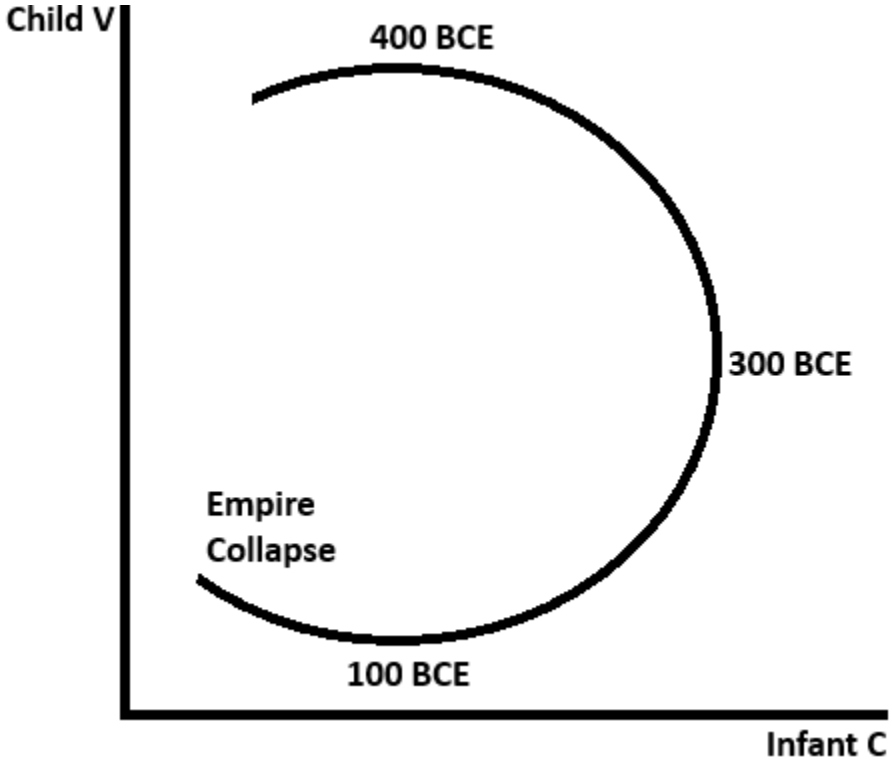
guidance alongside law. This may have reached a low point around the first century BCE. Then punishments became stricter in the first and second centuries CE, though never at Qin levels, indicating a rise in child V.[642]

Another indication of falling C is that at the end of the second century CE the empire collapsed into several centuries of chaos and disorder. It was to be by far the longest Dark Age in Chinese history.

Although later periods in Chinese history were marked by outbreaks of strife, the chaos of the third to sixth centuries CE was of a particular kind, the result of a collapse in V and C similar to that which caused the fall of Rome. Biohistory proposes that the collapse was so extreme because ancient China, like ancient Rome and the modern West, was a low-S society with high infant C. This made it brilliantly successful in its heyday, but also unstable.

The civilization cycle in early Chinese history can be seen in Fig. 21.1 below.

Fig 21.1: The civilization cycle in early China.



Rising adult C and child V

The later history of China was to be much like India in showing a sustained rise in S, in contrast to the history of Europe after the fall of Rome. The likely reason, as with India, is that there were relatively few immigrants to introduce lower S genes.

Population did not decline drastically, as it did in the Roman Empire. And while the population of north China declined during the centuries of disorder, that of south China actually expanded.[643] Also, as in India, the invading nomads were pastoralists, far less numerous than Chinese farmers.[644] This meant that the rising S of the locals was not swamped by a mass incursion of genetically low S peoples.

Rising S was already obvious by the third and fourth centuries CE. In north China, Numerous short-lived states were established by nomad invaders, leading to frequent warfare, shifting borders, and political instability. Central authority was weak, and regimes rose and fell rapidly, until much of north China was unified by the Northern Wei in 439.[645]

The same can be said of the south. Southern China experienced fewer invasions and the rulers remained Chinese, with a succession of short-lived dynasties such as the Wu and Eastern Jin.[646] But there was no return to local states enduring for centuries, or a revered though powerless Son of Heaven. When rulers lost power, they were usually executed or forced to commit suicide.[647]

Eventually, the empire was reunited under the Sui (589–618) and Tang (618–907) dynasties, and from then on strong dynasties alternated with periods of chaos. This is the common pattern of high S civilizations with relatively low infant C, where strong states expand to the limits of the culture area.

Less resistance to alien rule

Another sign of higher S was that Chinese became less resistant to rule by alien peoples. For most of the twelfth and early thirteenth century, north China was ruled by the Jin dynasty, of Manchurian origin. In 1271-1368 it was dominated by the Mongols, and in 1644-1912 by the Manchus. These regimes were established and maintained by military power, but exercised by ethnic groups far less numerous than their Chinese subjects.

This simply never happens in low S civilizations. When low S peoples are controlled by foreigners, such as the Ionian Geeks by Persians in the sixth century BCE, it is by Empires with much larger populations.

A still further sign of this change was that hereditary rank became less important in the selection of officials. Aristocratic families dominated the early Tang, but with a gradual shift to use of competitive examinations. In later times exams became the key form of recruitment. Though when China was ruled by in the Mongol and Manchu dynasties, elites also included ethnic groups related to the ruling house.[648]

After the dark ages that followed the collapse of the Han dynasty, C began to rise again, though in the form of adult C. Markets, commercial cities and the use of money expanded from the seventh century onwards, apart from political disruptions as in the Mongol era.[649]

Unity became more continuous, with briefer periods of disruption, reflecting also what we would expect from an ongoing rise in child V, which promotes acceptance of powerful authority – including aliens.

These are the same changes we observed in India, though Chinese dynasties were relatively more successful in controlling the culture era. Another parallel was the increase in C- and V-promoters, reflected especially in the treatment of women.

During the Tang dynasty (618–907), women—especially in elite society—enjoyed relatively greater freedom. They could participate more visibly in social life, had some property rights, and remarriage was more accepted. While chastity was valued, it was not yet rigidly enforced as a dominant moral ideal.[650]

In the Song dynasty (960–1279), attitudes became noticeably more restrictive. Influenced by Neo-Confucian thought, there was a stronger emphasis on female obedience, modesty, and sexual purity. Practices such as discouraging widow remarriage became more common, and ideals of chastity began to be more tightly linked to family honour.[651]

In the Ming (1368–1644) and Qing (1644–1912) dynasties, the emphasis on chastity reached its peak. State and society strongly promoted female chastity, especially widow chastity, sometimes rewarding women who refused remarriage or even committed suicide after a husband's death. Social expectations placed women firmly under male authority, and their behavior was closely tied to family reputation.[652]

As in India, this benefit for society came at a considerable cost to women, made worse by another aspect of traditional East Asian culture. A woman was subject not only to her husband but to her mother-in-law, usually living in the same house. A bride was expected to obey and serve her and accept discipline and criticism, which could cause a great deal of distress.[653] This heightened anxiety would raise V in her sons even more effectively than patriarchy alone.

The effect of rising child V, was a growing focus on orthodoxy and tradition. In the Tang era, intellectual and cultural life was highly open and diverse. Confucianism, Daoism, and Buddhism all flourished, and foreign influences were widely accepted. This period is often regarded as one of the high points of Chinese civilization, especially in poetry, art, and cosmopolitan culture.[654]

In the Song era (960–1279), thought became more systematic and structured with the rise of Neo-Confucianism, which increasingly dominated official ideology. While still intellectually active, the range of accepted ideas narrowed.[655] In later dynasties, thought became more orthodox and controlled, especially through the civil service examination system based on Confucian texts.[656]

The Success of High-S Societies

People in the West tend to judge other cultures in terms of two main characteristics: wealth and human rights, the latter often seen as virtually synonymous with democracy. Societies that are poor or autocratic or both tend to be seen as lagging behind the West, a view reflected in terms such as "backward," "third world" and now "developing." None of the high-S societies in the modern world have achieved Western levels in economic terms, apart from city-states such as Singapore.

But biological success cannot be judged in such ways. Societies that grow and spread and outcompete their neighbors must win out over those which fail to replace themselves, or allow themselves to be overrun. From this viewpoint, the success of the high-S cultures of India and China is beyond question. Not only have they absorbed and assimilated all invaders but their peoples have spread out into many other countries, often becoming commercially successful because of their high C work ethic.

High levels of S do not in themselves prevent people from being commercially successful, provided C is strong enough, and any form of C is associated with hard work and self-discipline. In the modern West where C is dropping rapidly, Indian and Chinese immigrants have done very well, helped by the fact that many are tertiary graduates and thus a relatively elite group.[657]

While the Chinese lacked the high infant C of nineteenth century Europeans, their ultra-high adult C made them among the most disciplined and hard-working people on Earth. One result was a population explosion. In 1644, China had an estimated population of 140-160 million people.[658] At its peak in the twenty first century, it was close to ten times this level.[659] During the seventeenth and eighteenth centuries, for example, farmers expanded into marginal lands such as hillsides and uplands by the use of terraces, and dry or sandy soils in northern regions. They cleared forests and drained swamps.[660]

Emigrating to lands such as the U.S. and Australia in the nineteenth century, they were willing to work for lower wages in jobs that were dangerous and physically demanding, such as railroad construction and mining. This was considered such a threat that they were often met by violence, segregation, and exclusion from certain professions. Laws such as the U.S. Chinese exclusion act of 1882 aimed to limit immigration.[661]

High adult C also made them enterprising and skilled at business, especially when settling among lower C peoples. By the twentieth century, Chinese minorities in South East Asia came to dominate large parts of the economy including retail and wholesale trade, banking and finance, and manufacturing. This despite discrimination and episodes of violence, such as in Indonesia in 1965-66 when tens of thousands were killed.[662]

The Modern Chinese Collapse

High S makes less wealthy and more traditional in their outlook, as a result of lower infant C, which protects them to some extent from the collapse of C and V which destroys civilizations. But, as the history of modern China shows, they not immune.

The traditional Chinese character, built by powerful C- and V-forming traditions, has suffered two great blows in the past century. The first was the triumph of Maoism in 1949, which led to attacks on Confucian values and traditions, especially during the Cultural Revolution of 1966-76.[663] Communism lacks equivalent values and is no substitute for traditional Chinese culture and religion.

The second blow was the immense wealth brought on by freer markets in recent decades. When the government relaxed its hold on the economy, enterprising and diligent workers soon made China rich. With traditional Confucian values stripped away, and importing the individualistic and wealth-obsessed culture of the West, the collapse of C and V under this avalanche of wealth has been catastrophic, far more extreme even than in India. The birth rate is now only half that necessary to maintain population.

On current trends, it is not difficult to predict the future. Not only will population decline continue and accelerate, but the fall in C will cause the economy to stagnate and then go backward. Eventually, the Chinese State will disintegrate or be taken over by an external power.

And that power will most likely arise out of Islam, especially in its most fundamentalist form. Today, Muslim societies are especially resistant to the siren calls of modernism. We saw in the last chapter that Muslim Pakistan is poorer and has a higher birth rate than Hindu-majority India.

In the next chapter we return to the birth place of Islam and the region which launched our examination of S—the Middle East. Its history gives a better understanding of the development of Judaism, Christianity and Islam, and their crucial influence on the West. It also gives the clearest picture of where the world, in the absence of any corrective, is headed.

23. The Middle East

"*History begins at Sumer*." — Samuel Noah Kramer

In this chapter we will go back to the world's first civilizations, those of the Middle East. We will see not only the first effects of C promoters, but also the first area to change from low to high S.

In previous chapters we saw that the early civilizations of China, India and Greece showed unmistakable signs of high infant C. They were creative, especially in the field of thought, and formed stable nations and city-states which lasted many centuries. In all these cases the decline of C and V led to civilization collapse, followed eventually by the rise of a more stable and conservative culture with exceptionally high adult C and child V, but lower infant C.

This change had two crucial elements. One was the development of religions and cultures with ever more powerful V-promoters and C-promoters. And the second was what appears to be a genetic change making parents more indulgent of infants and less indulgent of older children. The effect was to increase the more conservative child V, and to minimize the creative but unstable infant C.

This chapter will follow the same process in the Middle East, where the earliest known civilizations arose. It experienced a process of cultural evolution played out over thousands of years, and characterized by the development of a succession of major religions—first Judaism, then Christianity, and finally Islam. All of these contained a mixture of C-promoters developed in the settled lands, and V-promoters from the harsher outlying regions.

We will also see how the earliest civilization was of the low S type, as in India and China, with relatively high levels of infant C. These were also the first areas to change into more stable, high S cultures.

Sumer and Akkad

In the fourth millennium BCE the Sumerians developed the world's first civilization in what is now southern Iraq. All indications are that they had relatively high infant C. City-states including Kish, Uruk, Lagash and Ur thrived and maintained their independence for more than a thousand years.

They were also great innovators. Among much else they were responsible for the first system of writing, the first known codes of law and administration, the potter's wheel, the making of bronze, wheeled vehicles, and the abacus. They were the first to create formulae for calculating the area of a triangle and the volume of a cube. Their fascination with the number 60 is still reflected in how we measure time, as well as the 360 degrees in a circle.[664]

Law codes showed early signs of V and C-promoters including control of women's sexual behavior, and their subordination to men. Though these were not as rigorous as in later periods. Even respectable women were not confined to the home.[665]

In 2334 BCE Sumer was conquered by Sargon of Akkad. From then on, political control shifted between periods of unity and unstable successor states such as Isin, Larsa, Eshunna and Mari, whose borders could shift as the result of a single campaign.[666] These rulers were Akkadians and Amorites, from beyond the Sumerian culture area and speaking different languages.[667] Weaker local loyalties and acceptance of foreign rule indicate a lower level of child C.

In every respect this is comparable to the early histories of India, China and Greece, though two thousand years earlier. A civilization of creative nation or city-states is united into a powerful empire, which soon collapses into an extended Dark Age. Our explanation, as given in the past two chapters, is that high infant C made this society brilliant but unstable, leading to a decline in V and C and development of a more stable, higher S civilization.

Cultural Evolution and the Barbarians

All these early civilizations had low S, which means high infant C relative to C. This is no different from the modern West, except that these ancient civilizations had a lower *absolute* level of C. If it were possible to put a number on it we might place the peak C level of most hunter-gatherers at 1, Neolithic farmers at 2, Sumerians at 3, the Greeks and Romans at 4, and nineteenth-century Europeans at 5.

Later civilizations had a higher level of C than the Sumerians because they had the advantage of thousands of years of cultural evolution, which involved the development of religions and other traditions with more powerful C-promoters and V-promoters. The key driving force was competition among families and societies, in which people with higher C and V tended to overcome or outbreed those with lower levels.

C-promoters are necessary for the rise of civilization, and civilizations tend to produce more powerful C-promoters with time. Settled peoples have a great deal to gain from higher C: not just larger political units but also more hard-working and productive farmers and merchants. The immense resources the Sumerians poured into their temples and religious systems can be understood as an investment in making their societies more competitive, by strengthening and supporting C-promoters. Not that they consciously saw it this way.

V-promoters are different. They tend to be developed most fully by peoples in the harsher and more unstable environments away from the fertile river valleys. The process of cultural evolution, especially as observed in the Middle East, is one in which C-promoters spread from civilization to the barbarians, while V-promoters are most fully developed by barbarians and brought back to civilization.

This is illustrated by tracing the source of the first conquerors of Sumer. In later ages barbarians would emerge from the plateaus and mountains of central Asia (modern Iran and Afghanistan, and the central Asian steppes), and finally from the Arabian desert. But the Akkadians did not. They came from central and northern Iraq, a land of open plains and gentle hills, and with more rainfall than in the south.[668]

At first sight this is odd. If V is produced in harsh environments with periodic famines, how could the conquerors come from here rather than more inhospitable regions? It was undoubtedly a poorer and more backward area than Sumer, and may well have experienced famine, but conditions cannot have been as tough as in the mountains and deserts.

High V requires culture as well as harsh environments

We can start by recognizing that a harsh environment alone is not enough to create the highest level of V. It will certainly be increased by occasional famine, especially when interspersed with times of more plentiful food or a sudden increase in prosperity. But maximum V can only be generated when famine is reinforced by cultural V-promoters such as patriarchy and limits on sexual activity.

Also, effective barbarians need organization to attack and overrun wealthy civilizations. Even the most degenerate state can raise thousands of soldiers, many of them experienced professionals. Defeating them requires the ability to form large coalitions at considerable distance from their home bases, among people who might be more accustomed to fighting each other. In other words, successful barbarians require not only famine but cultural technologies to increase both V *and* C.

The best place to find such technologies, of course, is from the civilized peoples themselves. This is why the first barbarians emerged from areas close to existing civilization rather than from harsher and more remote regions. The Akkadians of ancient Mesopotamia had been close neighbors to the Sumerians for well over a thousand years. Even the barbaric Gutians who eventually took down the Akkadian Empire were from the Zagros mountains of what is now western Iran, only a few hundred kilometers from Sumer.[669]

We have seen the same pattern in ancient China, which was first unified by the semi-barbarian but agricultural state of Qin in the Wei River valley. Nomad raiders from the north were a problem, encouraging the construction of the defensive works which eventually developed into the Great Wall. But it was to be five hundred years before true nomadic horsemen from the steppes overran China, and 1,400 years before the nomads reached their peak of power under Genghis Khan around 1200 CE.

These cultural technologies arose early in the history of civilization. The laws of Hammurabi, which drew heavily on earlier codes, included provisions to control sexual activity with heavy religious sanctions. For example, a woman accused of adultery had to swear an oath before a god

or be drowned in the Euphrates, and the chastity of unmarried girls was strictly protected. The subordination of women was also firmly established by this time. Women were considered the property of their husbands and could even be seized in settlement of a debt.[670]

Without conquest, the spread of such cultural technology must be slow, but it happens gradually through trade and migration. The Akkadians, Gutians and other barbarians adopted some aspects of Sumerian religious systems, and as a result became better organized as their levels of C rose, while V-promoters help to maintain their V against the perils of prosperity.

It was the combination of these cultural practices with famine and incessant warfare which raised V to higher levels, with increasing C allowing them or organize on a wider scale.

When V and then C began to drop in the neighboring civilizations, as they became wealthy, these fiercer and better-organized barbarians were ready to move in and take over. It is natural for humans, and indeed any primate, to copy the behavior of higher status individuals, and so the conquered peoples began to imitate the high V invaders and raise their own levels of V. And because V combined with high population density increases stress there will also be a long-term rise in C.

In other words, what occurs is a two-way process whereby civilized peoples and barbarians reinforce each other's C and V. Civilizations are better at developing C because this is vital for farming. Barbarians are more likely to develop V because of their experience of famine and because it is useful for war. And key behaviors such as sexual restrictions and domination of women support both V and C, so cultural norms that support one tend to support the other.

As already indicated, this is a slow process. C and V reflect the life experience of ancestors for several generations, as epigenetic changes are carried in sperm and ova. Also, people do not easily accept values requiring big changes in behavior. A man who is used to regular sex might abstain for a week, if a priest told him it would cause the gods to bless his crops. He would be less likely to abstain for a month.

A religion promoting high C cannot be fully accepted by people with much lower C, so behavior in the beginning will only be slightly affected. But as levels of C and V rise, people are willing to accept more stringent codes which further affect behavior in a kind of ratcheting-up effect.

The same problem was encountered by early Christian missionaries in northern Europe, for whom nominal conversion of the people was a necessary first step. After that began a centuries-long struggle to reduce or eradicate traditional lower-C behavior, such as the taking of multiple wives.[671]

Israel and the Development of Judaism

A vivid illustration of how a cultural technology can move from settled to nomadic peoples and then back to civilization can be found in the Hebrew bible. During the second millennium BCE the Jewish people developed a highly advanced cultural technology, including limits on the sexual behavior of both men and women, as well as the belief that there was only one God—an innovative theological concept at the time.

The book of Genesis illustrates the early stages of this process. Some scholars doubt the authenticity of these accounts, but they are exactly what we might expect if the previous account of cultural evolution is correct.

The story starts with the figure of Abraham, whose family appears to be Amorite herders from northern Mesopotamia. The customs described in Genesis, such as the adoption of an heir who had to give way to a "legitimate" son, are familiar from contemporary tablets discovered in this area.[672] And of course, Abraham's later career was that of a successful pastoral leader, not a lifestyle to be taken up easily by a soft city dweller.

At the same time, his association with the Sumerian City of Ur is plausible. Though his ancestors had typically Amorite names, the names of Abraham's generation tend to be Sumerian. Sarai (his wife and sister) is the Akkadian name for the wife of Sin, the Sumerian moon god, and Terah's daughter Milcah was almost certainly named after Sin's daughter Malkatu.[673] Abraham thus represented an Amorite herding family who lived for a time in Sumer and was influenced by its culture, including its C-promoting religious traditions.

The same process is seen even more powerfully in the Exodus story. The Israelites clearly kept much of their pastoral tradition and culture, as indicated by a very high birth rate, but were also influenced by the sophisticated and advanced Egyptian culture. It is significant that Moses, the great lawgiver, was brought up as an Egyptian prince and would thus have been both literate and familiar with Egyptian laws. Laws are a key aspect of a high C culture, and religious laws are powerful and effective C-promoters.

Thus it was that the Israelites who moved into Canaan had a religious and cultural system combining effective C-promoters and V-promoters. With relatively high C, and V levels elevated by their harsh desert experience, they were both aggressive and cohesive enough to impose their religion and culture on the more numerous natives.

This would have been a gradual incursion by an elite, not an outright conquest as described in Joshua. This is clear both from the lack of widespread destruction and the continuity of Canaanite pottery styles, architecture, and farming practices.[674] Similar to what would happen in a later century, when desert Arabs imposed their language on the settled lands.

By the time of the Babylonian exile in the sixth century BCE, the Israelites had developed still more powerful C and V-promoting traditions, strong enough to survive transplantation of the elite to another country and eventually to endure two thousand years of exile from their homeland.

The Ten Commandments provide a sense of why this religion was so effective. Three of them (keeping the Sabbath, respect for parents and forbidding adultery) directly support V and C.

Another three (only one God, no idols, no blasphemy) build reverence for a single deity and no other, an increasingly important principle as the demands of the Jewish faith grew in rigor. Polytheists can escape from overly demanding deities while maintaining their basic worldview, while monotheists, putting their whole faith in a single God, cannot. The other commandments prohibit violence, theft, dishonesty and greed, important for maintaining social cohesion and also C-promoters, in the sense that any control on behavior elevates C.

Combined with a host of other laws given divine sanction, and with inspiring and colorful narratives of great men and their deeds, Judaism formed a powerful and effective tradition that was the end-product of thousands of years of cultural evolution.

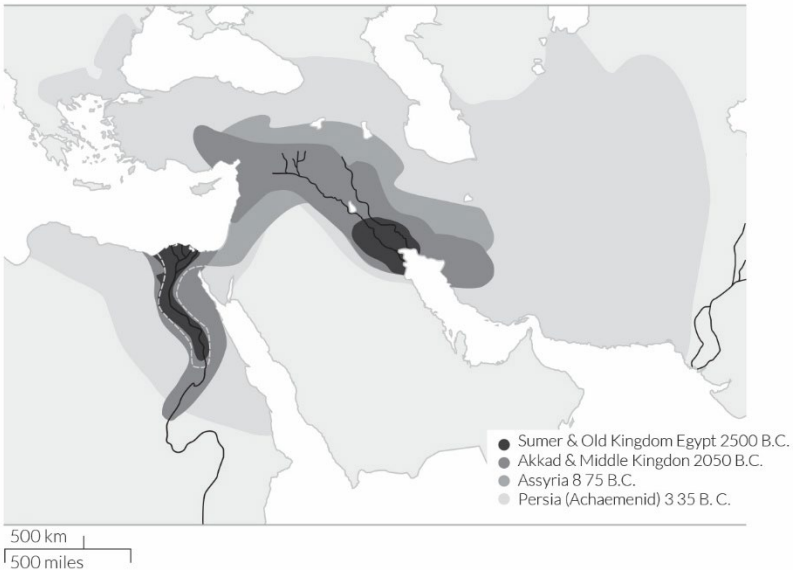
Two thousand years ago these advanced Jewish traditions began spreading to other peoples through Christianity and then Islam. And through Christianity these traditions made their way into northern Europe, whose low-S levels allowed them to build spectacularly high C by the nineteenth century. That made possible industrial civilization.

The Strengthening of C-promoters and V-Promoters

Even before this, cultural technologies developed first in Egypt and Iraq spread gradually to the surrounding peoples. As they did so, and as C-promoters gradually became more powerful and effective, the size of empires grew (see Fig. 22.1 below).

This was helped by the fact that during the long Dark Age that followed the collapse of Sumerian civilization, the peoples of Mesopotamia had clearly evolved from low to high S. From the time of Hammurabi onward there was a shift from city and nation-states to large and cosmopolitan empires. Nor did any civilization show the innovative brilliance of the Sumerians, despite much greater wealth and larger populations.

Fig. 22.1. Expansion of civilization in the Middle East.[675] Civilization expanded steadily from its Sumerian origins to successively harsher terrain as C- and V-promoting technologies were taken up by barbarians.



S rose in the Middle East for the same reason as it did in ancient India and China. The invading pastoralists were much less numerous than the dense populations of the river valleys. This was even more the case in Egypt, which was largely surrounded by a desert with very few inhabitants. Nor did Mesopotamia suffer depopulation as in the Roman Empire, where the wealth of conquest and vast slave estates allowed farmers to drift to the cities.

Thus, the nomadic invaders had a limited impact on the gene pool, but a major impact on culture by strengthening V-forming traditions. Especially influential were the Aramaeans, who invaded the Fertile Crescent in the twelfth and eleventh centuries BCE with the collapse of the bronze age empires. Prior to this lived in the less fertile borderlands, with some being semi-nomadic herders. They had no established kingdoms.[676]

Despite the fact that they never formed a major empire and were soon crushed by Assyria, their language became the *lingua franca* of the Middle East. Their very lack of unity, combined with military ferocity and what seems to have been a fast-growing population, suggests an unusually high level of V.[677]

In the fourth century BCE, this entire area was taken over by the Greeks under Alexander. But while Greek was taken up by the elites and became the langue of administration, the common people still continued to speak Aramaic.[678] To us it seems strange that people should adopt the language of illiterate pastoralists but reject that of the culturally more advanced Greeks. But what counts, in the end, is not culture but reproduction. Peasants who maintained the high V culture of

the Aramaeans would have had more children. Elites who adopted the language and lower V culture of the Greeks[679] would have had fewer.

This process can be followed in Egypt under the Ptolemies (305-30 BCE). The Greek elite remained in control to the end, but declined in number while the native Egyptian population rose. As a result, with time, more natives took on administrative and military roles, especially at lower and middle levels.[680]

A singular example of fertile Aramaic speakers can be found in the family of Jesus. His parents had at least seven children who survived to adulthood, despite being craftsmen rather than landowners.[681] The population of Galilee was growing at that time, despite heavy taxation and the expansion of large estates. The result was a rising number of landless or near landless people.[682]

Judaism, with its intense V-promoters and C-promoters, would have contributed to this. Another indication of high V and C is that the Jews rose in a ferocious revolt within a few decades of Jesus' death.

Through the last two millennia BCE, V-promoters in the Middle East continued to strengthen, as indicated by the growing subjection of women. Repression of women limits their sexual activity, and also makes them chronically anxious, both of which support V. Assyrian laws required respectable women to wear veils in public and began to be secluded, practices extended further by the Persians.[683]

The subjugation of women is not only inhumane but expensive. It takes a lot of effort to seclude women and reduces their contribution to agriculture, industry and the economy in general. But the military success of the Assyrians and Persians must have more than compensated for the cost involved in segregating their women. In the long term, biological and cultural success is based not on wealth or even happiness but on the number of surviving children and the status they hold. Military prowess, in both offense and defense, is an effective way to achieve such success.

Then, in the seventh century CE, all these trends came together into a system of unique power and potency: Islam.

24. Islam

"There is no god but Allah, and Muhammad is his prophet." Quran

We have seen how the barbarian invaders of civilized lands came from steadily further afield, as V and C-promoting technologies spread to harsher and more distant areas. Islam arose in the harshest and most inhospitable environment of all—the deserts of Arabia. This chapter will follow the rise of Islam, and work to explain its unique strength and power.

Here again, as with the Israelites in earlier times, we can see the influence of cultural technologies from more settled lands. There were sizeable Jewish and Christian communities in Arabia in the sixth century CE.[684] Muhammad respected and accepted the Jewish scriptures, though with differences of interpretation, and recognized Jesus as a prophet.[685]

He also established the Ramadan fast. This built on traditions of fasting in Judaism and Christianity, such as Yom Kippur and Lent, which was noted in the Quran.[686] But Islam gave it a far more rigorous form by forbidding food and drink during daylight hours for an entire month, an exceptionally tough requirement for people living in lands close to the equator. In Iraq, for example, typical summer temperatures peak at 45-50℃.[687]

He also made it one of the five pillars of Islam, so difficult to avoid. Even many liberal Muslims observe the Ramadan fast in full, though others do it partially or symbolically.[688] By contrast, only 59% of American Catholics observe Lent in some form, and this may involve no more than avoiding a favorite food or beverage, or attending church services. Other denominations are even less likely to engage.[689]

Because Ramadan is annual it is a uniquely powerful V-promoter, similar to a famine. By contrast, the requirement that Buddhist monks not eat after mid-day is a C-promoter, since it involves regular mild hunger rather than occasional but more severe hardship.

Psychologically, the Islamic stress on absolute submission to Allah suits a temperament which has high child V and a great deal of stress as a result of severe punishments in childhood. It is thus receptive to powerful authority. The word "Islam" means "submission", though of course in the sense of submission to God. Taking on such an attitude probably also increases V, given the effect feedback cycle, whereby any behavior resulting from C or V tends to increase C or V. Combined with exceptionally high V from a harsh desert environment, this helped make Islam the ultimate high V religion, far more so than Christianity, Judaism, or any other faith.

There is far more to the Islamic way of life than fasting and segregating women, of course. Praying five times a day is a C-promoter, as is avoiding alcohol. The custom of eating with the right hand, leaving the left for ablutions, is a C-promoter but also an effective hygiene measure in a culture

without modern sanitation. And this is only one of many health measures associated with Islam, such as ritual washing.

Then there is the Quran itself and the sonorous power of the Arabic language, with an attractive system of ethics including a focus on alms-giving and the equality of believers. Putting all this together created a powerful religious technology which made its followers more aggressive, confident, united and with a higher birth rate than any competing culture.

The Arab Conquest

It is not surprising that the united Arab tribes should sweep over the Middle East in scarcely more time than it had taken Alexander, a thousand years earlier. The tribes of desert and steppe make fierce warriors once their harsh living conditions combine with the cultural technology for maintaining high V. Higher child V, and at least moderate adult C, makes them better able to accept authority and thus unite in larger groups.

High V peoples tend to indulge in incessant feuding but are almost unstoppable once united. The same would apply to the Mongols of central Asia, just 500 years later. The Mongols benefited from the northern spread of Chinese cultural technology, which may have been helped by nomad leaders marrying Chinese 'princesses', either members of the extended family or women given the title for diplomatic purposes.[690]

These women could have transmitted higher C to their children, who as people of status would have more children themselves. This might even explain why the Mongols arose from the eastern fringe of the great central Asian steppes. Monogamous Roman Emperors did not marry their daughters to barbarian chiefs.

The most striking consequence of the early Islamic conquests is what came after. The conquered peoples largely adopting the religion, dress and even the language of the Arabs. Unlike in later times, this was not a matter of deliberate policy. A treaty attributed to the time of Caliph Umar (633-644) forbade Christians from imitating Muslim dress, names, or outward markers, aiming to preserve the distinction between conquerors and subjects.[691]

Early seventh century caliphs showed little interest in their subjects converting to Islam, and in some cases discouraged it. One reason was that they depended heavily on the jizya, a poll tax levied on non-Muslims.[692] Tensions rose in the late seventh and early eighth centuries as an increasing number of converts sought equal status with Arabs. Only in the ninth and tenth centuries, after all barriers were removed. did Islam become the majority religion in Iraq, Iran, and parts of Syria.[693]

Conversion bought benefits for those aiming to succeed in business or attain rank in the administration, army and the court.[694] But not obviously for the 80-90% of the population who

worked the land.[695] But their benefit is clear if we follow the lessons of history. High V is advantageous to settled peoples. It makes them confident, aggressive and with a high birth rate.

Those who adopted high V customs, in imitation of their new overlords, would outbreed and outcompete those who did not. This in sharp contrast to the effects of Greek rule in early centuries, during which the elites tended to accept Greek culture but the common people did not.

Muslims also adopted existing cultural technologies such as the custom of secluding women. This was not prescribed by the Quran but, as we have seen, was common in Middle Eastern elites. Between the eighth and fifteenth centuries it spread from the elites to the urban middle classes, though remaining less strict in rural areas and among the poor.[696]

This is part of the process by which Islamic culture has become more rigid and severe, and thus more effective in the one way that matters for long-term success—having more surviving children. This is again a form of ratcheting effect, by which high V customs increase V, which makes even more extreme customs possible.

Fundamentalist vs Liberal Islam

Islam in the modern world takes many different forms. The dominant tradition in Indonesia, for example, is relatively mild, though Ramadan is widely observed.[697] One of the strictest forms of Islam is Wahhabism. It is no coincidence that this very high V version of Islam arose in Saudi Arabia, the area of the Arab world which until recently had the harshest climate and living conditions.[698]

Though its hold has weakened lately, given the extreme wealth and urbanization of Saudi society. Women are now permitted to drive and have more opportunities for employment. There has also been a re-introduction of cinemas, concerts, and entertainment.[699]

A pre-Islamic custom practiced by Muslims in many areas is female genital mutilation, a method of reducing women's sexual enjoyment with a severe impact on their health.[700] But which would also act as V and C promoters.

It has often been said that practices subordinating women do not belong to the "true" religion of Islam. For example, Muhammad seems to have had a relatively positive relationship with women, listening to his wives and helping them with household chores.[701] But what is important when it comes to cultural success or failure is not the sacred text but how people actually behave. This is the product of how that text relates to and combines with folk customs and pre-Muslim traditions. Put together, these have a massive effect on temperament and behavior.

People reared in this way think, feel and react quite differently from those brought up in the West, or in the more liberal culture of urban Muslims. Failure to recognize this fact has had disastrous

consequences. The costly, chaotic occupations of Iraq and Afghanistan by the United States and its allies arose from a belief that human beings are fundamentally the same and that removal of tyrannical regimes, plus some education, will turn these countries into free, prosperous democracies. But five thousand years of cultural evolution have ensured that people are *not* the same, and political regimes tend to reflect these differences.

Parliamentary democracy in the developed nations of the West is intimately tied to the relatively high infant C and very low child V found in those countries, resulting in national loyalties and impersonal political systems.

Arabs, Persians, Afghans and the other Muslim ethnic groups of the Middle East and Central Asia are epigenetically primed by centuries of cultural evolution for personal loyalties rather than impersonal institutions. High child V and stress make them amenable to harsh authority and inclines them to rebel against rulers they perceive as weak. It also makes them rigidly conservative, so that education of women, seen by Westerners as an unalloyed good, is seen by many fundamentalist Muslims (quite correctly) as a threat to their culture and way of life.

Higher Fertility

Muslims have not been immune to the degenerative effects on C and V of wealth and Western values. The birth rate of many Muslim countries has dropped dramatically in recent decades, as has that of Muslim immigrants into Western countries.[702] But they have proved more resistant to decline than followers of any other religious system. Of the ten most fertile countries in the world today, five are majority Muslim and one, Nigeria, has a large and growing Muslim minority. The most fertile three. Niger, Somalia and Chad, are majority Muslim.[703]

People in the West see the traditional culture of the Muslim Middle East as primitive and "backward," and there are constant calls for modernization. In fact, as had been seen, Islamic culture is anything but backward. Civilization first arose in Egypt, Mesopotamia and the Indus Valley in what is now Pakistan. It is no coincidence that these lands, with the longest experience of civilization, are now the most strongly and fervently Muslim. Long experience of civilization has bred a high-S genotype and culture which perfectly adapt people to survive and expand their numbers in dense agricultural and urban populations.

Such countries tend to be poor, if we leave out the anomalous effects of oil wealth, since their peoples lack the infant C that promotes industrialization. But wealth as such is of no benefit in the long-term struggle for survival and success. It can even be a negative, in the sense that it undermines both V and C.

The advantages of Islam can be clearly seen in countries with mixed populations. Lebanon once had a Christian majority but is now 54% Muslim.[704] In Communist Yugoslavia the provinces with Muslim populations grew much faster and received tax revenue from the wealthier Christian states.

The population of Kosovo, the spiritual homeland of Christian Serbia, grew from 733,000 in 1948 to over two million in 1994, with the Muslim component surging from 68% to 90%, and lately going even higher.[705]

Meanwhile, Muslims are migrating into Europe where V and C are in decline, the birth rate is far below replacement level, and people no longer have much faith in their own culture. Over the next few decades, as chapters twenty five to twentysix will indicate, the native peoples of the West will become feebler and fewer. This means that on current trends Europe will become an Islamic continent in a century or so. Similar trends will take place in the Americas and elsewhere. Unless something happens to change this course, it is likely to be the true end of history.

25. Changing Power Elites

"*The old order changeth, yielding place to new*." — Alfred, Lord Tennyson

We have now considered civilization cycles, which traces particular cases of rise and fall. This chapter will apply biohistory to human history as a whole, showing how elites and entire populations can be replaced when their C and especially V falls too low.

In earlier chapters we have seen that high levels of C and V are essential to the survival and success of a civilization. C promotes hard work, business skills and obedience to the law. Child V promotes acceptance of authority, making states unified and cohesive, and V gives them the warlike aggression necessary to win in battle. In this chapter we will see what happens when V and C decline, mainly as a result of prosperity and commercialism.

Among pre-literate peoples the onset of prosperity often leads to an increase in aggression, as plentiful food increases population and thus V, while declining C causes testosterone to surge.

During the Indian wars of the mid- to late-nineteenth century, the Sioux were the largest and one of the most warlike tribes in North America. But this was a relatively recent development. Until the early eighteenth century they had been a small and insignificant people, hunting and gathering wild foods while growing small plots of corn, squash and tobacco.

Forced west of the Missouri by more powerful tribes, they gained access to horses and guns, and when smallpox wiped out most of the rival tribes, they were able to take up bison hunting on the Great Plains. This was so rewarding as a source of food that they abandoned agriculture altogether.[706]

But instead of V declining with access to plentiful food, it *increased*. The status of women fell and the Sioux became ferociously warlike. During this period, they attacked rival tribes mercilessly, either killing them or driving them from their lands. In 1873, a thousand Sioux warriors killed nearly two hundred Pawnees, men, women and children, for trespassing and hunting. There was no peacetime for the Sioux.[707] Along with their violence went a supreme self-confidence, all indications of high V.[708]

The Yanomamo of the Amazon illustrate this principle, the groups in the precarious highlands being distinctly less warlike than those on the fertile lowlands.[709] The same can be said of Margaret Mead's Highland Arapesh in their poverty-stricken uplands, who were far less aggressive than their more affluent neighbors.[710]

But this does not last long. Among pre-literate peoples whose cultures lack strong V-promoters, the initial surge of V drops rapidly after a few generations, allowing other groups to move in and

take over. The expansion of the Sioux was terminated by colonial rule, but Biohistory indicates it would have faded with continuing prosperity.

When pre-literate peoples are not displaced in this way, the full effects of declining V may be observed. The Tchambuli, also described by Margaret Mead, had settled in a fertile lakeside area which supported a relatively dense population. They seem at one time to have been fierce head-hunters, as indicated by the requirement that every boy kill a man for ceremonial reasons, but at the time of Western contact they were distinctly low in V. Men were so unaggressive that captives for sacrifice were sometimes purchased rather than captured in war. Some twelve years before contact they had been driven from their home by more warlike peoples.[711]

In most circumstances the changeover happens far more quickly than this. Pre-literate peoples in lowland areas have no great advantage in technology, numbers or size of political units, so any loss of V would quickly cause their displacement. Thus it is that the lowlanders are more aggressive than peoples from the marginal lands because as soon as they lose V they are driven out, and the invaders gain a temporary surge of V from suddenly plentiful food. And so the cycle repeats.

Replacement of Elites by higher V groups

Elites in civilized societies can hold onto power longer than this because they have institutional advantages, such as the ability to hire barbarian mercenaries. But they too suffer from a loss of C and V. C-promoting and V-promoting behaviors are difficult to maintain in any circumstances, and become far more so in times of prosperity. This is especially a problem for elites.

Elites have more food than ordinary people. They are freed from the C-promoting effects of manual work. They tend to live in cities where opportunities for commerce promote selfish individualism and an obsession with status, both powerful C-reducers. The end of famine and other hardships undermine V. Changing character undermines the traditions that support C and V, leading to a descending spiral. Not only are these elites less warlike, but loss of C and V undermine the social cohesion that hods them together, causing a rise in faction and disputes within ruling families.

The normal end result will be replacement of the elite by a higher V group. The best-known example are the cycles as described by the Muslim scholar Ibn Khaldun, and which bear his name. Warlike and cohesive tribal groups, often nomads, invade and conquer the settled land, becoming less warlike and united until overcome by a new wave of invaders.[712]

Societies also go through times of exceptional weakness when central authority collapses, for reasons to be discussed in my book Lemming Cycles, and which allow relatively small invading forces to take control. The Manchu conquest of China is an example. The Ming dynasty collapsed in 1644 after a major rebellion led by Li Zicheng, amid severe internal crises.

The Manchus, a relatively small population from the northeast, were then able to enter China and establish the Qing dynasty, aided by Chinese allies such as the Ming general Wu Sangui. Although they were a minority compared to the Chinese population, they took control China in the following decades.[713]

Another example is when the Japanese overran much of China in the 1930s, closely following the Warlord Era of the early 1920s, when the Chinese government had lost control of the country. The Japanese were both united and far more advanced in industrialization

Revolution

When child C is high, regimes can also be vulnerable during the period after the V year, for a very different reason. At such times, high V commoners with strong impersonal loyalties may have the energy to overthrow rulers who no longer reflect their interests. The French and Russian Revolutions are examples of this.[714]

When revolutions arise in the countryside, they find their strongest support from areas with the highest V. The Cuban Revolution of 1956–9 was led in part by urban intellectuals including the Castro brothers and Che Guevara, but it was based on Oriente Province, the most mountainous area of Cuba and one with a long history of patriotic warfare. It also had an ultra-high birth rate in the 1930s. All of this suggests that Oriente had unusually high levels of V.[715]

Further to this, the foot soldiers of the Revolution were the poor peasants of the rugged Sierra Maestra. In effect, the Cuban Revolution can be seen as the victory of the highest V fraction of the population, in the most mountainous area of the most rugged province in the country. As late as 1980, more than a third of the Central Committee was from Oriente.[716]

The picture is even clearer when examining the victory of the Chinese Communists in 1949. As in Cuba, the original leaders were urban intellectuals, but not so the soldiers who brought them to power.

Mao's forces had been badly defeated in the center of the country, forcing on them the devastating Long March which brought them to the Shaanxi Province in the north-west, which had a harsh climate and a history of famine. The famine of 1876-79, in which nine to thirteen million people died in Shanxi and neighboring areas, was one of the deadliest famines in human history.[717] This could not have directly affected the 1930s' generation, but it would give a boost to local V levels, and also made unusually rapid population growth possible in earlier decades.

All of these factors together—the harsh climate, the recent famine, and growing population—given the people in this area exceptionally high V. It was from here that the Communists fought off the Nationalists and the Japanese, and eventually emerged to take over the country.

Population Replacements

The decline of C and V has so marked an effect that regimes eventually collapse even when there are no obvious barbarians to do the work. An example is the decline of the Later Han dynasty in China in the second century CE. Though nomad horsemen from the north would overrun China in later centuries, in this period they were no significant threat.

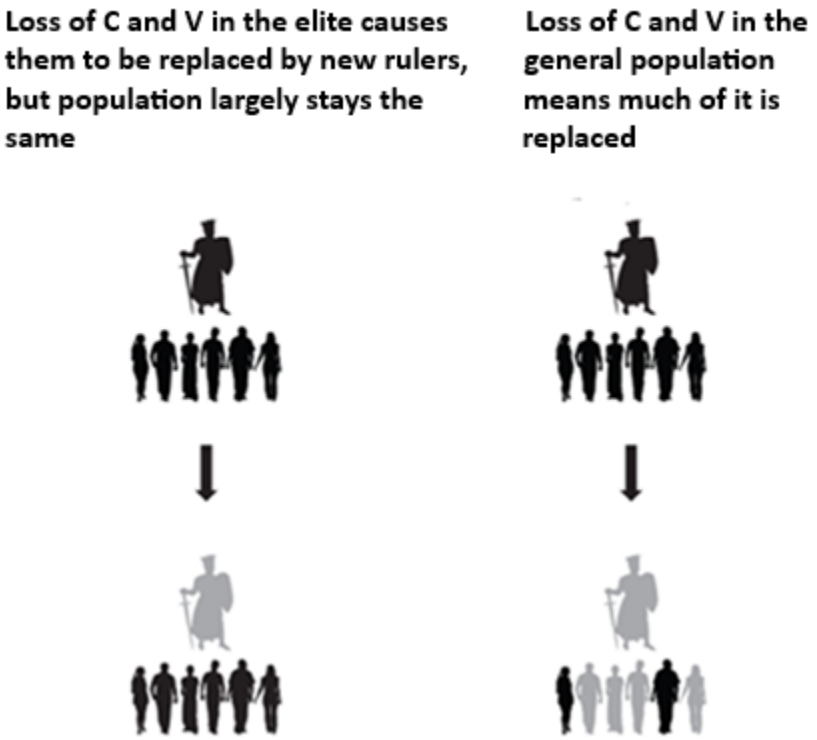
Much has been written of the mysterious collapse of the Mayan civilization in Guatemala, or the early Harappan civilization of north west India. Explanations have been offered which include natural disasters, intensified warfare, famine due to over-population, and civil strife.[718] None of these factors are needed to explain collapse. Even very modest levels of prosperity undermine C and V, especially when powerful C and V-forming traditions have yet to develop.

If it is only the V and C of the elite that is undermined, higher V invaders tend to displace the elite and form a new ruling class. This new elite becomes wealthy in its turn so that its own V and then C are undermined. But if the decline in V and C is general throughout the entire society, the whole population may be overrun, causing either the destruction of the entire civilization or at least the supplanting of swathes of its people.

When Germanic tribes invaded Britain after the fall of Rome, the long Roman peace had so sapped the V of the native population that it largely vanished. The newcomers not only imposed their own language and culture. but even their Y chromosome outside the borders of Wales.[719] In other words, the newcomers took the women so that surviving British men had few or no sons.

However, after the Norman Conquest in 1066, the native English kept their language and identity largely intact and eventually absorbed the Norman incomers. Fig. 30.1 below helps to put this into perspective.

Fig. 24.1. Declining C and V cause regimes to collapse or be overrun. The greater the decline, the more serious the collapse.



Declining Elites: Fujiwara aristocrats and Chinese scholars

We will now take a closer look at some elite groups undergoing these changes. There are certain things we should expect to see. Low V should cause reductions in energy, confidence and morale. From declining C we should see a loss of the work ethic, of self-control and adherence to rules of behavior, of interest in family and children and (as suggested by studies of rats), a decline in fertility. To gain a better understanding of this process we will look at two urban elites which suffered a decline in V and C: court aristocrats in eleventh century Japan, and a group of wealthy twentieth-century Americans.

The Fujiwara were descendants of aristocrats who had helped the Japanese imperial house gain effective control of Japan by the seventh century CE and dominated the court for several hundred years. By the eleventh century the authority of the imperial court was in decline, with local military aristocrats gradually gaining authority in the provinces. But the court retained considerable wealth and prestige. We know a great deal about this society because it gave birth to some of the world's

greatest works of literature—the Tale of Genji and other works written by women in the imperial court.[720]

Courtiers were described as valuing cultural refinement over martial activity. They avoided such pursuits as hunting and war, and expressed contempt for warriors. There was a sense of fatalism and of the futility of effort; a feeling of resignation and world-weariness.

Marriage and sexual relationships among the aristocracy were relatively flexible by later standards, often involving visiting relationships rather than permanent co-residence, which could make paternity less publicly emphasized. Women of the court could inherit property and sometimes enjoyed a degree of autonomy, more so than in later centuries. Although their status remained shaped by family strategy and court hierarchy.

As with the Tchambuli, this was a society obsessed with artistic expression. There was an intense focus on poetry, on the details of dress and personal appearance, and a deep sense of appreciation for natural beauty which was to have a marked influence on future generations of Japanese. [721] It is not possible to link artistic creativity too closely to low V, since the arts have also flourished in high V societies, such as Elizabethan England or Athens at the time of Pericles. But low V societies commonly show a distinctive artistic sensibility focused on external forms and appearances.

In most situations, elites that lack martial vigor and a work ethic soon lose power. The continued dominance of the Fujiwara and the imperial court into the eleventh century reflects the importance placed in Japan on hereditary status and aristocratic lineage. In the twelfth century, however, political power increasingly shifted to provincial military leaders, culminating in the establishment of the Kamakura shogunate in 1192. While this reduced the political authority of the court and the Fujiwara, they kept considerable ritual prestige and cultural significance.[722]

American Elites

A group of wealthy young Americans receiving psychiatric treatment during the 1970s provide evidence of declining C and V in the modern world.[723] The individuals concerned were from the third generations of very rich families. They had been brought up from birth with the wealth generated from businesses started by their grandparents and expanded by their parents. None of these young people held jobs or pursued hobbies or intellectual interests. Their lives tended to center around their social set, cars and clothes. They were the so-called “beautiful people.” In common with the Tchambuli and the Japanese aristocrats, they tended to focus on appearances.

The psychological attitudes of these wealthy young Americans were similar to the Japanese courtiers. They complained of boredom, hopelessness and emptiness. They were described as easily angered, lacking shame and embarrassment, acting on impulse, having frequent brushes with the law, and pursuing compulsive sex lives.

Their families' declining interest in children can be traced generation by generation. The first generation had kept enough contact with their children to be effective role models. But when this second generation became parents, they were occupied with their own activities and pleasures and left childrearing to a shifting body of servants, who were frequently fired when the parents became jealous of their attachment. Thus, the third generation saw little of their parents. They had a great deal of freedom and little consistent discipline—all circumstances which minimize C. Few of the third generation married or had children, and those who did made poor parents.

It seems that the grandparents had relatively high C, the next generation high infant C but much lower adult C, and the third generation low C overall. By then, V had also fallen to an absolute minimum. It must be said, however, that only some wealthy American families follow this pattern. Those with a tradition of public service, such as the Rockefellers and Kennedys, have done considerably better.[724]

These examples show how people behave when C and V fall dramatically, and also how fast this can occur. Judging by the American example it seems to take no more than two generations of ineffective parenting for them to collapse completely. But for a ruling class to lose power in most societies the change in character need not be this extreme. Any loss of C and especially V can have serious effects.

Iraq

The recent history of Iraq also makes better sense once we understand that the peoples of the 'Sunni triangle' in northern Iraq clearly have higher V than the rest of the country. This was, after all, the home base of the Assyrians and other warlike Empires that repeatedly overran the more fertile river valleys to the south. Though Sunnis are only one fifth of the Iraqi population, it was the Sunni-dominated Ba'ath Party which seized power in a 1968 coup.[725] Saddam Hussein was from this area, as were most of his key supporters.

After he was overthrown, it was the center of armed resistance to the Americans and later of ISIS, whose fierce fighters defeated much larger numbers of Iraqi government troops. These events are normally considered in terms of differences in religious ideology, but are better explained by differences in temperament.

We do not always have complete information about the background to revolution, foreign conquest or other forms of regime change, but when we do the pattern is quite consistent. Wealth and population density act strongly to undermine V and thus eventually C, leading first to military and then economic and political weakness. Famine and population growth, on the other hand, act as V-promoters which allow new people to take power.

In the next chapter we apply this understanding to the modern West.

26. The Modern World

"*The Galactic Empire is dying.*" — Hari Seldon, *Foundation*

We live in a golden age.

There have been no major wars in Europe or North America for eighty years, apart from the invasion of Ukraine, and only minor regional conflicts elsewhere. The continuing magic of the machine age has brought prosperity to billions. In most countries, epidemic disease has been curbed and new-born infants can expect a long and healthy life. Elections are held in many countries, though often managed so as to keep the ruling party in power. The population bomb has been all but defused. Science and the arts are flourishing, including new art forms such as movies and computer games that previous societies could not have imagined.

Conventional wisdom is that the West has reached a new equilibrium, that birth rates plus immigration will maintain populations, that Western nations will remain peaceful but capable of defending themselves, and that they will remain open and tolerant liberal democracies. An example of this thinking can be found in Francis Fukuyama's book *The End of History*:

> What we may be witnessing is not just the end of the Cold War, or the passing of a particular period of post-war history, but the end of history as such; that is, the end point of mankind's ideological evolution and the universalization of Western liberal democracy as the final form of human government.[726]

When people raise concerns thy are most often about damage to the environment and global warming, through emission of carbon dioxide from burning fossil fuels. Though there is also growing concern about falling birth rates, especially in East Asia and parts of Europe.

This chapter will look at changes in the modern world in the light of biohistory, seeing what lessons we can draw for the future.

A Rapid Decline

Our first observation is that C and V are declining much faster in the modern world than at any time in human history. Hunger is an effective C and V promoter which has been all but banished from developed countries, and even from much of the Third World. Today, obesity is far more of a threat to health than starvation. Compare this to ancient Rome, our best example of collapsing C and V in the past, where food riots were common in the late Republic and Empire.[727]

The modern world also has C and V reducers that were unknown in the past. These include social media, online porn, drugs such as cocaine, video games, multiple methods of gambling, and much more.

A measure of this difference is that birth rates have fallen to levels unknown in the past. Women in the Roman Empire typically gave birth to 4-6 children, though epidemic disease meant that many failed to survive.[728] Today, the only developed country where women average at least two children is Israel.[729] For many countries, especially in East Asia and southern Europe, the average is closer to one.[730]

Readers interested in this subject are directed to my book Birth Rate Crisis, which gives an account of declining fertility rates and the changes in attitudes behind them. Essentially, people with low adult C find marriage and children less interesting than those with higher adult C. Lower V also has an impact.

This is why baby bonuses and the like have so little impact on birth rates. Even though people commonly cite lack of money as a reason for having fewer children, the core reasons are psychological rather than financial.

The Decline of Child V and V

Another reason for the decline in C in the modern world is a fall in child V. As discussed in chapters thirteen and fourteen, it was high levels of child V and its associated stress that combined with C-promoters to produce maximum C in the nineteenth century. By that time, indications of child V such as harsh treatment of children and criminals had ebbed greatly from its sixteenth century peak.

This decline has continued into the modern age. For example, capital punishment has all but vanished from western countries except the United States, and even there is far less common than in the past.[731] Physical punishment of children has also been banned in schools, except for some American States.[732]

The rise of democracy also indicates a decline in child V. The totalitarian regimes of Germany and Italy gave way to stable democracies after 1945. The last holdout in Western Europe was Spain, which made the same transition after the death of Franco in 1975. East Asian nations such as Japan, South Korea and Taiwan have also become democracies, with power passing peacefully as the result of elections.

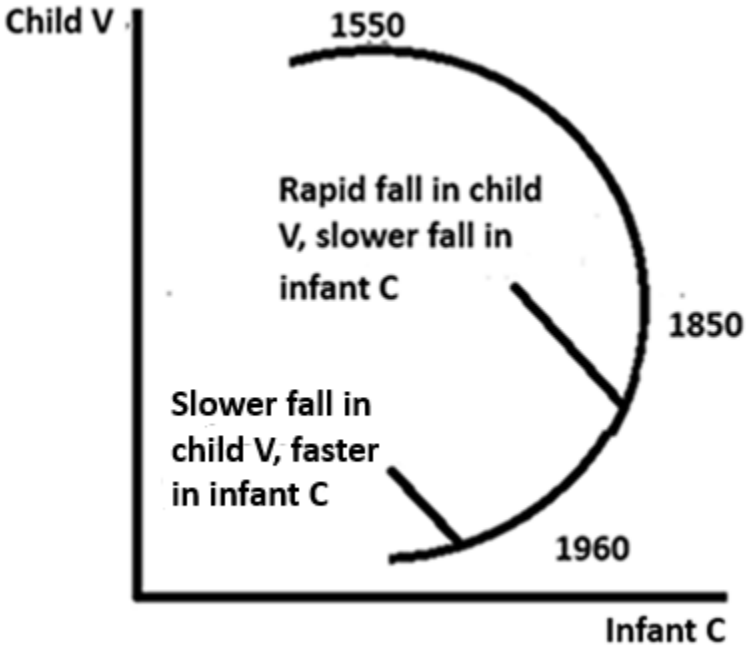
An indication of falling V is the improved status of women. Until 1893, no developed country gave women the right to vote. By 1971, all had done so.[733] As the twentieth century passed, women gained ever greater social and economic freedoms. For example, as late as 1960 only 35-40% of college graduates were women. Since the l980s, most have been.[734]

Another indication is a growing reluctance to fight wars. Until recently, formerly militaristic nations such as Japan and Germany spent little on defense. Germany some 1.2-1.4% of GDP and Japan about 1%.[735]

This decline has been slower in the United States, which has been more willing than others to fight wars in Vietnam, Iraq, Afghanistan and (most recently) Iran. As mentioned earlier, Americans are more likely to punish children in schools or execute criminals. Russian V remains higher, as indicated by the war in Ukraine.

Throughout the developed world, the decline of child V and stress was especially rapid in the nineteenth and early twentieth centuries, with the most significant visible effects taking place by the 1960s and 1970s. This too fits our civilization cycle model, in which an initial fall in child V is followed by a much larger decline in C (see Fig. 31.1 below).

Fig. 25.1. Civilization cycle in twentieth-century Europe and America. Prior to the 1960s there was a rapid decline in child V and stress but only a minor decline in infant C. After this, infant C began to decline much faster.



Loss of Cultural Confidence and Morale

Another effect of falling V is a decline in morale and cultural confidence. 150 years ago, Europeans had little doubt that their progressive, industrial and Christian culture was beyond compare. Their colonial empires ruled most of the world, while science and technology progressed at an unprecedented rate. Charles Kingsley mirrored the immense confidence of the time by writing of: "the glorious work which God seems to have laid on the English race, to replenish the earth and subdue it."[736]

Contrast that bold, vigorous confidence with the self-doubt which has grown since the 1960s. Today, Kingsley's words seem hubristic and arrogant. There is widespread pessimism about the environment, politics and even the value of science.[737]

Perhaps the strongest expression of this change is the theory and practice of multiculturalism. As late as the 1970s, most American Colleges required history majors to complete a course in Western Civilization. By 2011, only 2% of General Education Programs retained this as a required course.[738]

Changes to Marriage and the Family

The best absolute measure of C is the age of puberty, which tends to be later when food is chronically short. This has fallen from as early as late as 17 in nineteenth century Europe to around 13 today, similar to what it was in the Middle Ages.[739]

Declining C in the past century has seen relaxed controls on sexual activity, both a sign of falling C and a loss of the cultural norms that support it. It is also reflected in the rise of one parent families. In 1960, only about 9% of children were growing up with a single parent. Today, more than a quarter are doing so.[740]

Significantly, though, the actual level of sexual activity is declining in young men, [741] likely reflecting a fall in infant C. Our own experiments have shown that while food restriction reduces sexual activity in adult rats, it has the opposite effect on their young. Kkk

Another and related trend is that children are much less controlled than in the past. This is a different factor from punishment, which has been in decline since the sixteenth century. From all accounts, as indicated in chapter eleven, control of children reached an all-time high in the nineteenth century.

Changing behavior can be reconstructed from parental advice books, because people tend to buy the books that reflect their attitudes. These books began advocating leniency in childrearing from the 1920s. From this time there was a gradual rejection of the mechanistic and behaviorist idea of childrearing, and an increasing emphasis on the importance of meeting a child's emotional needs. For example, in 1936 Charles Aldrich's *Babies Are Human Beings* advocated greater leniency and reduced control.[742]

By mid-century, Dr Spock took a far more radical position. He argued that the child's emotional needs came before those of parents, imploring mothers to enjoy their children and reject traditional attitudes.[743]

The level of C in Western societies has been falling for close to 150 years. The sheer slowness of this fall can be explained in part by epigenetics. An individual's level of C is determined by the

life experience of their ancestors for several generations, conveyed epigenetically by sperm and ova.

Declining Mental Health

Another effect of declining C has been a decline in mental health. This is not a product of lower C as such, but of lower adult C falling in later life, as compared to infant C which is fixed by about age two. We saw in chapter seven that an especially rapid fall in adult C, in periods such as the 1920s and 1960s, led to rising stress and eventually recession.

An anonymous survey asked U.S. adults how often they felt nervous, hopeless, restless, worthless, or depressed. The lowest levels were reported by people born in the early 1930s, at the heart of the Great Depression. They were significantly less likely to report mental distress than those born earlier or later. The same pattern can be seen in suicide statistics. People born in the 1930s were less likely to self-harm than earlier or later generations.[744]

The effects are mostly vividly captured by the term 'deaths of despair', which groups together suicide, drug overdoses, and alcohol-related causes such as liver disease and cirrhosis. All of these deaths signal unhappiness, and it is often hard to tell the exact cause. A drug overdose, for example, might be accidental or a deliberate act of suicide. Even when addicts don't intend to kill themselves, they often show a reckless attitude to risk.

In America, deaths of despair have risen in all social classes, but are most common among people without a college degree. This is also the group which has seen the steepest decline in community and marriage, in work ethic, and in religious engagement.[745] Deaths from drug overdose have also risen in other English-speaking countries such as Canada, Ireland, Britain, and Australia.[746]

Rates of anxiety and depression have risen all over the developed world, especially among the young. This has been noted not only in America but in Britain, Australia, New Zealand, Japan, and South Korea. More people report pain, severe mental stress, and difficulty going about their everyday lives.[747]

One of the clearest reasons for this is this is that people today are more likely to be lonely. Studies show that lonely people are far more likely to be depressed, fall ill, and even die.[748] One important reason is the decline in community, which is another effect of falling adult C.

Loss of community and faith

In the year 2000, David Putman's classic book *Bowling Alone* showed a marked decline in broad social ties over the previous fifty years.[749] Groups such as labor unions, Freemasons, political parties, the boy scouts, veterans' groups, and the Red Cross had been shrinking.

The book's title reflected the finding that while more people than ever went bowling, fewer were doing it as part of an organized League. Instead of group activities, they opted instead to spend far more time on solitary and family-based pursuits, such as watching television.

The loss of social engagement has become even more extreme since then, especially with the rise of social media. People spend less time with their friends than even twenty years ago, and are far less likely to report having close friends at all.[750] Intense use of social media is no substitute for face-to-face meetings and is linked to a rise in loneliness. Much of it is consumed with the chasing of "likes", which reflects an increased focus on status.

Loss of community is especially reflected in the decline of religion. In 1972, 4% of white Americans between the ages of 30 to 49 gave their religious preference as 'none'. By 2010, 21% gave the same answer.[751] As with attitudes to family, this decline is especially striking in the young. People born in the last thirty years are far less likely to go to church than previous generations, and also less likely to pray or even believe in God.[752] Though this decline may have levelled out in the past five years.[753]

The decline in churchgoing has been especially marked. Today, only three in ten American adults attend any kind of religious service regularly. Hindus, Buddhists and Jews are even less observant. And Americans are the most religious among wealthy nations. Europeans, Canadians and Australians are far less likely to say that religion is important to them.[754]

This trend is not confined to the United States, but is evident across many developed nations.[755] More than 70% of young Japanese adults describe themselves as non-religious. More than a third of Buddhist temples are expected to close over the next 25 years, and one in six has no resident priest. Even funerals are increasingly likely to be secular.[756]

Buddhism and Christianity have also been in decline in South Korea since 2000, especially among the young. In 2015, 65% of 20-year-olds reported no religious affiliation, highlighting a striking shift in generational priorities.[757]

Retreat from community forms part of the same pattern as retreat from marriage. Individuals form fewer families than in the past, and families have fewer contacts with outsiders. As with every other factor we have identified, this change is most obvious in the youngest generation. Young people today are far less likely than in the past to be married or in a romantic relationship.[758]

In tracing the rise of the West, we saw how moral attitudes shifted from a focus on personal charity to such values as integrity, self-discipline, hard work and principled philanthropy which tried to reform the character of the poor. These attitudes reached a peak in the nineteenth century and especially the Victorian era, and are a key indication of high C.

150 years later, those standards have been all but abandoned. A recent study found that a group of young adults, regardless of social background, had few absolute standards of any kind. The only

"traditional" values retained were that murder, rape and robbery were seen as wrong. Otherwise, morality was seen in terms of what one's peers would think and the chance of getting caught, and standards of right and wrong were a matter for personal choice.[759]

Obesity, Infertility, and Falling Testosterone

Falling V and C have other consequences. One is obesity, which has reached epidemic proportions in most Western nations. Obesity has been linked to risk-taking in men and impulsivity in women, single parenthood and poverty, all indications of low C.[760] Overeating is a consequence of lower C in the sense of reflecting a lack of self-discipline. It also acts as a C-reducer.

An interesting result from our recent experiments is that the offspring of well-fed mice have a greater appetite than those from food-restricted parents. If this applies also to humans, it suggests that obesity could be a cascading problem, with plentiful food in one generation making it easier for their children to gain weight. kkk

Infertility is also increasing, another result of falling C. One of the most significant findings from our laboratory research was that sperm count is significantly lower in rats whose mothers did not experience calorie restriction in infancy, compared to those who did. In humans, sperm count has been declining in Western men over the past two generations. A recent large-scale study found a 32.2% decline in French sperm count between 1989 and 2005, with the proportion of properly formed sperm falling from 60.9% to 52.8%.[761]

This may also be in part a response to falling V, especially given evidence cited in earlier chapters of lower fertility in other declining V groups, such as the Romans of the second century. Increased infertility will further accelerate the population decline discussed earlier.

Disease

Another consequence of falling C and V is that infectious disease becomes more virulent. Rat experiments show that food restriction (high C) increases resistance to disease, a relationship borne out by the decline in disease in Europe as C rose.

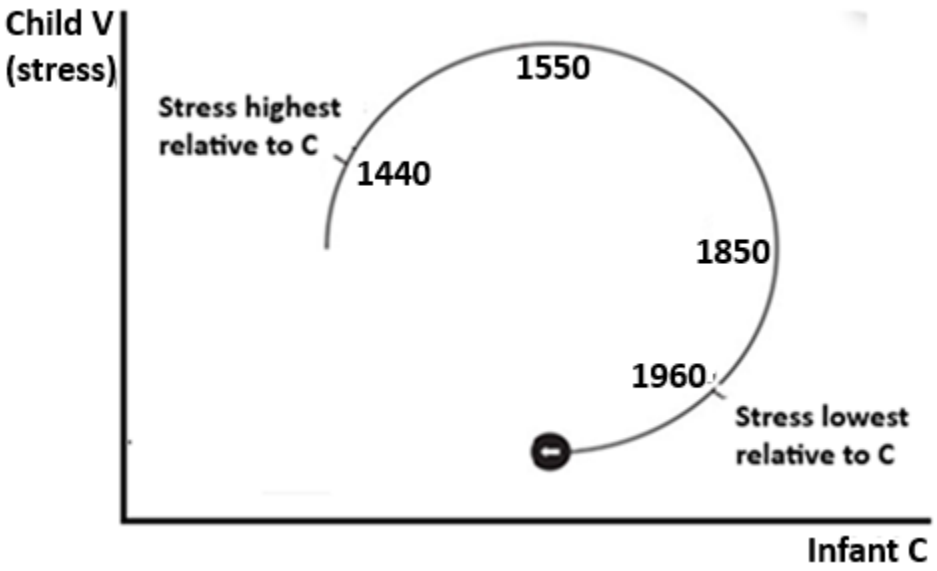
But the pattern here is very different from other indications of C, in that the early stages of declining C saw a marked *decrease* in infectious disease, well before the invention of antibiotics. To take one example, tuberculosis was a major killer in Western countries in the eighteenth and early nineteenth centuries, causing almost 25% of all deaths.[762] But between 1851 and 1935, tuberculosis mortality in England and Wales dropped from more than 300 per 100,000 people to fewer than 100, with a similar decline in the virulence of other infectious diseases.

Less known but quite striking is that TB declined *before* any effective medical treatments were in place.[763] This is not because it was eliminated like smallpox or polio, since even today an estimated one third of the world's population has been infected by TB.[764] Nor can it be fully explained by better public health measures, though these have been effective against diseases such as cholera. The invention of antibiotics has certainly reduced mortality, but in historical terms they have had far less impact.

The explanation for this conundrum can be found in the link between disease and stress, since stressed people are more susceptible to disease. Thus, people should be most resistant to disease when C is at a high point and stress at a low point. The theory of the civilization cycle predicts exactly when this should be. We have seen earlier that in the late nineteenth and early twentieth century there was a rapid fall in V and stress but only a minor fall in C. It was only from the 1960s onwards that the fall in stress slowed and that of C started to accelerate. It follows from this that the optimum time for high C and low stress should be around 1960, as indicated in Fig. 32.1 below. This is when resistance to disease should be greatest.

The opposite phase of the civilization cycle occurs when C is lowest relative to stress and we should expect least resistance to disease. As indicated in Fig. 32.1, this can be placed in the late fourteenth and early fifteenth centuries, the time of the Black Death. Stress reduces resistance to disease and C increases it. Around 1440, their combined effects made people especially vulnerable to infection. Around 1960, their combined effects made people especially resistant to disease. As C continues to fall in the civilization cycle, infection diseases can be expected to become more deadly.

Fig. 25.2 The civilization cycle in Europe affects resistance to disease.



Thus it is that fifty years after the optimum point of the 1960s, infectious disease has begun to rise. Since the 1980s there has been a resurgence of disease in many countries—not only old killers such as tuberculosis and cholera but new ones including Legionnaire's disease, HIV, hepatitis, SARS and avian influenza.[765] As yet this has been only a minor statistical change, nothing like a return to the early nineteenth century, but a portent for the future as C continues to decline. An example of what to expect is the great plague of 165–180 CE that devastated the Roman Empire, and in the even greater Justinian plague of the sixth century CE.

But falling C and V affects more than personal behavior, health and wellbeing. It has important implications for the economy.

27. Economic effects

"*The way to wealth depends chiefly on two words, industry and frugality*." — Benjamin Franklin

One benefit of high infant C is a strong market economy. In chapter twelve we saw how non-market institutions of the Middle Ages, such as serfdom and craft guilds, gave way to free markets with minimal government control by the nineteenth century.

An indication of falling C since then is the steady rise of government spending, which is in essence a non-market distribution system. In most European countries this is now well over 50% of GDP.[766] Even in America, behind the trend in so many ways, the government's share has risen from 7% in the early 1900s to around 36%.[767] Lower C people want governments to redistribute income and are less market oriented.

Equally significant is a massive increase in government regulation, with a multitude of laws covering wages, hiring and firing, licensing, planning permissions, rent controls, environmental regulations and more. People with lower infant C are less comfortable with the market. The same belief in regulation was seen in the later Roman Empire, where Emperors such as Diocletian tried to stem economic decline by fixing prices and tying people to their jobs. [768]

In this as in other areas, Americans are following the trend but somewhat behind other countries. Many Americans are suspicious of high government spending and increased regulation, especially in more conservative states such as Utah and Texas.

Declining Work Ethic

In the long-term national wealth depends on hard work, and the number of hours worked is dropping rapidly with the fall in C. There has been a steep rise in the proportion of people in the U.S. deemed unable to work, for reasons of disability. This rose from 0.7 percent of the workforce in 1960 to 5.3 percent in 2010, despite improved medical care and a decline in jobs requiring hard physical work.[769] Many, if not most, claimants have genuine disabilities, and expanded eligibility has contributed to the increase. Even so, experts believe that a growing number apply because they prefer not to work.[770]

Also, unemployed men in 2003-2005 were less likely to be doing anything useful than three decades earlier. They spent less time in job search, education and training, and completing useful tasks around the house. Unemployed men during this time also spent less time on civic and religious activities and even active pastimes such as exercise, sport, hobbies, or reading.[771]

Since 2006, employment surveys have found more and more young men to be out of the workforce. They are failing to start or complete bachelor's or advanced degrees, where women now form a clear majority. But they are also avoiding the trades, which offer greater earning potential straight

out of high school. As a result, more than 40 percent of skilled trades workers are now over the age of 45.[772]

Even employed people are working fewer hours. In 1950, the average American worker spent 1,984 hours on the job each year.[773] By 2024 that figure had fallen to 1,810 hours.

Even with the decline, Americans are still rank among the hardest workers in the developed world. Australians currently average 1,627 hours per year, while the British work about 1,499. At the lower end of the scale, Swiss workers log as few as 1,346 hours annually. The decline has continued over the past two decades and shows little sign of slowing.[774]

Rising Debt, Slowing Wage Growth

The economic rise of the West was driven, at least in part, by hard work and a willingness to defer immediate gratification for future benefit. People were inclined toward self-improvement and had a tendency to save and invest rather than spend.

Falling C has the opposite effect. People are now more likely to favor short-term spending over future benefit. At a moderate level this could mean lower levels of savings and investment. At higher levels it increases debt. Thus, it is no surprise that debt levels have grown dramatically in recent decades as C has fallen. Since 1950, American household debt has grown from 20-25% of GDP to 75-85%. [775]

Other countries are even more indebted. Australian and Canadian households owe more than 100% of GDP.[776] But even thriftier societies are more indebted than in the past. German household debt has doubled to 50-55% of GDP since 1950, and Japanese households now owe 60-65%.[777]

The same pattern applies to public spending. Advanced economies ended World War II with high levels of public debt, but this had fallen drastically by the 1970s. Since then, total government debt in the U.S. has risen from 35-40% of GDP to 110-120%.[778] Other countries have seen similar increases since then, with Japan the outstanding example. Japanese public debt has rise from 20-30% of GDP in the 1970s to 240-260% in recent times.[779]

People dislike paying more tax, but they consistently vote for parties that promise ever more government spending. Ever-rising public debt is the only way governments can at least partially satisfy both desires.

Another concern is the slowing of wage growth, despite major technological advances in areas such as IT. Between 1945 and 1973, real wages grew by well over 2% per annum in developed nations including the U.S., U.K., Australia and Canada, far more rapidly still in Germany and Japan which had been devastated by the war. Since 2008, average wage growth had been under half this level.[780]

The puzzle of the professional classes

In fact, the real puzzle is not why our economies are stagnating, but why they have-until recently-done so well. C has been in decline for more than a century, and the birth rate below replacement level for several decades.

This applies especially to the professional classes of the big cities, who economists consider the most important sources of economic dynamism. These include engineers, software developers, scientists, physicians, researchers, managers and entrepreneurs, who play a key role in increasing productivity.[781] Such people tend to have below average fertility, and are concentrated in areas with very low fertility such as the San Francisco Bay Area, Manhattan, Boston/Cambridge, and Seattle.[782]

They have other signs of low adult C. Compared with the general population they tend to be individualistic with less sense of community obligation, career-focused, more secular, and more accepting of non-traditional sexual and family arrangements such as same sex marriage.[783]

But they also show clear features of infant C. They are hard-working and willing to sacrifice now for future benefits, and highly flexible and creative in their thinking.[784]

One way to understand this is that adult C reflects experience from late childhood onwards, including adult life. Infant C reflects C-promoters in infancy, but also those of previous generations. People with high infant C, low adult C and low child V can be intensely productive.

Many professionals in countries like Australia and America are recent immigrants from Asian countries,[785] where the fall of C has been more recent so that infant C levels remain high. The problem is that the lower adult C of modern professionals must eventually reduce the infant C of their children, so we can expect the benefit to society to be only temporary.

Growing gap between rich and poor

But this also creates a problem because the gap between declining C population and professionals with higher infant C is concentrating wealth into fewer and fewer hands. Also, incomes are more equal when C is highest relative to stress. In other words, income equality follows the same pattern as economic growth and resistance to disease.

Chapter twelve showed that as the economic skills of ordinary people increased from the Middle Ages, so the premium for skill and capital declined. Thus the gap between skilled and unskilled wages narrowed, and rents fell relative to land values. Child V and stress are also linked to extreme status differences, as seen very clearly in sixteenth century England and Japan. So as these factors fell in the early twentieth century, they masked the early fall in C. Societies became more equal.

This trend reached a peak around the 1960s, a time of low unemployment and relatively equal income distribution. But as C fell from the 1960s onward, certain groups were far more affected and their economic value declined. Among lower income groups, divorce rates are higher and married people less happy.[786] Unmarried and divorced parents are especially likely to exercise minimal discipline. As quoted in one community study of a Pennsylvania town:

> Then you hear why the discipline was only minimal—"Well, you know, I talked to them and they said this, that, and the other, and I figure "Maybe he's right" … You want to be the cool parent, the friend parent, the great parent that the kid does whatever he wants, however he wants, dresses great.[787]

The essence of high infant C is hard work and the willingness to invest for the future. A striking feature of recent decades is that highly educated professionals work more hours than they used to, while the less-educated work less, especially men.[788] An even greater divergence is in the tendency to save and invest, with professional classes gaining an increasing share of national wealth.[789] Growing inequality can have many causes, but loss of infant C in the less educated is a contributing factor.

Another concerning trend is in attitudes to government. People with high infant C are loyal to the nation-state and adamantly resist alien rulers. It is thus significant that faith in government has fallen dramatically in recent decades. People are less patriotic and have less trust in political parties, in parliaments and legislatures, and even in democracy itself. These trends are especially evident in the young, among whom the decline in infant C is most advanced.[790]

If these trends continue, there is no doubt about what will happen. As C continues to fall and people become less and less capable economically, growth must turn into stagnation and then decline. Western nations will become weaker, with shrinking populations and growing poverty, as feeble and debt-ridden governments are unable to command support.

Technology in the form of computers or other machines cannot save us because this technology creates the wealth that is undermining C, far more than in the case of Rome. In the late Republic mobs rioted when the high price of bread left them hungry. In the modern West one of the greatest problems of the poor is *obesity*. So not only must Western economies collapse, but the collapse is likely to be much faster than was the case for Rome.

Weakening of Democracy

There will also be political changes. Democratic government depends on loyalty to impersonal institutions such as parliaments, the rule of law and electoral systems. All of these in turn rest on infant C, which is plunging fast. This shift from impersonal to personal loyalties is reflected in the re-election of Donald Trump, Trump was brought to power at least in part by an embittered underclass, their economic prospects shrinking and despised by an educated and wealthy elite. For many of them support for a person, Trump, had higher value than support for the principles of

democracy. That is why most Republican voters have come to believe that the 2020 presidential election was 'stolen', and many approved the storming of Congress by a violent mob in early 2021.

Another prediction is that the Chinese economy, though currently powering ahead, will falter in the next decade or two, before going into decline. This is driven by prosperity, but also propelled by the efforts of the Communist regime to destroy the traditional Confucian values and practices that support C.

In the case of Europe, the end of democracy is as likely to come from without as within. The nation and city-states of ancient China, India and Greece merged into cosmopolitan empires before their collapse. European nations are already losing their sense of national identity and pride in their own culture, and their shrinking and aging populations are less and less keen on military service.

As economies decline and democracy flounders, a more vigorous neighbor such as Russia or some Middle Eastern power must move in and take over. This last option is especially likely because by then, most of the European population will be of Middle Eastern or African origin.

The American Exception

One Western nation has followed a slower path on the road to declining C and V. In the past decade, U.S. growth has outpaced other OECD countries such as Germany, France, the U.K, Canada and Japan.[791] As previously noted, Americans tend to work longer hours and have lower taxes than other wealthy countries, both signs of higher infant C.[792] Even more significant, Americans are far more likely to go to church and consider religion as very important in their lives.[793]

A sign of higher V is that America spends more on defense than other OECD countries, and in the past 25 years has suffered far more deaths in combat.[794] An indication of higher child V is that Americans are more likely to punish children physically and to impose the death penalty.[795] However, the U.S. is trending in the same direction as other wealthy countries, just a few decades behind.

In the long-term, North America might follow a similar path as Western Europe in embracing Islam, or perhaps develop some more conservative Christian version. Meanwhile the wealthy urban populations of East Asia and elsewhere will decline and diminish, falling prey to autocrats or collapsing into anarchy, the survivors drifting back to subsistence farming in the struggle to stay alive. Industrial civilization, in Europe and America and throughout the world, will collapse.

Eventually, as poverty and the revival of traditional values do their work, V and C will revive. But this will be a very different world, with no more brilliant low-S civilizations to create industrial wealth. To our descendants, struggling for survival in a harsh world of famine and disease, the wonders of our time will be no more than a distant memory.

This is the direction in which the world is heading, and no moral revival can halt the trend. It would be like trying to halt a hurricane with an electric fan: the right idea but orders of magnitude too weak. The force of the civilization cycle, especially given the wealth and urbanization of modern times, is far too strong.

But there is one key difference between our era and any in the past. Our new understanding of neuroscience has the potential to change everything.

28. Implications and Testing the Theory

"*Study the past if you would define the future*." — Confucius

The following needs to be blended in here somewhere:

Testing the Theory

This book builds on the dedicated work of countless scholars in areas including history, economics, demography, cross-cultural anthropology, psychology, neuroscience, biology, and more. At the same time, the reasons it gives for historical events are different from those put forth by the scholars themselves.

One reason is that it brings together evidence that most academics might not be aware of, given the extreme specialization required by modern scholarship.

This book isn't intended to convey a fixed and final answer to all the questions it raises. It is a highly tentative account, which has been modified greatly in recent years and will undoubtedly be modified still more in times to come. But this approach has one major benefit lacking in other social theories—it is *testable*.

The scientific method has been an outstanding success in helping people understand the world and develop technologies and drugs that improve and lengthen our lives. And at the core of the scientific method are two quite simple ideas. The first is that, as mentioned in the Introduction and all things being equal, we prefer the simplest theory to explain the available facts. This principle is commonly attributed to William of Ockham, a fourteenth century English philosopher, and is known as "Ockham's Razor."[796]

And second is that a scientific theory should generate non-obvious hypotheses that can be tested, and on that basis the theory is confirmed, modified, or refuted. If a theory cannot be falsified by an experiment then it is, in principle, not scientific.[797]

As an example, Einstein's theory of Relativity predicted that light should be affected by gravity and bent by a specified amount when passing near a massive object such as the sun. This had never been observed, and no competing theory made any such prediction. The trouble was that the sun is so bright that it drowns out light from distant stars. The only way to test the theory was by a total solar eclipse, observed in the right place and with exactly the right weather.

Scientists spent many years traipsing around the world in pursuit of just such an event, and eventually made observations. The sun's gravity bent the light of distant stars, and by exactly the amount Einstein predicted. Thus was Relativity confirmed.[798]

For the social sciences, this approach has proved difficult. To take just one example, the Chinese Cultural Revolution has generally been explained, at least in part, by the actions of Chairman Mao. But the only way to test such an explanation would be to run the century again without Mao, which cannot be done.

Biohistory proposes, by contrast, that broad historical changes reflect changes in the prevailing character of the population, and that these in turn have a biological basis. For example, they might reflect people having a higher or lower level of stress, or being more or less sensitive to dopamine.

To follow the example above, the chaos and violence of the Cultural Revolution was undoubtedly influenced by the actions of Chairman Mao. But it may also have reflected a peculiarly aggressive age cohort of young people who were born at the end of their Civil War in 1949.

One reason for this is historical parallels. It is common for major conflicts to break out when the generation born at the end of a major war comes of age during a time of peace. The rebellions that overthrew the Qin and Sui dynasties in China show the same pattern, as does the Second World War in Europe.

Biohistory proposes that this had a biological basis, one that we share with animals and that could be tested by measuring the epigenetics of people born at such times, compared with older and younger cohorts.

Original start of chapter:

Biohistory suggests that the key to much of what is going on in the modern world can be found in biology. This includes political issues such as government stability, democracy, dictatorship, and war. It also covers financial matters such as economic growth, inequality, productivity, creativity, booms and recessions. It has important implications for social issues such as the falling birth rate and loss of community. It touches on mental health problems such as rising levels of loneliness, depression, drug addiction and suicide. It has implications for physical health concerns such as declining sperm count, infertility, and obesity.

The view of the future Biohistory presents is a grim one. On present trends we are faced with falling populations and shrinking economies, the end of democracy and order, and a return to the

poverty-stricken world of the past. Similar to what happened to ancient Rome and other civilizations, but very much faster.

Yet, none of this needs to happen. All that we need to do is mimic the effects of food restriction, in a way that does not involve going short of food. In principle, this should not be difficult.

One method would be the use of religious technologies that limit dopamine surges, and thus allow the brain to become more sensitive to dopamine. Actions include rigid control of sexual activity, the suppression of ego and status competition, tight control of children, and avoidance of much of the technology of the modern world, including social media and mass entertainment.

This has been achieved by groups such as the Amish and Ultra-Orthodox Jews, who have retained the high birth rates and stable families of former times. But they have only done this by cutting themselves off from the wider community, including in both these cases use of a secondary language – Pennsylvania Dutch, and Yiddish. In practice, resisting the many temptations of the modern world is simply not practical for the great majority. People can use such principles to improve their lives, but it is unlikely that such efforts could halt the overall decline.

Drugs

A more promising approach is to develop drugs that have similar effects to food restriction, without any need to change people's diet or even behavior. In effect, we would be looking for medical C-promoters.

My research team has begun the search with Ozempic, the weight loss drug which seems to have some of the effects of food restriction. For example, there is anecdotal evidence that the new weight loss drugs reduce interest in smoking, drugs, and alcohol.[799] Controlled trials have also found significant benefits to social functioning and mental health, compared with a placebo.[800] Weight loss drugs can have unpleasant side effects, such as nausea, but tweaking them could be a start.

To screen drugs efficiently, my research team is growing human brain cells in an array of small dishes, using robotics to apply thousands of different drugs. We can then look for epigenetic changes linked to calorie restriction. The best candidates are being tried on rats, looking for changes associated with food restriction, and checking for side effects. Any successful drugs could go to clinical trials in humans, most likely at first for serious conditions such as addiction.

Another approach is CRISPR, a powerful new tool that allows scientists to make precise changes to DNA. It has been used by researchers to cut DNA at specific locations, and remove or replace faulty sections. Recent improvements in the technology mean that CRISPR is being increasingly used to treat human ailments.[801]

One early success has been for the treatment of sickle cell anemia, a condition common to people with African ancestry. It affects the shape of blood cells, preventing them from moving easily through blood vessels. Effects can include blindness, agonizing pain, and an early death. Treatment involves extracting stem cells from the patient, correcting and then replacing them. The result is a massive improvement in quality of life, though unfortunately it is as yet too expensive for general use.

CRISPR can also be used to make epigenetic changes, altering the function of target genes rather than changing or deleting them. This is a low-risk treatment, compared with genetic changes, because epigenetic changes should be fully reversible.

It is potentially a better tool than drugs for mimicking the effects of food restriction. Changes can be targeted to specific areas of the brain, with less danger of side effects. This is especially the case since targeting has improved greatly in recent years, though not yet to the stage where it can be used for humans.[802]

Another benefit is that it could mimic the lasting effects of early life experience. Each gene has multiple targets for methylation, some of which can be triggered in adults, but others only in early life. By modifying all these methylation targets, CRISPR could achieve an especially powerful effect.

For example, we have seen that the Great Depression had a huge impact on people who passed their late childhood in this period, and who later became the parents of the baby boom. This is the age, from late childhood into adolescence, which largely sets the level of adult C. Treatment of adults would have some effect, but a lesser one.

The same applies to increasing infant C, which is set in infancy or passed epigenetically from parents and even grandparents. This seems to be set by the age of 5 at latest, and it is not likely any treatment of adults would have much effect at all.

V, like adult C, could also be increased in adults with the appropriate treatment. This is, after all the effect of rigorous fasting such as Ramadan. A possible approach would be to increase the level of cortisol in baby formula. Breast fed babies have been found to have 40% more cortisol in their saliva, compared with bottle fed babies, which may help improve the stress response and resilience in later life.[803]

Another approach is the use of pheromones. Our experiments have found that rats exposed to the soiled bedding of calorie restricted rats show the physiology and behavior of calorie restricted animals, though to a lesser extent. Analysis of the urine found ten pheromones more concentrated in calorie restricted animals.

Human pheromones differ from those of rats, but we aim to compare sweat samples from calorie restricted people, with those of controls. Any differences could be used to adjust the ambient levels of pheromones, to see if there are therapeutic effects. Even a small boost to C could have benefits, for example, in the treatment of drug addiction.

Medical Treatments

Although a successful C-promoter could have benefits to society, such as increasing the birth rate, it's initial function would be to treat serious medical conditions.

An effective way to raise adult C would be especially useful. High adult C reflects a brain that is sensitive to dopamine, which makes 'surge' activities or substances less attractive. By re-sensitizing the brain, a treatment should help with recovery from any form of addiction, including gambling, alcohol, and drugs such as cocaine.

It should also be an effective treatment for certain forms of anxiety and depression, by promoting family life, social connections, and the ability to find meaning in work. All of these are related to happiness. In effect, it would reduce the level of deaths of despair from suicide, as well as from alcohol and drug abuse. These are all social ills that have worsened in recent decades, as a result of decreased sensitivity to dopamine.

An especially useful treatment would be for severe ADHD, which makes boys in particular unable to concentrate and behave well in school. Current treatments include the use of drugs such as Ritalin, a controlled substance that can have serious long-term side effects, including demoralization and apathy.[804] A C-promoter should act to make work more absorbing, and reduce the attraction of the distracting activities that get in the way of schoolwork.

If taken in late childhood or adolescence, when the brain is most programmable, it should increase long-term educational and career success. Given this, it would quickly give rise to off-label demand, in the same way that drugs licensed to treat diabetes have been found to aid weight loss. A C-promoter should also help people to avoid obesity.

These may all seem extravagant claims, but they simply arise from the expected results of a treatment that mimics the effect of food restriction in making brains less sensitive to dopamine.

Given that V is associated with confidence and energy, a V-promoter should also be an effective treatment for anxiety and depression, with the proviso that too much has the potential to increase aggression.

Perhaps the most interesting potential would be a promoter for infant C, though it would need to be epigenetic unless given to babies. This would likely have no medical value, since the excess of

infant C over adult C is the cause of many of our social ills. But it could have economic significance.

A high level of infant C should be able to wipe out economic disadvantage almost overnight. This could apply to marginalized groups such as aboriginals or native Americans, if such people wished to take advantage. Combined with a low level of child V, it would also have the potential to unleash creativity on a large scale, including in countries that are now chaotic and poor.

Multiple studies have shown that it is character, far more than intelligence, that determines economic success.[805] C promoters have the potential to change character in a fundamental way.

Biohistory also has implications for business. Monitoring sewage should make it possible to predict broad changes in the economy, with falling dopamine sensitivity and rising cortisol indicating a coming recession. Measuring C, and especially infant C, might help businesses select better staff, especially from among people with few formal qualifications.

None of this is to claim that effective C-promoters and V-promoters would solve all social problems. If widely adopted, they would likely cause both populations and economies to surge, putting renewed pressure on the environment. Perhaps the biggest danger of all is that a V-promoter could bring back the passion for war last felt in 1914, but this time with nuclear weapons.

Though the likely effects of a continued fall in C and V, as outlined in the last chapter, could make such a risk worth taking.

Research Projects

Though the main focus of our current research is the development of effective C-promoters, there are a number of projects in progress or planned which would help to advance and possibly modify Biohistory.

We are currently running an experiment which looks at the effect of previous 25% food restrictions on maternal behavior, expecting to see the main effect in the juvenile phase, lesser in the period after puberty, and none in infancy. Maternal behavior would be tested while the mothers were fed unlimited food, to avoid the confounding effect of actual food shortage.

In studying the effect of food restriction and other C-promoters, we will be looking for measures of dopamine sensitivity.

We also aim to develop an animal model for V. This would require a stressor that is significant but short-term and relatively mild, since severe and especially chronic stress tends to undermine V. The effect should be one of building resilience, and likely increasing testosterone.

For this purpose, we have experimented with 50% food restriction of rats for three days, and exposure of young rats to a dominant animal, both of which seem to have a form of V effect. Another possibility is cold exposure.

One difficulty of measuring V is that it should promote small group cohesion and out-group aggression, which is not well measured by looking at individual aggression. One useful experiment would be to apply V-promoting stresses to colonies of rodents such as spiny mice which live in multi-male groups, assessing level of hostility to other groups.

Another possibility is to look for epigenetic differences in remains from European graveyards, expecting also to see indications of higher V in growth periods like the sixteenth century. Once our understanding of infant C and child V has increased, we should also expect to see indications of maximum child V in the sixteenth century and of infant C in the nineteenth century.

A further experiment would be to look for epigenetic differences showing increased V in groups born towards the end of major wars or conflicts. This could be from bodies for earlier wars, such as 1918-19, or from living people such as Chinese born around 1949 or 1972. We could also seek evidence of higher adult C in people who passed their late childhood in bad times such as the 1930s.

Another experiment would be to look for S effects of women in different ethnic groups. Chinese or Indian women, for example, might show higher levels of pupil dilation as a response to infants, compared with Europeans or sub-Saharan Africans.

Biohistory is distinct as a theory of history in that it leads to hypotheses that can be tested in the laboratory, which is a key element of the scientific method. To the extent that any of the above hypotheses are confirmed, the theory is strengthened. If refuted, then weakened. We can also expect changes. For example, is V strongest when conflict occurs before a baby is conceived, during gestation, or in infancy?

As mentioned in the introduction, biohistory is an ongoing project rather than a finished work. Expect further modifications in the light of the ongoing research program. Research updates will be logged at www.biohistory.org and in future editions of this book.

Potential collaborators are welcome to contact me through my personal website jimpenman.com.au, which also contains a digital avatar that has been trained on several million words from my books and talks. In addition, they may subscribe to my monthly newsletter, which contains updates about the research program.

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