

(an English translation of the original work in Chinese)

a Discussion of Modernization

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Chapter 1 Old Problems and the New History

Introduction: *Why was there such a vast disparity between China and the West in the modern era? How could China overcome this disparity? What would China look like after it has caught up, and could it recapture its past glory? Today, by using new historiography, together with economics, biology and other natural sciences as well as studies of China's historical traditions, we can place China's modernization within the context of the entire course of evolving human civilization, which lasted tens of thousands of years. We can thereby come to an unprecedentedly deep understanding of, and provide answers to, these three major questions of concern to modern Chinese. In addition, we can make relatively reliable predictions about China's future based on this understanding.*

Amidst the anguish of their backwardness and of the beating they took during the 1840 Opium War, most Chinese people began to contemplate these three questions: Why was there such a vast disparity between China and the West? How could China overcome this disparity? What would China look like after it had caught up, and could it recapture its past glory? To this day, these three questions continue to bedevil the minds of the Chinese people, and they have been constantly explored by elites from various circles.

Beginning around the same time approximately 250 years ago, Western elites, who had moved ahead during the same historical period, began to ponder the causes behind this new world situation. The West was already far ahead of other regions in the world, and over the next 200 or more years, the advantages of this lead resulted in the rapid formation of the West's global dominance. Why was the West able to rule the world? Can such rule continue?

While these issues of East and West appear to invoke opposite emotional responses to different group of people, they are in fact two sides of the same matter. The waning of the East and the dominance of the West during the past 200 or more years has consistently been a core concern for world elites from various walks of life both in China and the West. All sorts of theories and doctrines have emerged on this subject, but to this day a consensus has yet to be achieved. Existing theories seem limited both in their ability to explain history and to predict the future. Their greatest commonality is the relatively short historical interval they look at: some go back a hundred years, others at most a thousand years. This field of historical vision is still too narrow. The statement of Li Hongzhang (one of the most important Chinese politician, general and diplomat of the late Qing dynasty) in 1840 that China was facing "changes unseen in three thousand years" was indeed a profound insight about history. Yet until the modern age, people studied history primarily through written records. Writing has existed in the West for 5,500 years and in China for 3,300 or more years. Written historical records cover less than one percent of mankind's entire evolutionary history, which is clearly insufficient for tracing and interpreting the entire course of human evolution. Moreover, traditional historiography itself has biases and limitations. Merely relying on the perspectives offered by written histories will not allow us to fully answer the above questions.

Fortunately, traditional historiography has been fundamentally transformed over the past several decades, as a series of breakthroughs

in scientific disciplines have provided completely new tools which enable us to understand a much longer span of history.

Radio carbon dating was officially discovered in 1949. This technology allows us to use the half-life of carbon isotopes to date an object with relatively high accuracy. Combined with genetics, this new technology has made possible a quantum leap forward in studying the history of the era before the appearance of written languages. Ever since, relics which have been continuously unearthed all around the world have become archeological evidence even more important than written records.

Since the 1950s, the discovery of DNA's structure led to a period of rapid development in biology which hastened the births of disciplines such as molecular biology, genetic biology, and evolutionary biology. The integration of these with other disciplines allowed scientists to have, for the first time, a relatively comprehensive understanding of human evolutionary history itself. In 2012, biologist E.O. Wilson formally suggested a complete theory of human origins, which he published in his work *The Social Conquest of Earth*. This was one of the greatest developments in the study of human evolution since Darwin.

In 1919, the Serbian geophysicist Milutin Milankovitch proposed Milankovitch cycles. This theory was finally verified in the 1970s, and it was mathematically proven that the centrifugal force related to the earth's angle of rotational axis and its precession influenced the distance between the earth and the sun. This creates long-term major cycles in the earth's atmosphere, each lasting approximately 100,000 years. This theory helped people to understand for the first time the cause and timing of the ice age, as well as to predict when future ice ages would occur within a major cycle. In 2004, scientists drilled a two mile deep hole at the South Pole, and from the ice sheet formed by snow accumulated over many years they collected climate data from the past 740,000 years, as well as data on the impact of human activity on the

atmosphere during this period. These data also recovered some of the traces left by human activities in the atmosphere over the past tens of millennia.

In 1987, scientists led by American geneticist Rebecca Cann came to a conclusion that astounded people at the time: all females share a common ancestor who lived in Africa. She was called the African Eve, and was born approximately 200,000 years ago. This conclusion has since been continuously verified by various studies, but the time during which Eve appeared has been pushed forward to approximately 150,000 years ago. Soon thereafter, scientists also discovered the African Adam, the ancestor of all males. This major discovery proved that all present-day humans originated from the same ancestors. In any large groups, human traits such as intelligence, diligence, creativity, and altruistic tendencies show extremely similar distributions. This conclusion posed a huge challenge to traditional views and shattered any theories which took racial or cultural differences as the basis to explain the superiority of either the West or East.

It was the major developments in various disciplines which laid the groundwork for the appearance of the new historiography. The new historiography is a methodology which constructs a new interdisciplinary interpretation of humankind's long history by utilizing cutting edge scientific developments in various fields. Its great breakthrough is its ability to study much earlier periods in history without the limitation of only using written records.

Biologist and geographer Jared Diamond might be called the first person to use the new historiography. In his 1997 publication *Guns, Germs, and Steel*, he was the first to point out the decisive impact of geographical location on human historical development by tracing the origins of agriculture. Not only did his research look back over the past 10,000 years of human history, but it also for the first time fully, powerfully and

accurately explained why Europe thoroughly conquered the Americas in the sixteenth century. Just as the discovery of the New World and the conquest of the Americas had epochal significance in the course of human history, so too were Diamond's discoveries and this book a major breakthrough in the field of historiography.

Another practitioner of the new historiography is archeologist, classicist, historian, and Stanford professor Ian Morris, who used existing scientific tools to depict the basic evolutionary trajectory of human civilization over the past tens of thousands of years. He discovered the patterns of human development, used these to explain the disparity between East and West in the modern era, and predicted the future of human society. Morris provided the best answers to these questions in his 2010 work *Why the West Rules for Now*, and its 2013 companion work *The Measure of Civilization*. By using Morris's method of quantitatively measuring the basic trajectory of civilization, and adding to this more economics, biology, and other natural sciences as well as studies of China's historical traditions, we can place the issues of China's modernization into the context of the tens of thousands of years of the entire history of the evolution of human civilization. By doing so, we can gain an unprecedentedly deeper understanding of the three major questions of concern to the Chinese people in the modern age mentioned at the beginning of this chapter, we can better provide answers to them, and based on this understanding, we can make relatively reliable predictions about China's future.

I, the author, was born in China in the 1960s and have over twenty years of life experience both in China and the United States. My interest in issues of China's modernization started at a young age and has lasted for more than thirty years. My work in investments over the past twenty-odd years has added an occupational need to predict China's future, and during this time, I have been able to accumulate some knowledge and ideas. This series of "Discussions of Modernization" is a record of my

musings over the past thirty some years, and I hope they will inspire others to come up with even greater ideas on the topic. This series will start by primarily looking at the results of Jared Diamond and Ian Morris' studies and integrating them with some of my personal views and interpretations. Next, from a Chinese perspective, I will analyze quantitative charts compiled by Professor Morris's team covering some 16,000 years of human evolutionary history, describe the major stages of human development, and point out the rules of this development with a focus on the genesis of modernization. Then I will focus on the nature of modernization and China's path to modernization, and predict the future of China. The contents of this section will consist predominantly of my own humble opinions. Finally, I will touch on the impact of China's modernization on the West and explore the common future of the human race.



Chapter 2 The Trajectory of Human Civilization

Introduction: *The West had a continuous lead over the East from roughly 14,000 BC to 500 AD. Then, around 540s, the East overtook the West and maintained its superiority until approximately 1770s, thus holding a lead over the West for more than 1,200 years. However, not only did the West catch up with the East after 1800 AD, it also entered into a period of rapid development and widened the gap between West and East until the West ruled the entire world. The social development index of the East also started to rise in the twentieth century. Today, while it is still far behind the West, there are already signs that the East is capable of pulling even. This is the trajectory of human civilization in the East and West over the past 16,000 years.*

Practitioner of the new historiography and Stanford University Professor Ian Morris proposes a quantitative method for measuring the long trajectory of human civilization. Morris refers to his quantitative method as his Social Development Index, which is a measure of a society's ability to get things done. A society is made up of people, who like animals must consume energy. According to the Law of Conservation of Energy, a society must first have the ability to capture and use energy in

order to get things done. Therefore, the most important index for measuring the degree of social development is the ability to capture energy and use it. Morris divides the ability of a society to capture and expend energy into four traits: energy capture per person, social organization, information technology, and war-making capacity. Energy capture refers mainly to the ability of each member of a society to capture sufficient food, fuel and raw materials on a daily basis. Social organization is defined as the population of the largest permanent dwelling unit in a society; over a fairly long period this would be the population of the largest city, since the larger the population, the greater the need for social organization. Information technology is one of the most critical types of energy consumption for man. Every day, members of a social organization must exchange, store and remember various types of information, so such information technology is one of the most important ways in which people use energy. It goes without saying that warfare is an important source of human energy consumption. While these four traits do not constitute all of human activity, they are the most representative forms of human energy capture and consumption. More critical is the fact that these four measures can be compared across societies, and they can be longitudinally compared over long periods of time as well. Because the entire history of human evolution is in fact the history of energy capture and energy use, social organizing, the formation of population centers, the exchanging of information and war-making are also the most important activities of human society.

In considering his quantitative method, Morris chose to use the way how indices were composed and computed. He took 14,000 BC as the starting point and 2000 AD as the end point for the time period to be covered. A total score was assigned to each of the four aspects, with the score for the year 2000 AD set at 1000, evenly divided among the four. With the year 2000 AD representing the highest level of development in the West, the highest possible score for each social development index is

250. For example, in 2000 AD, the average daily per capita energy capture in the United States, the most developed region in the West, was approximately 228,000 Kcal. That same year, the average daily per capita energy capture in Japan, the most developed region in the East, was approximately 104,000 Kcal. Based on this ratio, if the United States had a score of 250, Japan's score would be 114. This method is used for all subsequent calculations as well.

The farther back we reach into time, the more difficult it is to obtain such data. However, in the early periods of human history, the rate of increase for these four indicators was very slow. Furthermore, in comparison to 2000 AD, the scores for social organization, information technology and war mobilization abilities were close to zero for a very long period in the early development of humans. Therefore, the indicator for measuring social development in earlier periods is in fact the ability to capture and expend energy. The intervals for taking measurements can be widened for earlier periods. For example, data is collected for every 1000 years for the period from 14,000 BC to 4000 BC, as there was little score variation for this period. Data is collected for every 500 years for the period from 4000 BC to 2500 BC because more data was available then. For the period from 2500 BC to 1500 BC, data is collected for every 250 years, and for every 100 years for the period from 1500 BC to 2000 AD. In the modern age, scientists are fully able to precisely collect data for each year or even each month. However, in order to estimate data relatively accurately for this entire 16,000 year period, we must supplement it with achievements in archeology, meteorology, physics and biology from the past several decades.

Morris defines the objects of his measurements as follows: the two westernmost and easternmost major cores of human civilization which appeared in Eurasia after 9600 BC, a time during which agricultural civilization was forming, and the various cores of civilization which succeeded these two. Because the major cores of Eastern and Western

civilization also varied at different historical stages in history, he chooses the most advanced regions of East and West of their time. For example, in the West, it began with the Hilly Flanks near the Euphrates and Tigris river basins and the Jordan River. Subsequently, the Western core shifted to Mesopotamia, Syria, Egypt, the Mediterranean, and Rome. It then moved to the Balkans, and thence to the Mediterranean, Southern Europe, Western Europe, and finally to the United States. The center of eastern civilization originated in the basin of the Yellow River and advanced into the alluvial plain between the Yellow and Yangzi Rivers. It then moved to the Yangzi River basin. In the twentieth century, it shifted to the southeastern coastal areas of China and to Japan, and was represented by Japan around 2000 AD. Because these four social development indices are highly applicable to both East and West, the same data can be used to measure long periods of human history.

It is worth noting that much of the data for prehistoric records has to be estimated. Therefore, archeological discoveries are an important source of information. Archeology is a new academic discipline. Stratigraphy, an approach now widely employed, was not utilized until 1870. After 1950, scientists began to use carbon dating, which led to substantial rapid advancements in archeology. Since the 1970s, people have gradually acquired systematic knowledge about prehistoric records.

Through great efforts, Morris and his team plotted a series of charts using the social development indices. These charts can help us gain an intuitive understanding of the historical trajectory of human social development in the East and West.

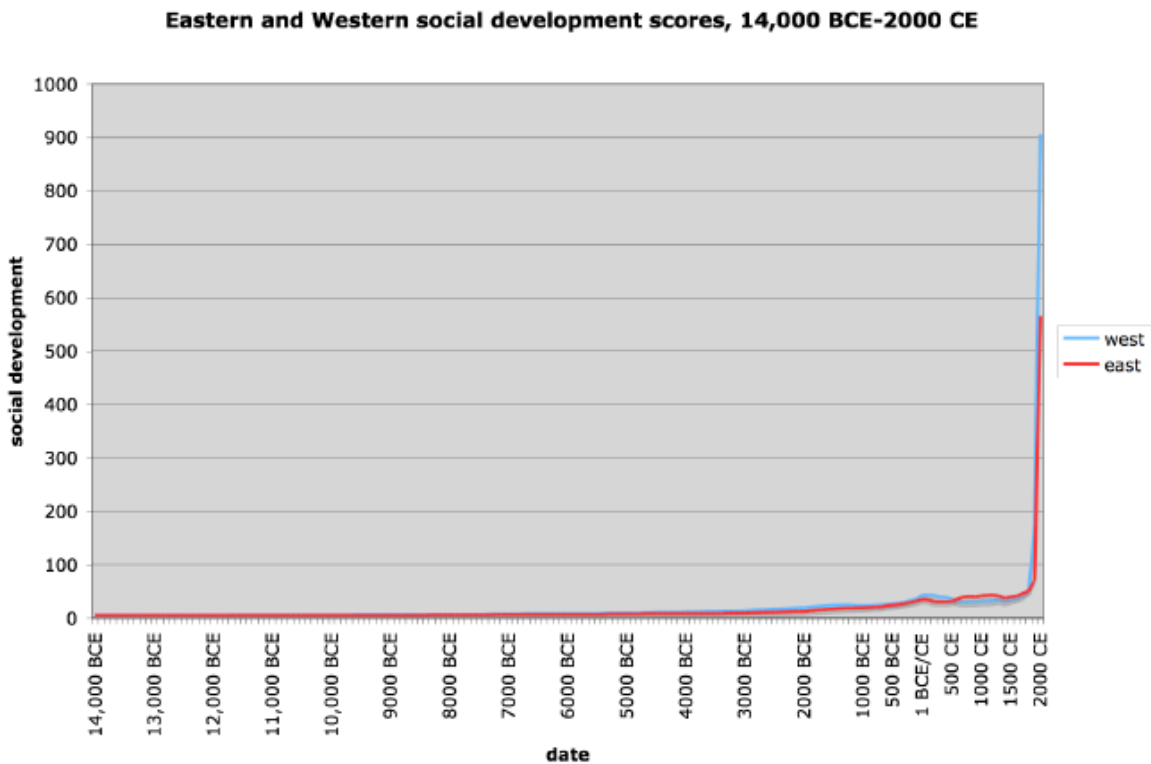


Figure 1: Human Social Development Indices for the East and West (14,000 BC – 2000 AD)

Source: Ian Morris, *Social Development* (2010)

First, from Figure 1 we can see that until approximately 3000, BC there was almost no discernible difference in development between the West and East. Although there are some changes in the curves of both sides after this point, these only occur very slowly. However, after 1800, there is a fundamental change in the entire chart, as the trajectory of social development shows explosive growth. Next, without affecting the validity of his data, Morris performs a logarithmic function on the previous charts. The results are shown in Figure 2, which allows us to more clearly compare East and West.

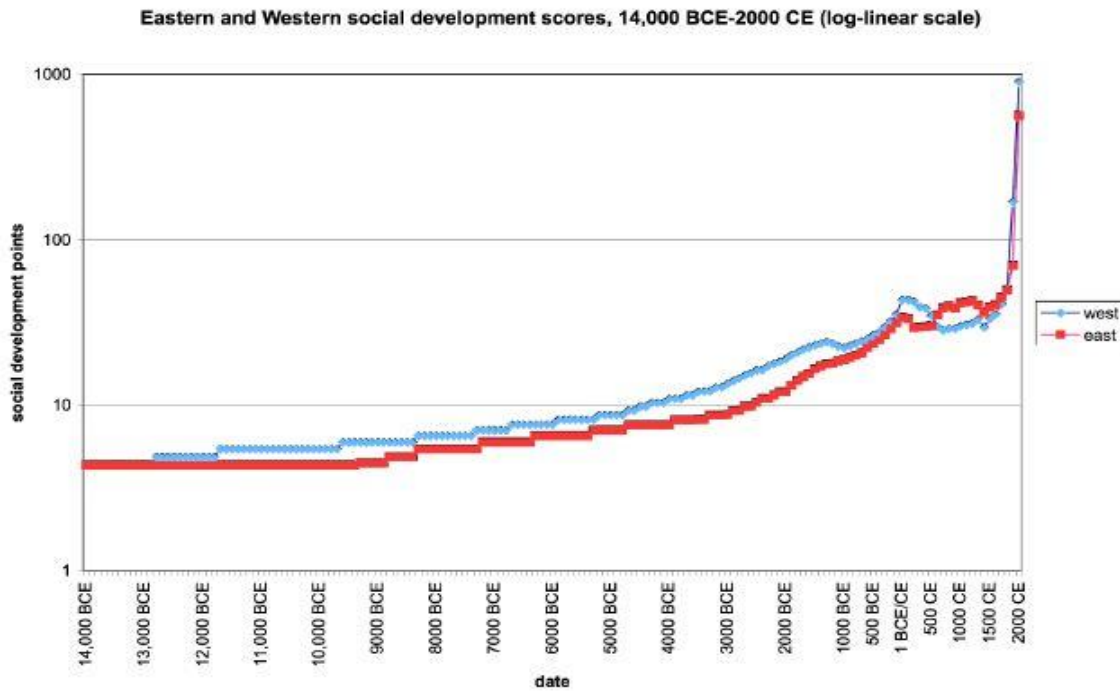


Figure 2: Linear Logarithmic Model for Social Development Indices of the East and West (14000 BC—2000 AD)
 Source: Ian Morris, *Social Development* (2010)

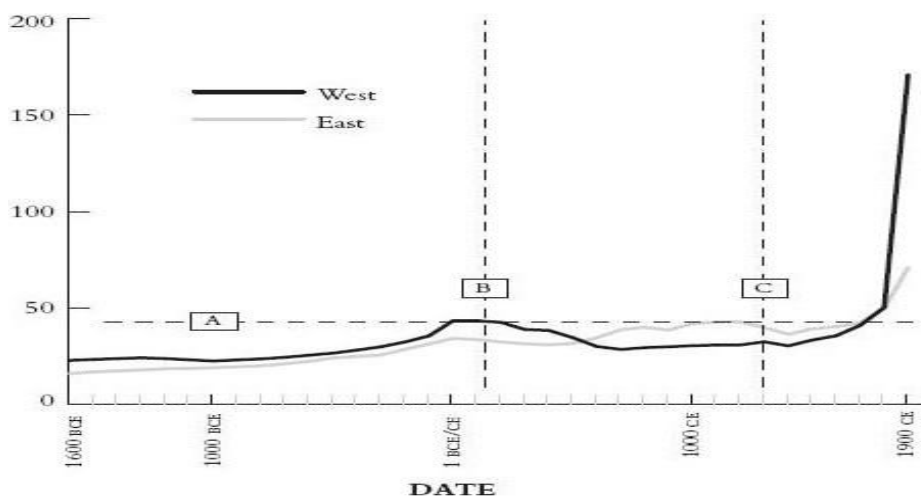
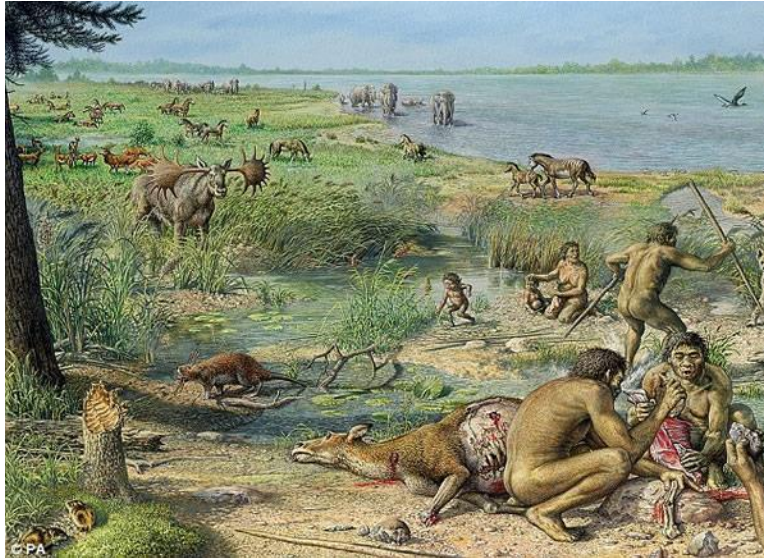


Figure 3: Social Development Indices for the East and West (1600 BC—
1900 AD)

Source: Ian Morris, *Why the West Rules – For Now* (2011) P168

Let us now look at this chart which covers the period from 1600 BC to 1900 AD. This is a period for which there are relatively clear written records and with which people are relatively familiar. Combining this chart with figures 2 and 3, we can see that the West was ahead of the East all the way from approximately 14000 BC to 500 AD. Then, in approximately 540s AD, the East began to catch up with the West and maintained its edge until approximately 1770s AD. During these 1,200 years, the East was ahead of the West. However, from 1800 AD on, the West not only caught up with the East, it was also first to enter a period of ultra-rapid development which widened the East-West disparity into Western global dominance. The social development index of the East also started to rise very rapidly in the twentieth century, and while it is still far behind the West at present, there are already signs that the East can catch up with the West. This is the trajectory of human civilization in the East and West over 16,000 years.

The subsequent chapters in this series will focus on explaining the causes behind the trajectory of human civilization, the differences and similarities in the development of Eastern and Western civilizations, the reasons for the explosive development of society after 1800 AD, and a comparison between East and West. I will then go on to explain why the West was able to rule the world in the modern era and why China was backward in this era. Only with such a fundamental understanding of history's broad patterns and their causes can we answer the question of how China can catch up with the West, sum up the features of China's modernization and anticipate the future of both East and West.



Chapter 3 The Evolution of Human Civilization from 1.0, 2.0 to 3.0, and the First Great Leap forward of Human Civilization

Introduction: *Based on differences in the methods of production of human beings in different time of history, I have divided the development of human society into three stages: hunter-gatherer civilization, or Civilization 1.0; agriculture (farming and animal domestication) civilization, or Civilization 2.0; and the science and technology civilization following the industrial revolution, or Civilization 3.0.*

Over the course of dozens of millennia from 60,000 BC to 12,000 BC, humans ventured out of Africa and eventually occupied lands all the way to the southern tip of South America. Without knowing anything about their destination or the future, generations of humans showed stubborn determination in crossing glaciers and oceans, advancing at a speed of one mile per year into every corner of the earth. At this time mankind's primary tools were stoneware, and the main mode of transportation was man's two legs. They were hunters and gathers, organized in very small bands. Even today, I'm still in awe and inspired when I think of the long journeys our ancestors undertook.

Ian Morris's Social Development Index charts clearly show a continuous trend of rising in the trajectory of evolution of human civilization, while variations in curve amplitudes indicate different rates of rise during different periods. Society keeps developing amid constant fluctuations in the curves, and there are different patterns of fluctuation in each phase of history. We can see that human social development always maintained an upward trend, but different phases had different paces and each had its own distinctive features. Therefore, I believe that in order to better understand the course of evolution of human civilization, it is necessary to divide it into different stages and analyze each of them separately.

Here I define civilization as the sum total of achievements produced by people in the course of their own survival and development, using their own resources and the resources of their environment. The intent is to measure how far people have moved from their closest animal ancestors. It is easy to confuse *Civilization* with the separate concept of *Culture*, which refers to the distinct ways of living, habits and beliefs of people living in different places, which were formed over ages. *Culture* can be used to distinguish various groups of people from different regions, whereas *Civilization* can be used to describe what is universal to human development and what distinguishes human from their animal ancestors.

In the long flow of human history, industrial civilization marked the beginning of a new stage, as did the arrival of agricultural civilization. Prior to the emergence of agricultural Civilization, mankind's primary means of production was hunting and gathering. In this essay, I have broadly divided the development of human society into three stages, based on the different means of production used in each: hunter-gatherer civilization, or Civilization 1.0; agriculture (farming and animal domestication) civilization, or Civilization 2.0; and the scientific and technological civilization pioneered by the industrial revolution, or Civilization 3.0.

It would be a misunderstanding to think that there was little change in mankind's ability to capture and use energy throughout the period of Civilization 1.0. In fact, there was a great leap forward some 70,000 years ago, not in the way of how human captured and consumed energy but where they did so.

To understand the unique characteristics of humans, we must first understand the environment in which they lived. To our best knowledge today, the Earth has a history of 4.5 billion years, but living creatures only have one of 1.5 billion years and Homo sapiens only have one of 150,000 years. The natural environment has a crucial impact on all living creatures; and in particular, climate is the one with the greatest impact.

Approximately 50 million or more years ago the earth's climate underwent a profound transformation. Continental drift during this period caused most continents to move into the Northern Hemisphere while the Southern Hemisphere was essentially covered by oceans. Another change occurred 14 million years ago when the volcanic activity which formed continental shelves basically ceased, accompanied by a decrease in the Earth's temperature. This resulted in year-round snow cover at the South Pole, In contrast, because there was no continental shelf at the North Pole, snow there melted relatively easily, and it was not until 2.75 million years ago that a year-round snow cover was formed there. Within this greater context, Milankovitch cycles began to exert a cyclical influence on the Earth's climate. The Earth does not revolve around the sun in a perfect circle. Rather, its path is often elliptical due to the gravitational pull of other planets. In addition, the rotational course is often tilted, and there is precession in its rotational axis as well. Because of the impact of these three factors, the Earth's climate experienced three major cycles of every 26,000, 41,000 and 96,000 years. These cycles created variations in the amount of solar

thermal energy reaching the Earth and produced glacial and interglacial periods in the climate.

There have been forty to fifty ice ages in the course of history of the Earth, with the two most severe occurring 190,000 years ago and 90,000 years ago. These periods played a decisive role in the origin and early development of humans. During the most severe ice age, Arctic Ocean glaciers alone covered the northern regions of Europe, Asia, and the American continent. Most of the planet's surface water was absorbed into glaciers and the Earth became extremely dry, with sea levels 300 feet lower than at present. Furthermore, sunlight was refracted back into the atmosphere, thus lowering air temperatures. As the number of plants and animals declined, greenhouse effect-producing carbon dioxide decreased as well, and temperatures dropped even further. Homo sapiens, the ancestor of modern humans, appeared approximately 150,000 years ago. The harsh climate of this period meant Homo sapiens could only live in extremely limited areas of Africa near the equator. The vast majority of geneticists and archeologists believe that at one point the total human population dropped to approximately 20,000, and there was no sign that humans would later conquer the Earth. This was the darkest period in human history.

However, approximately 70,000 years ago, human fortunes changed for the better when the Milankovitch cycle was reversed. Eastern and Southern Africa started to become warmer and moister, providing humans with better natural conditions for hunting and gathering. The increase in food sources was accompanied by a rapid population increase. It was at this time that humans, as a unique species, began to display true superiority.

As soon as humans appeared, they demonstrated considerable differences from other animals, and even from the anthropoids who were most closely related to them. This distinction was not fully manifested

before the climate started to warm, but once the climate created favorable conditions, humans began to display their great advantages. Compared to other animals, the most unique trait of humans is their enormous brain size and exceptional ability to calculate. Although the brain accounts for only 2% of human body weight, it uses 20% of her total energy. If humans could be born only after their brain had completely matured, their mothers would be utterly unable to give birth. This problem was solved by human babies being born prior to the maturation of their brains. In this regard they are different from all other mammals. Cattle, horses, sheep, lions, and tigers all can independently stand, grow, survive, and even hunt for food soon after birth. However, newborn humans are still far from maturity and from being able to survive independently. They require a number of years of growth before they can stand, walk, and talk, and before their brains fully mature. This is why the infant mortality rate is high for humans, yet after maturity their advantages become considerable. After the climate became favorable to living creatures, human superiority became particularly evident. This superiority was fully demonstrated in the first major leap of human civilization when humans ventured out of Africa.

As a result of both climatic change and the impact of their living environment, our ancestors traveled out of Africa and left behind their familiar habitat to face new and completely different ones, thus opening up new possibilities for our collective survival and development. This major advancement in civilization demonstrated the unique initiative and intelligence of humans as opposed to other animals. Starting in 60,000 BC, humans departed Africa from Somalia and went to Arabia and Eurasia. They then traveled from northern Africa to Europe, from Eurasia to eastern Asia, from southern Asia to Australia, from Eurasia to North America via Alaska, and from North America to South America.

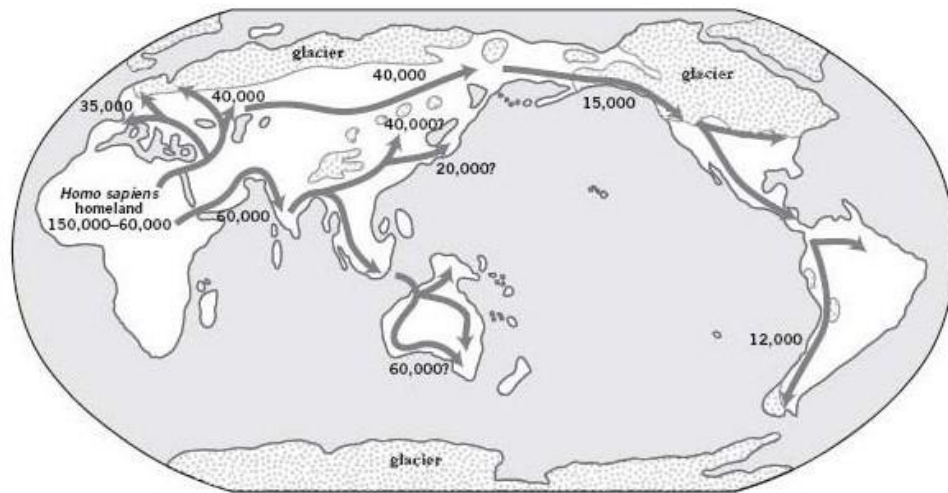


Figure 4: Times and Path Out of Africa-His Footsteps and the Times at Which Man Arrived in Various Areas

Source: Ian Morris, *Why the West Rules – For Now* (2011) P168

Figure 4 provides a general overview of the path of human migration during this period. In approximately 40,000 to 50,000 years, humans had essentially spread across the entire globe. As the climate continued to warm, more vegetation and animals started appearing in a greater number of areas, thus providing humans, who relied on hunting and gathering for existence, with the ability to survive in various regions around the world. Although Nature provided the same conditions to all types of living things, not all creatures had the strong initiative of humans, which allowed them to overcome so many hardships and move to all parts of the globe. Even today this journey is stunning and almost unthinkable. Try to imagine our human forebears of this period crossing glaciers and oceans and, without any understanding of the future or of their destinations, taking over the entire globe with dogged

determination, one generation after another. Over the course of tens of millennia from the period between 60,000 BC and 12,000 BC, people ventured out of Africa and ultimately all the way to the southern tip of South America, spreading across the entire globe at an average speed of one mile per year. At this time mankind's primary tools were stoneware, and the main mode of transportation was man's two legs. Agriculture and animal domestication did not even exist during this period. Humans could not rely on animals for their livelihood, nor did they possess any other tools. They had to rely on hunting and gathering along the way, and also by organizing into very small bands as they ventured ahead. Even today, I'm still in awe and inspired when I think of the long journeys our ancestors undertook to get us where we are.

The problem of whether *Homo sapiens*, which ventured out of Africa, was the ancestor of (modern) human beings was a contentious issue in academia until it was ultimately solved in the 1990s. In 1987, a team led by geneticist Rebecca Cann was the first to come to a groundbreaking conclusion. Through a global study of mitochondrial DNA which is only found in females and which can only be passed on by females, Cann came to the following conclusions: first, there is greater human genetic variation in Africa than in any other region; second, all human genetic variations in other regions of the world are derived from variations found in Africa; and third, the earliest mitochondrial DNA found by scientists originated in Africa. These three discoveries led to an inescapable conclusion: (everyone around) the entire world shares a common female ancestor who resided in Africa and is referred to as the "African Eve." Many subsequent studies have confirmed Cann's discoveries to varying degrees, except they have moved forward the time of Eve's appearance to approximately 150,000 BC. In the 1990s, by examining Y chromosomes which can only be passed down through the DNA of males, other geneticists came to an almost identical conclusion: namely, the common ancestor of all human males also lived in Africa,

and is referred to as the “African Adam.” Therefore, by the 1990s the controversy over whether Homo sapiens was the ancestor of (modern) humans was settled. All people today share a common ancestor, the Homo sapiens which ventured out of Africa and left its progeny all over the world. All other ape-men and anthropoids became virtually extinct within several tens of thousands of years after humans ventured out of Africa.

After leaving Africa, humans left traces of their civilization all along their journey. Among the most famous is the Altamira cave painting from 18,500 years ago. The level of artistry of this cave painting is astounding. It is so richly creative that after viewing it, Picasso lamented “after Altamira, all is decadence.” He felt that after this wall painting, all works were a step backwards.



Figure 5: Altamira Cave Painting
Source: Wikipedia Page for Altamira Cave

All the archeological discoveries along the routes taken by humans as they spread across the globe attest to their creativity and wisdom. This is the case with paintings and the styles of stone implements as well as with women's ornaments. Although the earliest humans only hunted and gathered and did not seem very different from other anthropoids, they displayed great drive and creativity. No other animals, not even the other anthropoids crossed glaciers and oceans and occupied every corner of the globe within a short period of tens of millennia as humans did. Nor did they leave behind their imagination and creativity everywhere they went. This determination, drive, search for meaning and expression through art was absent in all other anthropoids. The strong initiative and superb intelligence of humans shown from this time on made Homo Sapiens destined to be different from all other species ~ that had come before.

While their way of living did not change drastically after going all over the world from Africa , the number of humans rose rapidly from the earliest population of approximately 20,000. More important was the distribution of this population throughout the entire globe. Humans were already prepared to take advantage of the new opportunities for development presented to living creatures when the global climate started to change. Therefore, this journey out of Africa allowed human civilization to make its first great leap and greatly reduced the possibility of extinction. Genetic diversity and adaptability increased greatly, and humans began to search all over the globe for the living conditions most conducive to development. By the time such conditions appeared in some regions of the globe, the ability of humans to take advantage of them was already fully formed, and a solid foundation for great new advances of civilization had been laid.



Chapter 4 The Birth of Agricultural Civilization

Introduction: *There was a great disparity in the extent to which farming and animal domestication appeared in various regions throughout the globe, and this was primarily because the regions in which wild strains of domesticable plants and animals were found were not widespread and even less evenly dispersed. The world's two most advanced civilizations of today developed from the two most fortunate regions most suitable for agriculture, one in the Southwest Asian and Middle Eastern regions, and the other in the Yangzi and Yellow River basins of China. The concept of East and West also emerged during this period. Agricultural civilization spread either through colonization by advanced civilization, or by peoples living in areas with less developed civilization learning new production methods through imitation. Regardless of how it spreads, a new civilization would ultimately reach all areas around the world, and the way of living of different human races gradually grew more alike.*

The last ice age of the Earth ended in approximately 20,000 BC. Sea levels started to rise as melting glaciers flowed into the ocean. They continued to melt until 14,000 BC. By approximately 12,700 BC,

atmospheric temperatures rose back to within a few degrees of modern day temperatures. This temperature was particularly suited to the survival of plants and animals. The number and variety of animal and plant species increased rapidly on the planet. For our ancestors, who hunted and gathered for their living, there was also naturally a great increase in the number of food sources. From 18,000 to 10,000 BC the Earth's total human population increased from less than 500,000 to more than ten times. We may say that from this time on, humans started to inherit the Earth and receive the gifts it bestowed on them.

While the warming climate was a great gift to humanity, the blessings enjoyed by people living in different geographical locations varied. The most fortunate lived in the "lucky latitudes" located in the regions from 20° north to 35° north in Eurasia, and between 15° north and 20° south in the Americas. After 12,700 BC, various wild grains started appearing in both eastern and western Eurasia. These grains possessed very large kernels. Therefore, for each calorie spent on gathering these grains, humans who ate them obtained a return fifty times greater. Due to this abundance of food, the size of human communities started to expand and cores of civilization gradually formed. Soon it was at the Hilly Flanks, the most advanced region of the "lucky latitudes" which was located on an arched foothill between the Tigris and Euphrates River basins and the Jordan River, where the second great leap of human civilization first took place.

Today we may surmise that this great advance in civilization may have been due to the food-gathering experiences of women. While picking fruit they thought about whether or not harvests would become more predictable if they planted the wild fruit in fertile ground. Archeologists have increasingly found more evidence proving that humans started to grow plants during this period, and they gained a greater understanding of an array of agricultural activities including selecting and hybridizing species of superior quality, using fertilizers, and weeding. This signified

the emergence of modern agriculture, as the crops produced by these activities were no longer the primitive wild variety, but had a type of interdependent relationship with humans. A similar process led to the emergence of animal domestication, as animals were gradually tamed for human purposes. Humans first reared wild animals in captivity. They then bred the animals, selectively mating those of superior quality and artificially feeding newborns. This continued until these domesticated animals could no longer survive independently in the wild and had to become interdependent with people.

There was a great disparity in the extent to which farming and animal domestication appeared in various regions throughout the globe, and this was primarily because of vast differences in geographical environments and natural resources. Biologist, geographer and historian Jared Diamond first discovered the decisive role geography played in agricultural civilization. He pointed out that there are approximately 200,000 unique plant species in the entire world. Only almost 2000 of them are edible, and approximately only one or two hundred of these can be domesticated. Today, half of human energy capture comes from grain, primarily wheat, corn, rice, barley and sorghum. However, the original wild strains of these grains were not broadly spread throughout the globe, and were even less evenly distributed. In nature there are a total of 56 edible wild plants with large kernels and high nutritional value. There were 32 strains in the Hilly Flanks of Southwest Asia, six around East Asia and China, five in Central America, four in Sub-Saharan Africa, four in North America, two each in Australia and South America, and only one in all of Western Europe. Therefore, the probability of agriculture emerging in the Hilly Flanks far exceeded that of other regions.

The situations were similar for animal domestication: there are 148 species of mammals which weigh more than 100 pounds. By 1900, only 14 species had been domesticated, and seven of these were (originally)

wild species native to Southwest Asia. Today the five most important domesticated animals in the world are: sheep, goats, cattle, pigs and horses. With the exception of horses, all of the original strains of these animals were found in Southeast Asia, five of them in East Asia, and only one in South America. None of these species were found in North America, Australia, or Sub-Saharan Africa. Even though there are many animals in Africa, the overwhelming majority of them, such as lions, giraffes and others, are not domesticable. Thus, in terms of the distribution of agricultural resources, the Hilly Flanks area was the most fortunate region, followed by the Yangzi and Yellow River basins in China. While the latter were not as fortunate as the former, they still had the second best natural resources in the world. Conditions in other regions of the world were far inferior to these two.

In reality, the very emergence and dissemination of agricultural civilization was very closely connected with natural resources. Agriculture started to emerge in the Hilly Flanks region in approximately 9,600 BC, and it appeared in China in 7,500 BC. Agriculture basically did not appear in Australia, and it also developed much later in the Americas. An indigenous plant from the Americas called teosinte was corn's wild ancestor. Dozens of generations of genetic mutations were necessary for the breeding of teosinte into corn. There were also no domesticable native animals in the Americas, so natural conditions for the beginnings of agricultural civilization on the continent were extremely scarce. Another factor which caused agricultural development to lag behind in the Americas was the continent's geographical isolation. Human ancestors first crossed a land bridge from Eurasia to the American continent in 15,000 BC. Yet by 12,000 BC, the American and Eurasian continents were separated by an ocean, making it impossible for agricultural civilizations which emerged in Eurasia to spread to the Americas. Therefore, natural conditions for the development of agricultural civilization were very poor on the entire

American continent, and it also could not interact with other regions which had achieved agricultural civilization. In Western Europe natural conditions were likewise very poor. However, because traffic between it and the Middle East was relatively unobstructed, agriculture had spread to all of Western Europe by approximately 4000 BC. In Asia, agriculture originated in China in 7500 BC and was disseminated in all directions. It was introduced into present-day Southeast Asia and then spread to Korea and Japan in 1500 BC, basically covering all of (East) Asia.

Competition arose when agricultural populations entered a region where hunting and gathering was still the means of production. Agriculture was itself an advance in civilization. The energy capture and use of agriculture societies, as well as their ability to organize, far exceeded that of civilization 1.0. Once these two disparate civilizations clashed, it was inevitable that the advanced civilization would subjugate the more backward one. One manner in which civilization was spread was colonization by the more advanced culture, while another was the imitation and learning of new methods of production by people living in regions with more backward civilizations. Regardless of the manner of dissemination, new civilizations ultimately spread all around the world, and the lives of different peoples gradually grew more alike. The ancestors of about 20-25% modern Europeans came from the regions of Southwest Asia or the Middle East where agricultural civilization first appeared. No similar specific calculations have been done for Asia, but I believe that regardless of whether we use ethnographic surveys of Asian peoples or whether through direct observation, the ratio of those descended from Chinese ancestors would be similar.

Although the great majority of human traits are alike, the patterns and rates of development during the great advance of civilization 2.0 differed between regions because of variations in their natural conditions and whether they had the opportunity to interact with this new civilization. On the one hand, geographic location determines the natural conditions

of a region; on the other hand, it also determines whether it has opportunities to interact with advanced civilizations, and it therefore creates disparities in development between various places.

The greatest civilizations of our age descended from the two most fortunate centers: one in Southwest Asia and the Middle East, and the other in the Yangzi and Yellow River basins of China. The concept of East and West also emerged during this period, and geographical location had become extremely important ever since the appearance of agricultural civilization. The course of development for all regions which could interact with others was extremely similar. The manner, rate and path of development, as well as the rate at which civilization was disseminated, were very alike whether in the Hilly Flanks, China, or Europe. For example, the sequence in which certain phenomena appeared among different groups of people, such as planting, seed breeding, the emergence of large villages, the raising of livestock, the restructuring of ways of living and family organizations, ancestor worship, the emergence of pottery, and the formation of religious ceremonies, was extremely similar. While different living habits and cultures appeared in different regions, in terms of the development of civilization itself, given enough time, advanced civilizations were always ultimately disseminated to every possible location through colonization, imitation or assimilation. Therefore, by approximately 1500 BC all of Asia, the Middle East, the Mediterranean region of northern Africa and Europe had already entered the era of civilization 2.0. Due to inherently inadequate natural resources and geographical isolation, Americas and Australia didn't independently develop agriculture. They were basically still in civilization 1.0. While limited forms of animal domestication emerged in Sub-Saharan Africa, farming could not develop because of the constraints of geographical conditions.

Agricultural civilization's origins, genesis, development and dissemination were all intimately linked to a region's geographical

location. Both the initial natural conditions and the ease with which a region could interact with other centers of civilization determined the timing and extent of the development of agricultural culture there. Africa's geographical conditions near the equator allowed for the birth of the human race to occur there, and global warming enabled civilization 1.0 to develop in almost every region of the world. However, once civilization 2.0 arrived, the geographical conditions which favored civilization 1.0 were no longer necessarily advantageous, and even became unfavorable in many places. The conditions which had been favorable for the development of civilization 1.0 in Africa and the Americas became the greatest barriers to civilization 2.0. Civilization 2.0 naturally developed more rapidly in places with comparatively good conditions for agriculture, such as the Middle East and Southwest Asia. They had a great advantage from being in the forefront for 2000 years. However, this advantage was not permanent. Both China and Europe slowly caught up later with the formerly more advanced Middle East, demonstrating that while people act similarly in large groups, geography is responsible for differences in the rates and sequencing of development.

Human nature played an important role throughout history. Morris refers to part of this nature in his Morris Theorem: "Change is caused by lazy, greedy, frightened people looking for easier, more profitable, and safer ways to do things. And they rarely know what they are doing." However, humans also displayed a great capacity for learning and initiative. As soon as natural conditions presented them with an opportunity, they quickly transformed natural resources and conditions into an enormous driving force for their own survival and development.



***Chapter 5* Agricultural Civilization's Hard Ceiling and the Three Attempts to Reached It**

Introduction: *Photosynthesis placed an ever-present upper limit on social development in agricultural civilizations. Prior to the arrival of the Industrial Revolution, the trajectory of social development in agricultural civilization always adhered to a cyclical pattern in which agricultural development rose, reached the ceiling, and declined. Societies would reach an apex after every period of development, and once this insurmountable ceiling had been reached, decline was unavoidable. They fell back, rose again, reached the ceiling, and went into decline once more in this repeating cycle. Over the last several thousand years, there was not only a constant tension between the production of the pie (wealth creation) and how it was divided (wealth distribution), but this tension also became increasingly severe.*

The development of agricultural civilization led to sharp population growth. A long period of population increase began in approximately 10,000 BC, and more land was continuously put under cultivation. Yield

per unit of farmland also increased as a result of ceaseless improvement in agricultural technologies. Centralized irrigation techniques first appeared in the Mesopotamian plains of the Middle East in approximately 5000 BC. Hereafter, a series of advanced agricultural technologies such as deep plow, crop rotation, seed selection, seed breeding, fallow, improvements on farm implements, and use of livestock were employed in both the East and West. At the same time, iron farm implements, water wheels, windmills and other farming tools also emerged. People improved their organizational abilities in order to make better use of these new technologies. They created cities, states, and even larger empires. Population movement and predatory wars arose between city states and nations. Human exposure to animals and migration led to the dissemination of germs and plagues and gave rise to new wars. At the same time, population movements and new geographical discoveries also promoted trade and the social division of labor. Large empires were able to build stable unified markets, and advanced technologies could be disseminated more rapidly over large territories. Countries which were first to develop organizational capacities, establish institutions and innovate technologies gained greater advantages and challenged the existing centers of civilization, turning the latter's geographical advantages into disadvantages, supplanting them and becoming the new centers of civilization. The entire agricultural civilization 2.0 advanced and developed by constantly taking two steps forward and one step back.

Prior to the arrival of the industrial revolution, the trajectory of social development in agricultural civilization always adhered to a cyclical pattern in which it rose, reached the ceiling, and declined. Societies would reach an apex after a period of development, and once this insurmountable ceiling had been reached, decline was unavoidable. They fell back, rose again, reached the ceiling, and went into decline once more in this repeating cycle.

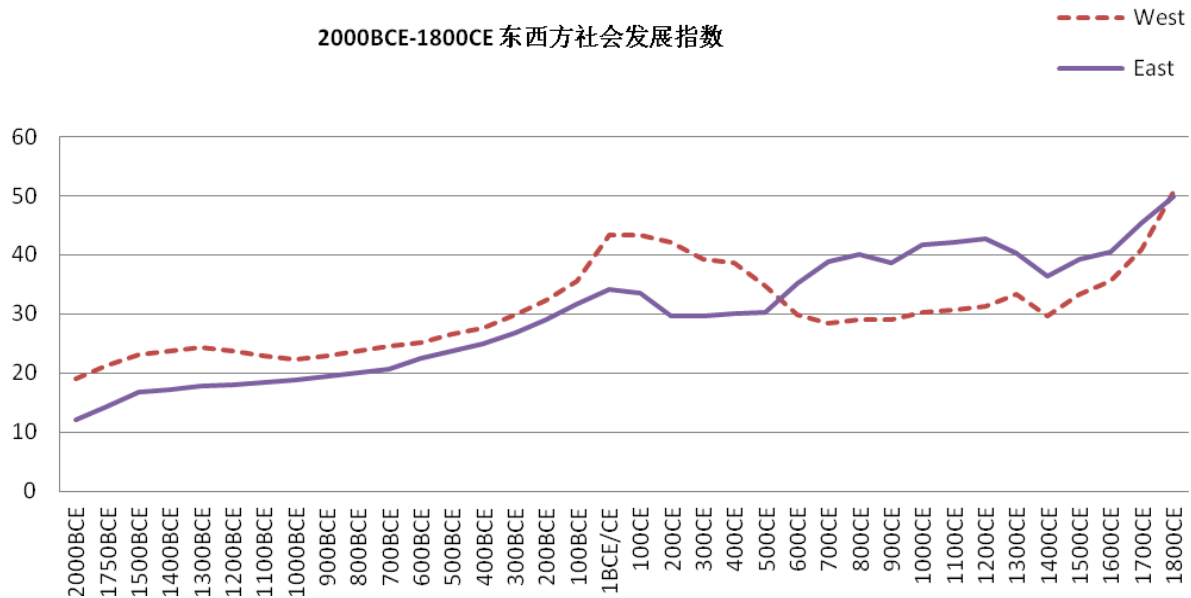


Figure 6: Human Social Development Indices for East and West (2000 BC – 1800 AD)

Source: Ian Morris, *Social Development* (2010)

At the heart of the matter is the fact that agricultural civilization has an upper limit to its social development because of a bottleneck resulting from inherent inadequacies. Agricultural crops are produced by photosynthesis. Animals must also consume plants, and the ratio of calories produced by animals vs the plants they consume is ten to one. The energy which photosynthesis can ultimately produce is bound by upper limits imposed by land area and yield per unit of land. Given that there are upper limits to both of these, natural resources will of course also have upper limits. Moreover, humans still could not control their population during this period. An important way that humans used new energy was having more children, so limited natural resources combined with almost unlimited population growth meant that population growth

would ultimately have to be absorbed and constrained by catastrophes. Beginning around 10,000 BC, this basic bottleneck was a problem which all of agricultural society was never able to solve. In examining the entire history of civilization 2.0, particularly the past several millennia, we find that not only was there constant tension between producing the pie (wealth creation) and dividing it (wealth distribution), but this tension grew increasingly severe.

In general, humans faced five types of disaster in the age of agricultural civilization: famines, wars caused by population movements, epidemics, climate change, and the failure of governments. Harvests are subject to weather, and climate changes both large and small will directly impact crop production. Small changes can lead to crop failures and cause localized famines, while major long-term changes can lead to systemic crop reductions in certain regions. These will inevitably lead to large-scale migration, which in turn will cause power struggles and war. Because their livestock consumed large quantities of plants, nomadic peoples were even more affected by changes in the climate. In addition, they were highly mobile and therefore more inclined toward plundering and war-making. For several millennia, the primary cause of war was the struggle between nomadic peoples and farming populations, and a main source of migration was movement between agricultural populations. Another direct result of nomadic movements on farming populations was the dissemination of germs and viruses and the ensuing large-scale epidemics. This was one of the major causes of population reductions in history.

In order to meet these challenges, people in the Eastern and Western centers of civilization began to strengthen their organizational capacities. This led to the emergence of cities, states and empires. On one hand, these innovations in social organization created peaceful environments and spurred trade and the dissemination of technologies within countries. Common markets were created, thus promoting social development. On

the other hand, the disparity between advanced and underdeveloped regions also became a major cause of war, the plundering of resources, and conquest. Climate changes often revealed the advantages of certain regions and caused centers of civilization to shift. However, the development of new centers would, at the same time, bring about a new round of challenges, which led to further shifting. Geographical advantages and disadvantages were in constant flux, and society as a whole advanced by taking two steps forward and one step back each time.

In examining the course of history, we find that in approximately 1300 BC, Western social development arrived at one of its intermittent pinnacles, as the social development index increased to a level six times greater than at the outset of agricultural civilization in the West, and it was also four times greater in the East. However, the West's centers of civilization then experienced region-wide destruction for the first time. When several of the five disasters appear simultaneously, civilization within a civilized area will be destroyed. This collapse caused Western development to revert to its level of 600 years ago in the ensuing two centuries. Meanwhile, the East continued to advance during this period. This was the first time that the disparity between the two great Eastern and Western centers of civilization began to narrow, and their subsequent development was astonishingly similar.

During this period, nomadic peoples from the north started to invade the two major centers of civilization in Eurasia. The nomads of this era were active along the great "steppe highway", a long band of steppes from Northeast China and Mongolia in the east to Hungary in the west, stretching in a long line across the Eurasian continent. For several thousand years, they continued to be the principal common enemy of agricultural civilizations in both East and West. The warfare and struggles between civilized agricultural states and nomadic peoples

never ceased, but Europe and Asia also became interconnected because of nomadic activities along the great “steppe highway”.

Despite facing challenges, agricultural civilization reached its apogee at least three times, and it continued to innovate as it responded to the threats. Institutional innovation in the era of agricultural civilization first involved the process of countries with rudimentary management evolving into ones with more advanced governance, and this was mostly completed between approximately 1000 and 200 BC. The West transitioned from rudimentary states to advanced governmental systems such as Cyrus’ Persian Empire and Darius’ Persian Achaemenid Empire. Next came the city states of Greece, and then the Roman Empire which aggregated all of these and represented the most advanced Western government system. Because it was located along the Mediterranean Sea, the Roman Empire had extremely convenient access to maritime routes. Thus, a vast trade empire which straddled Europe and Asia took shape within its boundaries. Natural resources were optimally allocated and for the first time, and social development reached its peak in an agricultural civilization. During the period from approximately 200 BC until the first century AD, Rome entered its zenith. At this point the social development index was ten times greater than at the beginning of agricultural civilization. During the same period in the East, after the rudimentary governments of the Xia, Shang and Zhou states and the transitional attempts at advanced government of the Spring-and-Autumn and Warring State periods, advanced and centralized political governance first appeared during the Qin and Han dynasties, and a large trans-regional empire also emerged. Although social development during the Qin and Han was still slightly behind that of Rome, it was still the most advanced in the East.

After agricultural civilization had reached its apogee for the first time, the five major challenges appeared at almost the same time in both East and West. In particular, due to the barbarian invasions of nomadic

peoples together with the failure of these regions' governments and the spread of epidemics, the two great empires of the West and East fell in succession after reaching their heights. As a result, all civilized regions underwent devastating decline, which lasted more than a thousand years in the West and almost 400 years in the East. After 400 years, the golden age of the Tang and Song Dynasties emerged in the East. This allowed the eastern empire of the Song dynasty to reach, for the second time, the apex of agricultural civilization. The Song Dynasty equaled and even surpassed the accomplishments of the Roman Empire. However, after reaching this peak, the Song was once more defeated by Mongolian horsemen and nomads. The political power of the nomads, together with the spread of epidemics, caused the Song Dynasty's effort to reach the heights to eventually fail. Mongol armies swept across all of Eurasia and conquered virtually all the countries which were centers of civilization, from China all the way to Hungary, Russia and the Middle East. They also brought epidemics to every corner of the world. While this conquest laid waste to all of the Song Dynasty's accomplishments in the East, it also spread the advanced civilization of the Song to Western Europe, which was relatively undeveloped during this period. At that time, when the Song Dynasty had reached the zenith of its civilization, it produced approximately over one hundred thousand tons of cast iron annually. It was not until 1700 that all of Europe combined achieved this figure. China's most important technological innovations of the time such as cast iron, gun powder, the compass, the spinning wheel, the windmill, the water wheel and farming techniques were all disseminated to Europe.

Another outcome of the Mongolian conquest resulted from what it did not do. After its campaign reached Hungary, the Mongolian conquest came to an abrupt halt. It did not reach any part of Western Europe, so its destruction did not extend to this region, yet the technologies (of the East) were disseminated there. This provided an excellent setting for the next explosive advance of civilization in Western Europe. At this time

Europe was in a state of feudal warfare. Several attempts at unifying the region after the Roman Empire had all failed. European governments consisted of hundreds of feudal states of varying sizes, and for over a thousand years, there had been endless wars between these kingdoms and the Papacy, and with each other. Therefore, after Chinese firearms arrived, they were rapidly developed into guns and cannons. These guns and cannons were in turn disseminated back to the East. Several hundred years later and with the assistance of guns and cannons, the shared efforts of Russia and the Qing Dynasty in the East and West completely brought to heel the nomads who had wreaked havoc for several millennia in lands populated by farmers. By around the seventeenth century, the great “steppe highway” was completely cut off after China and Russia signed the *Treaty of Nerchinsk* in 1689. The majority of this route was apportioned to Russia and a considerable section to China. China’s territory had also expanded from the original Yangzi and Yellow River basins into the northeast as well as Mongolia, Xinjiang and Tibet, thus opening a new land frontier for China from this time on. This also provided land resources for renewed social development, although the yields from these lands could not compare with those from the Yangzi and Yellow River basins.

During the same period in the West, Western Europe, which the Mongolians had spared, started to display a great new vibrancy from the 15th century on, and the Renaissance emerged in Florence and Venice. Because of the introduction of Chinese technologies, all of Western Europe experienced a new round of social development. The introduction of these new technologies, coupled with Marco Polo’s praise for China, gave rise to both the West’s first real bout of China fever and to efforts to seek the wealth of the Orient. These provided the essential driving force for the next great maritime voyages. From 1500 on, Western European society began to gradually develop. By the seventeenth and eighteenth centuries, both the East and West once again

started to push against the upper limits achievable by agricultural civilization. However, this time the West and East encountered completely different challenges and opportunities. As a result, their fortunes for the next several centuries would diverge greatly, and an entirely new path for human destiny was on the horizon.



Chapter 6 Agricultural Civilization’s Revolution of Thought and Institutional Innovations

Introduction: *The great thinkers of the Axial Age appeared on the scene at almost the same time in every one of the world’s centers of civilization in Eurasia. Their ideas were startlingly similar, as they pondered questions concerning the pain of the common man after the destruction of civilization, the struggles of those on the periphery, and the groan of the underclass. The most important legacy of Axial Age thinking was the establishment of sophisticated governments and systems of governance. In China, Axial Age thought resulted in the creation of the greatest political institutions in its history and the birth of Keju, the imperial examination system, which also helped China take the lead over the West for the next one thousand or more years. Another distinctive feature of the Axial Age was its diversity of thought. In particular, modern science ultimately developed gradually out of its rational branch. This revolution of ideas laid the intellectual groundwork for human development over the next several thousand years and continues to impact future generations to the present day.*

The iron law of agricultural civilization is its hard ceilings of social development. Each instance in which civilization reached its high point was followed by decline and destruction. This tested the peoples of these periods and brought them suffering and misery. However, suffering can often become the source of ideas and a revolution of ideas.

After World War II, as the German philosopher Karl Theodor Jaspers (23 February 1883 – 26 February 1969) contemplated the disaster brought upon Germany and the world, he pointed out empathetically that every human disaster has resulted in a revolution of ideas. He was the first to note an axial revolution of ideas in approximately the fifth century BC, which he referred to as the Axial Age. In China in East Asia, Confucius started to spread his teachings, while thinkers from many schools contended with one another at the same time. In the Middle East, the cradle of Western civilization, the prophets recorded their thoughts on the world and on God in the Old Testament and Bible. In India, Siddhartha Gautama gave up his affluent life as a prince to live amongst beggars in order to experience suffering with them, and preached about how to extricate oneself from suffering. The meanings of the individual, society and the state were comprehensively examined by Socrates, Plato, and Aristotle in Greece.

This revolution of ideas laid the enduring intellectual groundwork for human development over the next several thousand years, and continued to impact future generations to the present day. The thinkers of the Axial Age appeared on the scene at almost the same time, and came from every one of the world's civilization centers of Eurasia. In addition, the direction of their thought was startlingly similar. What all these thinkers had in common was that they were at the fringes of the civilizations of their time. They all pondered questions concerning the pain of the common man after the destruction of civilization, the struggles of those on the periphery, and the groan of the underclass. Confucius from the Kingdom of Lu, Kapilavastu's Siddhartha Gautama, Athen's Socrates

and the wandering prophets of Israel all took the underprivileged and the ordinary people as their starting point and the object of their concern. What they all opposed was rulers and evil governments which were corrupt and barbaric, and which duped their citizens. Thus their ideas were extremely revolutionary, yet none of them were revolutionaries themselves. Rather, their mission was primarily to explore the ultimate questions about humans, society and the state: What is the significance of humans? Why does government exist? What is good government? What is a good society? They also sought the meaning of life and sought to rise above their own lives and personal interests. For example, Confucius spoke of ren (virtue), Siddhartha Gautama referred to Nirvana, the Old Testament talked of God, and Socrates and other Greek philosophers discussed contemplation. They all sought the rise of spirit and meaning of life for humans in this world. At the same time, these thinkers all stated the golden rule for how people should treat one another. For example, Confucius stated “do not do to others what you would not have them do to you.” The Bible tells us to “do unto others as you would have them do unto you,” and Siddhartha Gautama asserted that all creatures in this world must have compassion for one another. Based on this core belief, the good societies they described were based on this type of interpersonal relationship. Effective governments also had to be people-centered, as Confucius and Mencius said: “The people are the most important; the state is next; the sovereign is the least important.” Even so, these thinkers were not particularly successful in the eras in which they lived, nor were they widely accepted. Socrates was put to death in democratic Athens; Confucius wandered from place to place and his views were not accepted during his lifetime; the Israelites lost their homeland and wandered around the world for thousands of years; Siddhartha Gautama did not have any real influence while he was alive. However, the rich content and enduring power of their ideas transcended their own lives and continue to nourish people’s souls to this day.

The ideas of the first Axial Age were embodied in the first attempt of agricultural civilization to reach its greatest heights. Failure after this first attempt occurred at almost the same time in both West and East, and they immediately entered into a dark age which lasted centuries or even over a thousand years. The suffering felt during this period brought about the second wave of Axial Age thought. After undergoing simplification, Buddhism spread widely across China and almost became the state religion; in the West, Christianity became the state religion of the Roman Empire and spread rapidly throughout the West; Islam emerged amongst the desert nomads of the Arabian Peninsula.

Islam is an extremely unique phenomenon. This is the only religion created by nomads and it was a cultural leap forward brought about by nomads themselves. Islam's founder, Mohammed, was an illiterate who married a much older widow. He ran a small business and had never achieved anything notable, nor were there any signs indicating his extraordinary future. However, when he was 40 years old, he began to dream of the Angel Gabriel delivering messages to him. Initially, Mohammed was unable to understand his dreams no matter how he tried. Only with the encouragement of his wife did he start to believe that he had been chosen to be the voice through which God would speak. He became a prophet and started to share with others what the angel had told him in his dreams. The words he preached were richly poetic and extremely persuasive, and he quickly attracted a huge group of believers. Subsequently, in the mere twenty or thirty years remaining in his life, Mohammed organized a small tribe of nomads eking out living on the periphery in the desert and conquered the entire Middle East, Egypt, and the Mediterranean Sea. He and those who came after him established the world's third greatest religion and founded a Muslim empire. In contemporary Chinese slang, this was a good example of Diaosi Nixi, or a counterattack by the underdog. Because middle eastern nomadic culture started to develop relatively late, Islam under the rule of

Mohammed and his successors demonstrated ample respect, tolerance, and humility in learning from peoples with more mature cultures. Greek civilization and Roman cultures, Judaism and sometime even Christianity were all more or less tolerated during the Muslim era, and were disseminated to East Asia via the great “steppe highway” (the long band of steppes from Hungary to Mongolia). Indian spices as well as Chinese porcelains and silk were also transported along this route, which formed the so-called Silk Road and linked up trade between the East and West.

The second wave of the Axial Age emphasized the comforting of the soul, and was manifested almost entirely as religion. Buddhism, Christianity and Islam all emphasized the liberation of the afterlife, comfort from the sufferings of this world and spiritual solace. The two waves of the Axial Age both appeared in the course of humanity’s progression from rudimentary forms of government to advanced ones, and they laid the ideological foundations for the more sophisticated forms of government which were established later. Advanced government systems were represented by the Roman Empire in the West and initiated by the Han Dynasty in China.

The most important legacy of Axial Age thinking was the establishment of sophisticated governments and political systems. In China, Axial Age thought resulted in the creation of the greatest political system in her history -- the birth of Keju, the imperial examination system, which was the greatest innovation of political system in the era of agricultural civilization 2.0 and the second greatest one in the entirety of human history in my opinion.

In confronting the challenges faced by agricultural civilization, all empires required peaceful development and trade. It was only by division of labor through trade that resources could be optimally allocated for farming and handicraft industries in different regions. In

particular, the optimal allocation of resources was especially important because agricultural civilization was limited by its natural hard ceiling and finite resources. Therefore, the larger and more populous the country and the more diverse its territory, the greater its ability to cope with challenges. So it was inevitable that governments would shift from rudimentary ones to more advanced ones.

However, after their formation, all advanced governments had to solve the problem of how to govern effectively. The traditional mode of government was based on consanguinity. Blood relations with those who conquered a country became the most fundamental basis for the distribution of power. However, consanguinity was no guarantee of ability, and it was particularly unable to ensure the capability of a government after several generations. Therefore, such governments could not be sustained. Well-administered governments require the rule of elites and the appointment of the wise. However, the problem with appointing the wise is that there is no guarantee of their loyalty or of government stability. In particular, if capable military men also have political power, they will naturally threaten the peace of the regime itself. In confronting the five major challenges of agricultural civilization, people had to form great empires, and how to effectively administer such large empires was always a difficult problem until China invented Keju system based on Axial Age ideas.

In Keju system, candidates of government officials were assessed based on their learning abilities, levels of knowledge and administrative abilities. Everyone was given an opportunity in a fair, transparent and open manner, and participation was not limited by family background or bloodlines. Outstanding and capable persons were selected from all levels of society and allotted political power based on their examination results. Furthermore, the use of Keju system created a unified official ideology which ensured that all who passed the examination were loyal to the government. This system for assessing and selecting officials

guaranteed that those chosen would be fully capable, could serve the people, and would be loyal to the government. The management of military officials by civil servants ensured that the government would not be challenged. Intellectually and ideologically, scholar-bureaucrats were loyal to both the imperial political system and to the Confucian moral code. They served both the commoners and the imperial authorities, while realizing their ideals and ambitions, supporting their families and building legacies for their descendants. This was a near-perfect attempt to create an institution. It originated in the efforts during the Western and Eastern Han dynasties to select wise officials through recommendations. After several centuries of practice, it was officially established as an institution during the Sui dynasty. The Keju system thereafter provided the strongest guarantee of stability for the administration of China's vast empire over the next one to two millennia. It also provided the foundation for China to rise again after 400 years of post-Han war and decay, and made it possible for the East to have entirely different fortunes from that of the West after the Han Dynasty and Roman Empire both went into decline. For the roughly 1200 years from 500 to around 1770 AD, China was more advanced than the West, and the innovation of Keju system was one of the most important factors which propelled China into the lead. The establishment of this institution allowed China to basically solve the problems of administering a vast empire and ensure a lasting peaceful environment. China was also able to create large trade markets, promote the exchanges of technologies and their broad applications, and develop its culture. In addition, it was capable of dealing with famines, epidemics and foreign invasions. This enabled China to be more advanced than almost any other country for the next thousand or more years. Even British Empire during the era of industrial civilization borrowed from the Chinese civil service system in creating its own civil service bureaucracy. Today, the United States military, all governments which have adopted a civil service system, and

non-governmental organizations, have all been influenced by China's Keju system to some extent.

While Keju system largely solved the problems faced by China's imperial government, its central shortcoming was the selection of the emperor, who was the supreme leader. The civil service system was essentially invented to perpetuate imperial rule, but imperial succession was still based on consanguinity. If the emperor was extremely capable, the full potential of the empire's power could be realized. This was repeatedly proven during the reigns of emperors Wendi, Jingdi, and Wudi of the Han Dynasty, Taizong of the Tang Dynasty, and Taizu of the Song Dynasty. However, blood ties are no guarantee of competency and cannot ensure that the throne will not be handed down to an incapable heir. Hence there was no way to prevent the emergence of weak or inept emperors. When such rulers were in power, infighting and corruption would inevitably arise within the government. The instability of imperial succession affected the rise and fall of dynasties. However, every dynasty hence retained the basic political institution of Keju system regardless of its innovations in administrative details. The impact of Keju system on Chinese politics began in the Han and Tang Dynasties and continues to the present day.

Another significant legacy of the Axial Age's revolution of ideas was its diversity of doctrines. In China, a hundred schools contended, each with their own ideas; in Greece, Aristotle concerned himself with an extremely diverse range of issues, including science, metaphysics, law, government, logic and oratory. The emergence of diversity in thought, and its rational branch in particular, pointed out another important direction for thinking. Ideas were not merely for the creation of fair societies and government and a means of spiritual solace. Beginning with the Greek notion of "knowledge for sake of knowledge itself," ideas themselves became an objective of human pursuit. Modern science gradually developed out of advancements in human thought, and

humans thereafter truly started to rule the world. This rational branch of thought pointed out a different and extraordinary direction for human development.



Chapter 7 The Discovery of the American Continent and its Epochal Impact

Introduction: Only a few generations after Columbus's arrival in the Americas, 75% of the indigenous population had been wiped out by germs. Influenced by the involvement of England and the new immigrant nations it established, the Trans-Atlantic economy became a unique and unprecedented type of economy. It was completely under the control of free merchants and capitalists, and formed a global free market economy with the support and protection of limited government. The publication of Isaac Newton's *Mathematical Principles of Natural Philosophy* in 1687 ignited a modern scientific revolution and brought Europeans a new world view. It also marked the beginning of an entirely new era. Together, the new Trans-Atlantic free market economy and the scientific revolution provided the basic conditions for the birth of the modern age.

Geographical location was always the weak spot of Western Europe during the era of agricultural civilization. While the center of the West

had already shifted from the Middle East to the Mediterranean and southern Europe, northwestern Europe was still a backward region. In addition, it was extremely far from the wealth of China and India. Fifteenth century Europeans were full of longing to see the paradise-like China described in Marco Polo's works, and they hoped to establish trade routes to India and China. At that time, trade between the West and East was mainly conducted via a land route which passed through the Middle East. The Middle East was then already under Muslim occupation, and this passage was very treacherous because of warfare between Christians and Muslims. Only a few scattered European merchants were able to conduct trade, such as the Venetian merchants who primarily dealt in spices from India. The West began the great maritime age in order to discover sea routes to India and China. Vasco da Gama of Portugal was first to establish a route when he rounded Africa's Cape of Good Hope. Next, Columbus set sail hoping to find a direct route to Asia via the Atlantic Ocean, and accidentally discovered an entirely new continent. He mistakenly believed he had arrived in India and referred to the native population as Indians. However, not only did this discovery alter the course of European history, it also completely altered the entire trajectory of human history as well.

Humans first set foot on the American continent around 15,000 years ago. The ancestors of humans who ventured out of Africa at that time crossed the Siberian land bridge and directly made their way on foot to the Americas. However, in 12,000 BC the ice age came to an end, the earth's climate started to warm, sea levels rose and the land bridge ceased to exist. Thus for the next ten thousand or more years, the entire American continent was isolated by the Pacific and Atlantic Oceans and connections with other civilizations were completely severed. While its own climate conditions were very favorable, there were hardly any wild plants and animals suitable for farming and animal domestication, so the natural resources required for agriculture were extremely scarce. There

were only four types of plants suitable for farming and no wild animals suitable for animal husbandry. Corn, which had the highest yield among native plants, was difficult to breed, requiring over ten generations of breeding to domesticate. Therefore natural conditions were extremely unfavorable for the development of agricultural civilization. The Americas got off to a slower start than all other regions, crop growing was extremely slow to develop and animal domestication never developed at all. The level of development of social organization was therefore also very low.

When Europeans arrived on the American continent, there were only two relatively large governments in today's Mexico and South America, and both were relatively rudimentary. The comparative advantages of the European invaders were evident. Due to many years of continuous warfare in Europe, its people already possessed abundant battle experience and a great capacity to organize for war. Technologically, they also had cast iron, guns and cannons. Therefore, resistance by the indigenous populations was doomed to fail. However, the most lethal weapon the Europeans brought was not their cast iron, guns or cannons, nor was it their skills in warfare. Rather, it was the germs and viruses that they and their livestock carried. Over the past several thousand years, humans had gradually gained the upper hand in their battle with germs. However, these diseases took a tragic toll. The Black Death killed one third of Europe's population in one instance, and other illnesses such as smallpox also led to the deaths of almost 10% of the population during the Middle Ages. While the survivors had developed antibodies, these germs and viruses did not die out, and they continued to coexist with humans and livestock. They were not a threat to the Europeans who had already been tested by them and carried antibodies. However, the indigenous peoples of North America had never been exposed to these germs and had absolutely no immunity. Only a few

generations after Columbus's arrival in the Americas, 75% of the indigenous population had been wiped out by germs.

The American continent originally only had a sparse population and poorly developed governments. After the arrival of Europeans, the governments were utterly destroyed and the indigenous populations almost completely eradicated by germs. In the early part of the sixteenth century, the Europeans found they had become the heirs to a brand new continent, and they were also pleasantly surprised to find that this continent possessed extremely favorable natural conditions suited for planting crops and raising livestock. Furthermore, this new continent had a land area almost nine times greater than that of Western Europe, as well as abundant natural resources such as large quantities of silver and other minerals. This new continent completely changed the economic situation in Europe. Spain alone shipped back 50 tons of silver from South America between the sixteenth and eighteenth centuries. The discovery of the Americas solved Europe's bottleneck of land shortage in one fell swoop by providing new possibilities for population movement. In particular, the Americas quickly became a better outlet for those who had been persecuted in their own countries, as well as those marginalized unfortunates who did not enjoy any inheritance rights. Moreover, the Americas possessed fertile land which was suited for planting any type of crop. The Europeans took a small number of luxury items to Africa and exchanged them for slaves. These slaves were made to grow sugarcane, cotton and timber in the Americas. These agricultural products would then be shipped to Europe, and new industrial products would be sent back to the Americas. This process created a vast Trans-Atlantic trading ring which caused the European economy to quickly become dynamic after the sixteenth century, and created the conditions which allowed it to break out of the economic bottleneck of agricultural civilization.

Different European nations had different attitudes towards their colonies in the Americas. The early colonial powers of Spain and Portugal did not regard commerce as important, and their authoritarian monarchies merely treated their country's merchants as their own ATM. Therefore, the new continent became an opportunity for plundering and obtaining silver for these monarchies. Spain's royal family stipulated that any person who conquered any part of the Americas would only need to turn over 20% of his gains to the monarchy. Silver collected by the royal family was mainly spent on the centuries of continual European warfare. However, during the same period, several countries in northwest Europe started to take a different approach to the new Trans-Atlantic economy. The most representative of these were Holland and England.

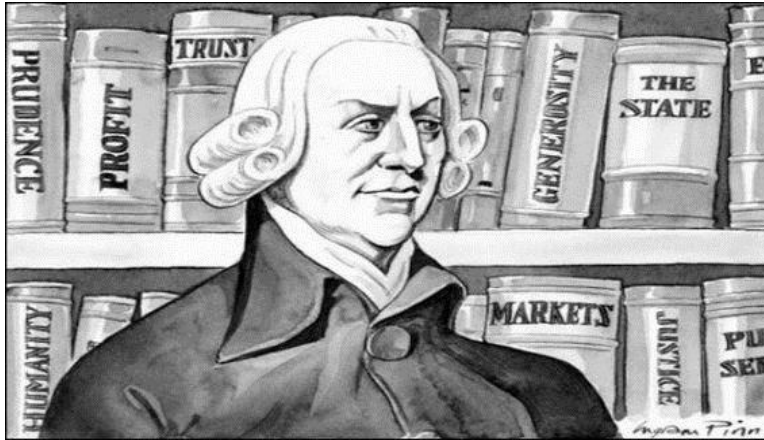
England had been a weak monarchy ever since the time of the Magna Carta. Subsequent Parliaments continued to take away more power from the royal court. After the fifteenth century, any citizen with a certain amount of property could vote for members of the House of Commons, which therefore gradually came to represent the interests of successful merchants. In the seventeenth century, after a series of internal struggles between the House of Commons and the king, the modern parliamentary system was initially established. Through a bloodless coup in 1688, a Dutch prince became the nominal monarch and signed the *Bill of Rights*. This marked the establishment of the first limited government of constitutional monarchy in human history, and the emergence of the first mercantilist constitutional nation. The main powers in this government rested with the House of Commons and represented the interests of merchants. The propertied classes could send their own members to Parliament, making seventeenth century England a mercantilist society. At this time, England's mode of operation in North America was completely different from those of Spain and Portugal in South America. Its fundamental goal was to create a nation of immigrants who would represent the interests of merchants and protect private property, and the

ultimate aim of those who immigrated to the New World was also primarily the pursuit of wealth and religious freedom. Influenced by the participation of England and the immigrant nations it established, the Trans-Atlantic economy became a unique and unprecedented economy. It was a transatlantic global free market economy formed completely under the control of free merchants and capitalists, with the support and protection of limited government.

The discovery of American continent and formation of the Trans-Atlantic economy raised a series of new questions for European intellectuals. As a result of the arrival of the maritime age and the discovery of the New World, this era began to face some very fundamental technical issues. Matters involving geography, geology, biology, marine technology and astronomy, as well as problems about the origins of government and the nature of economics were all areas which posed a series of new questions. European intellectuals of this time attempted to get to the roots of these problems, and they hoped to understand the world through a mechanical perspective. If we were to say that people had sought answers from the saints of the past during the Renaissance one or two hundred years ago, then during the Enlightenment Movement of this era they were no longer satisfied with the existing body of knowledge. They strongly needed new scholarship and a new world view to explain the new problems posed by the new continent, and they needed knowledge which was based on observation and experimentation, which could be repeatedly verified and predicted, and which was more reliable. It was this strong social needs of the era that led Isaac Newton to its greatest discoveries contained in *Mathematical Principles of Natural Philosophy* published in 1687. This book ignited a modern scientific revolution and provided Europeans with an entirely new world view, and also ushered in an entirely new age. Newton saw the world as a predictable clock-like mechanism, a world which was controlled by principles and natural laws. With such a world

view, people started to use a similarly rational and scientific approach to think critically about economics, politics, the humanities, religion, culture and society -- virtually all areas of human civilization – and they sought to discover its underlying rules. This gave rise to the enlightenment movement which lasted for over a hundred years.

Together, the new Trans-Atlantic free market economy and the scientific revolution provided the foundation for the birth of the modern age.



Chapter 8 The Birth of The Modern Age

Introduction: In 1776, Adam Smith published *The Wealth of Nations* in England, the founding fathers of the USA published the *Declaration of Independence*, and James Watt announced the invention of the world's first steam engine in Birmingham. The simultaneity of these three events marked 1776 a watershed year in human civilization. In the ensuing years, human civilization again leapt forward into a new stage.

It is human nature to seek equality of outcomes but to settle for equality of opportunities. The pursuit of equal outcomes causes any progress made in human civilization to ultimately spread and reach every corner of the world. Societies which provide their members with equal opportunities will eventually end up with prosperity, progress and lasting peace. Free market economy is the greatest innovation of social institution. Coupled with modern science and technology, they lead human race to reach a whole new stage of civilization.

A recurring phenomenon throughout the course of human history is the occurrence of a watershed year during which a series of major historic events takes place. 1776 was one such year. Three seemingly unrelated events took place in different parts of the world: the publication in England of *The Wealth of Nations* by Adam Smith, the publication of *the*

Declaration of Independence by the US founding fathers, and the invention of world's first steam engine by James Watt in Birmingham. Together, these three events made 1776 a watershed year in human history, and our civilization subsequently leapt forward into a new stage.

The central thesis of *The Wealth of Nations* is the nature of the Trans-Atlantic economy. At the time, after over a hundred years since the inception of this economic system, Adam Smith sought to examine whether an economy completely free from any government control could be successful. This economic form was unprecedented. Had it not been for the original anarchic state of the American continent, if England did not have such a unique history, and if the English merchant class had not so quickly risen to become important members of society because of the Atlantic economy, the English parliament could not have become such a dominating force in politics during the 18th century. In essence, this new Trans- Atlantic economy, encompassing England, the Netherlands and North America, is a free trade economy which was almost entirely dominated by private capital and where the role of government was limited. Adam Smith was a moral philosopher at heart who examined issues in moral terms, and particularly in terms of social benefits. He therefore looked at the “invisible hand” of the free market from the perspective of social well-being. He attempted to show that people acting solely out of self-interest, without any lofty motives, could, through free competition, make more products at lower costs, allocate society's resources more efficiently and thereby increase society's welfare as a whole. This process acted like an invisible hand which guided society to become more rational. The antithesis of this invisible hand was the visible hand of government. Facts showed that a society's economy could yield the best results without government intervention. He therefore came to the conclusion that the appropriate role for government was to adopt a non-interventionist, laissez-faire approach. The main functions of government were to protect private property, to

ensure free competition, to fight against monopolies, to maintain order and peace in a free market and to promote international free trade.

David Ricardo, who followed in Adam Smith's footsteps, further described the benefits of free trade based on the social division of labor. In the course of free trade and the social division of labor, Ricardo demonstrates that even if one party in the exchange enjoys advantages in all areas, the division of labor and exchange is still beneficial to both sides. This is a profound insight which explains why trade can bring prosperity and create wealth, and why the larger the market, the greater the wealth that can result from trade.

The Atlantic economy had already existed for over a hundred years by the time Adam Smith published his theory, yet there was still no consensus on how government should handle such an economy, and particularly on the future direction of this economic system. Mercantilism, which basically viewed foreign trade as a zero-sum game and advocated high tariffs and trade barriers, was still the most influential school of thought on the European continent. However, Adam Smith's theories had a lasting impact on Britain and the US. The role of government in these two countries, and particularly their attitudes toward colonies, were very different from the rest of the colonialist powers. Britain and the US began to promote free trade and free markets globally. This policy had a far-reaching impact on the development and spread of modern Science and technology based Civilization (or Civilization 3.0) around the world, and it ultimately led to the present day globalization.

Other political economists of this era explained the creation of value in terms of labor. Among them, the most influential was Karl Marx. He believed that human labor was the ultimate creator of all value, yet the fruits of labor were unfairly exploited by capitalists. He predicted that such exploitation would eventually lead to economic crises under

capitalism and cause the world to enter a new state, namely communism. Yet before the ink was dry on *Das Kapital*, the wages of Trans-Atlantic economy workers in Britain, other European countries, the US and virtually all capitalist countries in the world began a sustained rise for a century or two. Capitalism, as predicted by Adam Smith, ultimately benefited almost everyone, capitalists, laborers, owners of production resources and consumers alike.

America's independence in 1776 offered mankind a unique opportunity to establish an entirely new form of government, one based on the Enlightenment era's scientific understanding of society, nature, humanity and economics. The American founding fathers were deeply influenced by the Enlightenment movement, so the economic principles of this new government were strongly influenced by Adam Smith, while its political principles were deeply influenced by John Locke. What America established in 1776 was a constitutional and limited government, one whose fundamental goal was to protect property rights, and whose legitimacy came from empowerment by the people. Sovereignty rested with the people and the government was very small. It had very limited objectives, tools and mandates, and it existed solely to expand and maintain order in the free market, to protect business interests and private property, and to safeguard the individual liberties and freedoms of its citizenry. For instance, the first federal government administration under (George) Washington had only several dozen public servants and four departments. The head of each department was actually the President's chief secretary in that department; hence, in American English, the 'secretary' of each department meant the 'minister'. We should be thankful that a government with such principles was able to implement them in such a vast country, thereby ensuring that the new Trans-Atlantic economy could become the foundation for the future development of human civilization.

To a certain extent, the publication of *The Wealth of Nations* and American independence changed the course of human history, but a third event - the invention of the steam engine - had an even greater impact on human history. This invention allowed, for the first time, almost lossless conversion between thermal and kinetic energy. Isaac Newton had already proved that under ideal conditions, energy could change between all forms under the law of conservation of energy. However, before James Watt invented his steam engine, conversion efficiency had never exceeded 1%. The steam engine greatly improved that efficiency. Fossil fuels had already been discovered at that time. These were a gift of the earth which had been accumulated over several hundred million years, and containing an almost infinite amount of energy. The steam engine could take these energy-rich fossil resources and almost perfectly convert them into power with the greatest efficiency known to man. Henceforth, the amount of power that man can generate through man made tools would no longer be limited to several times that of human muscles, the way it had been for thousands of years up until then. Now using fossils and steam engine, the amount of power we can generate increased several hundred-fold. In a short span of times, it would become several thousand-fold, even infinitely. This gave people unprecedented control over mechanical devices. The industrial revolution now officially began with this energy revolution.

Science and technology (S&T) created a virtuous cycle, each influencing and promoting the other and giving people unprecedented control over nature within a short period of time. And when coupled with the Trans-Atlantic free market economy, together they unleashed an unprecedented force in wealth creation. Constantly improving technology makes products cost ever lower, which in turn creates ever greater demand that enlarges the overall economy that ultimately benefits every member. A consumer society was born.

The combination of modern S&T and a modern free market economy created the greatest innovation of institution in human history. This innovation allowed nearly everyone in a society to realize their own potential and obtain the material wealth they deserved. It is interesting to contrast this with Keju system invented in China, the previously greatest innovation in human institution. The imperial examination system was able to distribute political power according to one's intellect and managerial competency relatively efficiently. However, for most people, the pursuit of material wealth is far more important. And political elites too would frequently use their political power for personal economic gains. Thus the Keju system was both inadequate and prone to corruption. In contrast, a free market economy backed by modern technology offers true equality of opportunity to everyone and thus unleashed the potential for each person to obtain the economic benefit he deserves. I believe it is human nature to seek equality of outcomes but settle for equality of opportunity. Achieving equality of outcomes will always remain a dream for human that can never be realized, yet never abandoned. But people does settle for equality of opportunity. Therefore, any human institution that creates equality of opportunity is by definition a hugely beneficial one.

It is in the nature of people to pursue equality of outcomes while accepting equality of opportunities. The pursuit of equal outcomes causes any advancement in human civilization to eventually spread to every corner of the world; any society which establishes a system providing equal opportunities will prosper, progress and achieve long, lasting peace.

To date, the second greatest human institutional innovation has been the imperial examination system, through which political power was distributed in accordance to one's knowledge and capability. The greatest institutional innovation however, is the free market economy

built on modern S&T. This innovation allowed the human race to finally enter into a brand new stage of civilization.



***Chapter 9* Could China have been the birthplace of modernization?**

Introduction: As they study modern Chinese history, many Chinese people often cannot help but wondering why China was not the birthplace of modernization, and they try to find a persuasive answer. However, as I see it, these questions are false premises. All geographic and historic reasons make Western Europe the most likely birthplace for Civilization 3.0, and the chances of China being the birthplace of modern Civilization 3.0 were very slim.

Looking back at China's history of the past few centuries, people often lament: why was modernization not born in China? This question has not only caused anguish among the Chinese intelligentsia, it has also baffled many foreign observers who are familiar with Chinese history. Joseph Needham (9 December 1900 – 24 March 1995), a British scientist and historian at Cambridge University, devoted his life to studying the history of science and civilization in China. He had a deep understanding of the advances in Chinese science and technology and

therefore raised the famous “Needham Grand Question” -- why had modern science and technology not developed first in China?

The history of modern Western civilization started from the Renaissance. Today, a man of many talents was called a “Renaissance Man.” One such Renaissance man can also be found in Chinese history. His achievements in the various fields of physics, mathematics, geography, geology, astronomy, medicine, chemistry, agronomy and meteorology were world-class in their time. His most important scientific achievements were his discovery of the magnetic inclination of the earth and his invention of the most advanced compass in history, which provided the most precise guidance for the great era of navigation that followed. He was not only one of the greatest scientists of his era, but also an engineer, inventor and statesman. The sluice gates system of irrigation canals which he invented is still in use today. He turned more than a hundred square kilometers of swampland into fertile farmland. He drew maps of the entire country, and was the first to apply the concept of water erosion to correctly explain the formation of the peaks of the Yandang Mountains. He described fossil fuels and even discovered petroleum and predicted its future economic importance. He served as head of the Bureau of Astronomy and revised the calendar; he participated in nationwide economic reforms and served as finance minister; he was also an outstanding diplomat. He was no less a Renaissance man than Leonardo da Vinci or Benjamin Franklin (of the United States). He lived in China, some 500 years before the Italian Renaissance – he was Shen Kuo (1031–1095) of the Song Dynasty (960–1279), and the period he lived in happened to be the Chinese Renaissance Era.

During the Song Dynasty of Shen Kuo’s lifetime, the scholar-bureaucrat class began to reject the passive, escapist mentality of Buddhism. They felt that the meaning of life rested in actions of the here and now, and that true scholar-bureaucrats should strive to be “concerned about the

affairs of state before others, and enjoy comfort after others.” This period produced many outstanding writers, scientists, social activists and reformers. S&T progressed by leaps and bounds, and three out of the four great Chinese inventions were made during the Song Dynasty: printing, gunpowder and the compass. The production of cast iron in this period was so great that it was not until 1700, some 700 years later, that it was surpassed by the total cast iron production of all of Europe. Textile looms had already begun to be powered by wind mills and hydro-energy, and people already understood the movements of mechanical pistons and their power, causing Joseph Needham to always wonder why the steam engine was not invented in China. It was conceivable that modern science could emerge then, and it would be most likely in China. Yet even as the great era of navigation began with a flourish after the Renaissance in the West, the neo-confucianism of the early Song period turned, after one to two hundred years, into the branch known as the Song-Ming School of Li (School of Reason). This caused China to enter a conservative era where thoughts were shackled. Foot-binding of women began to be practiced, and the Keju examinations no longer included astronomy, history, geography and economics as they did during the administration of Chancellor Wang Anshi (December 8, 1021 – May 21, 1086, a Chinese economist, statesman, chancellor and poet of the Song Dynasty). Instead, they focused only on studies of the classics. To this day, those reading the Chinese history of this period can’t help but lament the unfortunate turn in the course of history.

At the same time that thoughts began to be shackled, social development during the Song Dynasty continued. The population reached 100 million for the first time, while the capital, with a population that had reached 1 million, already surpassed Rome at its most glorious. This continued during the Ming Dynasty (1368-1644). Zhu Yuanzhang, the first emperor of the Ming Dynasty, built the world’s largest navy in order to deal with his chief political rival. Zheng He (1371–1433 or 1435, a

Muslim court eunuch, mariner, explorer, diplomat, and fleet admiral during China's early Ming dynasty) led seven naval expeditions to the “western oceans” (the South China Sea and the Indian Ocean.) He commanded over 240 vessels and over 27,400 sailors. By comparison, Columbus only had a total of 30 vessels and 1,940 crew members during his four voyages, and Zheng He preceded Columbus by 70 years. If the technology of Shen Kuo’s era was inadequate for crossing the 6000 mile wide Atlantic Ocean, then by the time of Zheng He it was good enough to allow a fleet to sail to any place in the world. So why did Zheng He not discover the Americas? At least he might have established a Trans-Pacific economic circle including Southeast Asia, the Pacific Ocean and the western coast of the Indian Ocean, similar to the Atlantic economic circle. Yet the historic fact was that in 1492, the same year that Columbus discovered the New World, the Ming Dynasty instituted a ban on maritime trade and adopted an isolationist policy. Records of Zheng He’s expeditions were destroyed.

The China of the Ming Dynasty again lost the chance to start modernizing, but could the Qing Dynasty (1636-1912) seize the opportunity? Foreign missionaries had already been slowly introducing Western science and technology to China since the late Ming Dynasty. Emperor Kangxi (1654-1722) himself spent years learning the most advanced mathematics from missionaries, and he even established the Imperial Academy of Science modeled on the French Académie des Sciences. But in the end, Kangxi came to the conclusion that though the West was stronger in certain areas of mathematics, the basic principles of mathematics originated in the Book of Dao (Dao De Jing), so what foreigners knew was only a part of what Chinese knew. Gujin Tushu Jicheng (also known as Imperial Encyclopedia), a book commissioned by the Emperor, was a compilation of over 800,000 pages and constituted the greatest encyclopedia in the world. This shows the confidence Kangxi placed in Chinese scholarship.

By the reign of Emperor Qianlong (1736-1795), the New World had been discovered and the Trans-Atlantic Economy had taken shape. Could China have participated in the Trans-Atlantic Economy at that time and acquired the most advanced S&T? History indeed had presented China with such an opportunity. In 1793, Lord George Macartney, a cousin of King George III of Britain who harbored Marco Polo-esque fantasies about this ancient Oriental empire, led a mission which entered China from Guangzhou. After traveling for a year, he arrived in Beijing and had an audience with Emperor Qianlong. Macartney brought with him 19 varieties of gifts, 590 items in all, including the most advanced astronomical and geographical instruments, guns, models of carriages and ships, and glass lenses. This meeting could have allowed China to finally participate in the booming and dynamic Atlantic economy. Yet Qianlong, in his own letter of reply to King George III, once again closed the door of opportunity: “Swaying the wide world, I have but one aim in view, namely, to maintain a perfect governance and to fulfill the duties of the State: strange and costly objects do not interest me. If I have commanded that the tribute offerings sent by you, O King, are to be accepted, this was solely in consideration for the spirit which prompted you to dispatch them from afar. Our dynasty's majestic virtue has penetrated unto every country under Heaven, and Kings of all nations have offered their costly tribute by land and sea. As your Ambassador can see for himself, we possess all things. I set no value on objects strange or ingenious, and have no use for your country's manufactures. This then is my answer to your request to appoint a representative at my Court, a request contrary to our dynastic usage, which would only result in inconvenience to yourself. I have expounded my wishes in detail and have commanded your tribute Envoys to leave in peace on their homeward journey. It behoves you, O King, to respect my sentiments and to display even greater devotion and loyalty in future, so that, by perpetual submission to our Throne, you may secure peace and prosperity for your country hereafter. Besides

making gifts (of which I enclose an inventory) to each member of your Mission, I confer upon you, O King, valuable presents in excess of the number usually bestowed on such occasions, including silks and curios—a list of which is likewise enclosed. Do you reverently receive them and take note of my tender goodwill towards you! By special imperial mandate.” As for the opportunity described above, he decreed: “This is incompatible with our dynastic institutions and is absolutely unworkable.” (E. Backhouse and J. O. P. Bland, *Annals and Memoirs of the Court of Peking* (Boston: Houghton Mifflin, 1914), pp. 322331)

After his journey, Lord Macartney also came to his own conclusions about the Qing court: “The government, as it stands, is properly the tyranny of a handful of Tartars over more than 3 hundred millions of Chinese. Since a little before the conquest of China by Mongol Tartars, the Chinese had reached their pitch of civilization; but not having improved or having rather gone back, at least, for these hundred and fifty years past, whilst we have been rising in arts and sciences, they are actually becoming semi barbarous people in comparison with the present nations of Europe.”

As they study modern Chinese history, many Chinese people often cannot help but wondering why China was not the birthplace of modernization, and they try to find an explanation that they can accept. However, as I see it, these are false premises. The fact is that modern S&T Civilization 3.0 could not have been born in China. As stated earlier, the most fundamental reason for the birth of S&T Civilization 3.0 was the formation of the Trans-Atlantic Economy, and its most prominent feature was a free market economy which developed almost in the absence of government control. This economic system was completely different from all previous economic systems of any civilizations or any countries because private capital played a crucial role in this system, and because the role of government was limited to the protection of private property and the smooth function of the free

market. The formation of such an economic system in the 17th century on the periphery of the Atlantic Ocean was almost coincidental. On the American side of the Atlantic, the indigenous population had been decimated. The new immigrants who left their homelands in search of new opportunities were attracted by the tremendous business potential presented by the new continent, so of course they rapidly threw themselves into commercial activities. On the European side of the Atlantic, the traditional powers of kings were weakest in Great Britain, and out of that political system emerged a government representing the interests of merchants – this would have been totally inconceivable in China. Following the establishment of the Chinese empire during the Han Dynasty (202 BCE), the institutional innovations of the Sui Dynasty (581-619) with the establishment of Keju system for scholar-bureaucrats, imperial rule in China had become the most advanced and most stable political system in the world. This system had not changed much for more than 2000 years. To this very day, it is inconceivable to have a (Chinese) government which has no political goals of its own and which does not engage in economic activities.

By comparison, the government on the American continent faced neither serious internal problems nor external threats. The Atlantic and Pacific Oceans essentially kept out foreign enemies while domestically, the indigenous population had largely been decimated by germs. This made it possible for government to assume no major responsibilities other than the protection of the private property and to maintain domestic peace, at least for the first half of American history. In contrast, the Chinese government had to constantly deal with invasions from nomadic peoples throughout its history. Whenever it ran into fiscal difficulties, it turned the business class into its ATM. Business activities existed to serve the government and its goals, which was the opposite of the model of the Trans-Atlantic Economy.

Without the discovery of the New World, there would be no Trans-Atlantic Economy. Without an understanding of what powers a mechanized world, the Enlightenment Movement's criticism of old ideas and embrace of new ones would not have emerged. Without this way of thinking, a demand for science would have been unlikely. Without the development of a market economy, the appearance of professional scientists and technical inventors who could meet the needs of economic development would have been difficult. Without modern science and technology, the Industrial Revolution would have been hardly conceivable. Without the occurrence and spread of the Industrial Revolution, it would be hard to imagine that the Trans-Atlantic Economy could have so quickly grown into a force which could rule the world.

During this period, China had neither a free market economy nor modern S&T. The most important factor was that in the absence of a free market system, the government had no choice but to play a dominant role. The West had originally hoped to find a route to China when it accidentally discovered the New World. In contrast, China, as the most advanced civilization of before the modern era, had not the slightest motivation to explore the world. Moreover, the Pacific Ocean is twice the size of the Atlantic Ocean. Its currents cause the distances required to navigate the Pacific to be almost double the point to point distances, thus making it more challenging to navigate. In sum, China had neither the motivation nor the necessary technology to search all over the world for a place richer than it was. Geographically, Western Europe was best situated to first discover the American continent. Such a discovery made the formation of the Trans-Atlantic Economy more likely. Only with the Trans-Atlantic Economy was there a need for modern S&T. Only with such a need could modern S&T emerge, and only with the combination of modern S&T and the Trans-Atlantic Economy could modern civilization be forged. Britain and USA became

the birthplaces of modern civilization because they benefited from historical circumstances. Their governments were limited governments which served the merchant class, whereas ever since the Han Dynasty, such a government simply could have existed in China.

All these geographic and historical factors made Western Europe the most likely birthplace of Civilization 3.0, while the likelihood of this happening in China was very slim. This is similar to the birth of Civilization 2.0. More flora and fauna that could be used in agriculture existed in the natural environment of the Tigris–Euphrates basin; hence Civilization 2.0 was most likely to be born in this region. Thus while China's lost opportunities for modernization have caused innumerable anguish along modern Chinese intellectuals, this in itself is a false premise.



***Chapter 10* The Spread of Modernization and Competing Paths to Modernization**

Introduction: Since the beginning of the 19th century, almost all the nations of the world have been either actively engaged in the process of modernization, or have been swept up in it by force. In the 20th century, this has evolved into a contest between paths to modernization which has triggered two world wars and a cold war between East and West. For over a hundred years since 1840's Opium War, China has been doubly impacted by wars and inept governments. It was not until the late 1970s that it entered into an modernizing era by embracing both market economy and modern Science & Technology.

A review of 19th century world history shows a constant common thread tying together the fates of all the nations in the world. This thread is precisely the theme of the century, that is, all nations were either actively engaged in modernization or being swept up by it. At the center, the modernization process dominated by Britain entered a period of rapid development. In less than 100 years since James Watt invented the

first steam engine, the power generated by a steam engine could already exceed the physical strength of 40,000 workers, and even then it did not seem to have reached its upper limit. The enormous power of the combination of steam engines and coal began to directly or indirectly start revolutions in many other sectors. This began with textiles, followed by iron and steel, shipping, railways, and then radios, telegraphs and telephones. By the end of the 19th and the beginning of the 20th century, Germany and the USA began to lead a second Industrial Revolution. This started with the combination of the internal combustion engine and petroleum, which was followed by the appearance of automobiles and airplanes. Since then, fossil fuels have become the main source of power, and people, goods and information have been able to move non-stop across the world. Automobiles, airplanes, ships, railways, telephones, telegraphs, wireless communications and radios have suddenly made the whole world much smaller. With the flow of people, goods and information around the globe, markets have followed goods all over the world, and the entire world has become one big marketplace. Throughout the 19th century and influenced by Adam Smith and David Ricardo, governments led by Britain adopted foreign policies which promoted free trade. They opened up new markets throughout the world, broke down national and regional trade barriers, integrated resources globally and, for the first time, established a global market system dominated by Britain. Backed by gold, the pound sterling started to become a global base currency, and other countries nations pegged their currencies to gold and to the pound, thus creating a global financial system. For Britain, the USA and Western Europe, which were located at the center of S&T civilization, the 19th century was truly a golden era.

However, the 19th century was an entirely different story for the nations and peoples at the periphery of modern civilization. As with the spread of agricultural civilization, the way S&T civilization spread was either

through colonization of less developed regions by more developed ones, emulation of developed regions by less developed ones, or some combination of the two. This process brought both progress and calamity to those living in the less developed regions. The American Indians of North America and the aborigines of Australia were almost decimated by germs brought by the European colonialists. Africa (except Ethiopia), India and South America were totally colonized, while China became a semi-colonial nation. Of the centers of the original agriculture civilization's Eastern core, only Japan chose to modernize on its own. It started to industrialize in the late 19th century and by doing so, Japan escaped the fate of being colonized just in time. As for those peripheral nations which had not been incorporated into the centers of modern civilization by industrialization, the improvements to life brought by the modernization process were far outweighed by suffering, and they were forced willy-nilly to become part of the global economy. For instance, in 1876 and from 1896 to 1902, the Indian monsoons weakened suddenly. What would have been only crop losses due to severe weather patterns worsened by inflated grain prices and fast spread of diseases by railways with calamitous consequences. As a result, about 50 million people in India, China and Africa died from famine and epidemics.

There are two particularly distinct characteristics of the spread of modern civilization. The first is that the higher the levels of social development and culture of an agricultural civilization, the faster its pace of industrialization. The second is that the totally colonized regions developed more slowly than uncolonized or semi-colonized regions. Take Japan for example. It already had a high level of social development and had not been colonized; hence, it was first to industrialize. China originally had a very high level of social development, but it was semi-colonized and therefore had a slower pace of industrialization than Japan. As for India and sub-Saharan Africa,

their rates of industrialization were even slower, and they are just getting started now.

The East could not have been the birthplace of Civilization 3.0 because of its geographic location. However, this does not mean that Civilization 3.0 cannot be spread to and replicated in Asia. At these critical historic junctures, different leaders of these countries made different choices, bringing about drastically different outcomes. The clear contrast between Japan and China is the best example for illustrating this stark difference.

With the Meiji Restoration (1868-1912), Japan embarked on a movement to completely westernize. It comprehensively studied and learned from the West in culture, economics, technology, science and politics. On the one hand, Japan maintained stable and peaceful relations with the West, while on the other hand, it mobilized all its social resources to engage in wide-ranging industrialization. This was the second time in Japanese history when it so comprehensively emulated the experiences of an advanced country. The first was the total sinicization movement which took place during China's Tang Dynasty (618-907).

After the First Opium War, China lost almost two decades as it put down the Taiping Rebellion (1850-1864). 20 million people lost their lives and the imperial coffers were almost emptied during this time. The subsequent Self-Strengthening Movement (or Westernization Movement) stumbled badly due to bad leadership. Empress Dowager Cixi (1835-1908), for example, believed the rumor that members of the Boxer Movement (1899-1901) possessed invincibility against swords and guns. And worse, she encouraged them to challenge the Western powers, which directly led to an invasion by the Eight-Nation Alliance. Also, to protect its former vassal states of Vietnam and Korea, China went into war with two world powers, France and Japan, despite the fact that

China was only in the beginning stage of industrialization. These two wars utterly destroyed the fledgling Chinese navy. Moreover, at the most crucial time when China was at war with foreign powers, Empress Dowager Cixi misappropriated military funds to build the Summer Palace in celebration of her birthday.

During the Meiji Restoration which began in 1868 and lasted 30-plus years, Japan completed its initial industrialization. In 1889, it completed constitutional reforms. In 1895, after less than 30 years of industrialization, it defeated the Qing army, and again in 1905 it defeated Russia, one of the Western powers. Japan accomplished the entire process of industrialization in less than 40 years while China, during this most critical period (1861-1908) of modernization, was under the inept rule of Empress Dowager Cixi. Although it was HMS Nemesis, a British ironclad warship which forced open China's doors in 1840 and forced it to open its eyes to the arrival of Civilization 3.0, the true "nemesis" of China's modernization efforts was Japan. Post-industrialized Japan believed it can unify all the former centers of Eastern civilization and use this as a base to counterbalance the West. It therefore initiated all-out wars of colonization until its defeat in World War II in 1945. From 1895 until the end of WWII in 1945, China was either threatened by Japan or at war with Japan. China lost almost a century, from 1861 to 1945, first to incompetent rulers and then to Japanese invasion. It was not until 1949 when China had the opportunity to become master of its own fate again.

If the 19th century was one of modernizing or being forced to modernize, then the 20th century was one of a contest between paths to modernization. This contest began with failures at the original centers of modernization. At the end of the 1920s, because of the collapse of the stock markets and a subsequent series of failed government financial and fiscal policies, the centrally positioned United States entered into a Great Depression which lasted for many years and saw unemployment reach

25%. This Great Depression quickly spilled over to the rest of the world through globalized trade, finance and economics. For the first time since Adam Smith's publication of *The Wealth of Nations* and the worldwide expansion of the Trans-Atlantic Economy, the invisible hand seemed to have lost its magic. The newly elected US president Franklin D. Roosevelt (1882 –1945) unveiled a series of new policies called the New Deal in an attempt to remedy the malfunctioning free market. The British economist John Maynard Keynes (1883-1946) gave a comprehensive theoretical description of the visible hand, namely the role of government policy in a free market economy. At the same time, a different voice challenging the Trans-Atlantic Economy was raised in some countries located at the center of Civilization 3.0. Germany and Japan both began to consider the visible rather than the invisible hand as better able to resolve the crisis at hand. Some successors of (Karl) Marx went even further, arguing that the invisible hand was invisible because it was nonexistent. Thus, whether it was the planned economy of the Soviet Union or the state capitalism of Germany and Japan, now we had a different path towards modernization. The contest between these two models ultimately resulted in the largest and deadliest world war in human history. All nations either at the center or on the peripheral of the modern civilization were drawn into this war, and none were spared.

Victory in WWII and the subsequent Cold War allowed the Anglo-American economic model to achieve complete victory. After the disintegration of the Soviet Union, countries from the former Soviet Union and Eastern Europe began to enter the global market. China has also fully embraced the market economy after the early 1990s. For the first time, the free market economic model swept across the globe unimpeded. Another outcome of WWII and the Cold War was the growing replication of the Anglo-American political model of constitutional democracy in Western Europe, Eastern Asia, Eastern Europe, South America, and even India.

Ever since 1840's Opium War, China has been doubly burdened by wars and incompetent governments. It was not until the late 1970s that it entered into an era of having both a market economy and S&T development. In the 30 years since, China's GDP has increased over a hundred-fold. It has industrialized and modernized at an unprecedented pace. Although today there is still a gap between China and the most advanced nations, China has already shown promises to be able to fully catch up with the West one day.



Chapter 11 The Nature of Modernization and Its Iron Law

Introduction: *A pattern of compounding economic growth over a long span of time began to develop that seemed to have no ends. Since the beginning of Industrial Revolution, this phenomena has lasted for several hundred years with seemingly no end. This was unprecedented in human history. Such a state of affairs is the state of Science &Technology Civilization 3.0, or what is more commonly known as modernization.*

A freely competitive market is a mechanism which is constantly self-evolving, self-advancing, and self-perfecting. The injection of modern S&T into this process gives it greater speed. Thus, when there are competing markets exist, the largest one will eventually become the only one. If any individual, society, enterprise, or nation is removed from this single market, it will start to steadily fall behind and will ultimately be forced to join in. The best way for any nation to build up its own strength is to abandon all its tariff barriers and join the largest international free market system in the world. The best way to fall behind is to close itself off from other countries. Such is the Iron Law of Civilization 3.0.

David Ricardo, the British political economist, discovered that the division and exchange of labor could create greater value. He used an exchange between two individuals engaged in two separate activities to illustrate this. One individual may be more capable in both activities than the other, but if he concentrates on the activity in which he is even more capable and allows the second person to do what he is relatively better at, then the value they create after a mutual exchange will be greater (than if each had done both tasks alone). His rule shows that social divisions of labor and social exchanges create surplus benefits, and gives a fundamental explanation of why trade has been an important source of wealth creation since time immemorial. He used the formula $1+1>2$ to illustrate this concept. It is not difficult to infer from this that the greater the number of people engaged in exchanges, the larger the size of the market place, the greater the surplus values will be created. Hence, a free market itself follows the principle of economies of scale.

In the age of modern Civilization 3.0, the value created by the division of labor and by exchange is further increased because human knowledge can be accumulated. Compare to goods and services, human knowledge is easier to accumulate. Exchanges of ideas often result in a $1+1>4$ equation. When different ideas are exchanged, the parties not only retain their own ideas, they also obtain the ideas of others. Moreover, sparks can fly during exchanges, creating entirely new ideas. When ideas are having sex with each other, they become very productive.

One of the salient feature of Civilization 3.0 is the seamless integration of S&T knowledge and products. Knowledge is inherently cumulative, so that when modern S&T is combined with free markets, increases in efficiency, wealth creation more or less follows the scale of $1+1>4$. There are almost no limits to the explosive growth of knowledge. In the past century or more, human knowledge doubled roughly every 10 years. Because of the almost infinitely explosive growth of knowledge, the

latest advances in S&T can provide almost endless new products at costs which can be almost endlessly lowered. Together with the insatiable human demand, this creates a ceaselessly expanding modern economy.

Through free market mechanisms, modern S&T causes product varieties to increase endlessly and costs to be lowered endlessly. Together with unlimited human needs, the result is the birth of modern S&T Civilization 3.0. A pattern of compounding economic growth over a long span of time began to develop that seemed to have no ends. This was unprecedented in human history. The entire economy entered a state of sustainable and compounding growth. Such a state is the state of S&T Civilization 3.0, or what is more commonly known as modernization. Society encourages the discovery, study and spread of scientific knowledge while encouraging constant innovation in technology; and modern S&T can be seamlessly integrated into the free market economic system; and an economy guided by S&T can therefore grow on a compound and sustainable basis -- this is the nature of modernization, and this is what we call a modernized society and modernized country.

The economic theories of Adam Smith and David Ricardo explained how divisions of labor and exchanges apply not only within nations, but also applicable to exchanges across national borders. It is not hard to infer from this why markets themselves enjoy great economies of scale: the more market participants and the more exchanges they make, the greater the surplus value created, the more optimal the market allocates resources, the more efficient, wealthy and successful the market becomes, and the better it can then produce and support ever more cutting edge S&T. A freely competitive market is a mechanism which is constantly self-evolving, self-advancing, and self-perfecting. The injection of modern S&T into this process gives it greater speed.

Thus, when there are competing markets exist, the largest one will eventually become the only surviving one. If any individual, society,

enterprise, or nation is removed from this single market, it will start to steadily fall behind and will ultimately be forced to join in. The best way for any nation to build up its own strength is to abandon all its tariff barriers and join the largest international free market system in the world. The best way to fall behind is to close itself off from other countries. Such is the Iron Law of Civilization 3.0.

The contest between paths of development in 20th century provides a vivid illustration of this Law. At one point, the market of the Soviet Union and Warsaw Pact was very large, but because it was not a free market mechanism, its efficiency was much lower than that of the US and of the Common Market which was established in postwar Europe. Within the short span of 30 years, the entire Soviet system fell farther and farther behind the mainstream global markets. It ultimately lost the Cold War and was forced to join the larger global market. Another example was China, which in the Mao era adopted policies of self-reliance and isolationism. It finally joined the global market in the open door era after humiliation economic failures. Other good negative examples are the economic performances of countries like Iran, Myanmar and Cuba, after they were subjected to international economic sanctions and forced out of the international common market.

Let us also contemplate that suppose Germany had won WWII and established another European economic system dominated by state capitalism. I doubt it would have fared much better due to the absence of a free market mechanism despite its otherwise large size. It would therefore have been difficult for S&T to seamlessly integrate with the market, and there would not have been the process of constant self-improvement found in the American and British markets. With the passage of time, the final outcome might have been similar to that of the Soviet Union and Warsaw Pact.

Once the earliest free market was formed in Britain, the Atlantic periphery, and between Britain and the US, it displayed a strong tendency of continually self-improving and self-evolving. Its efficiency steadily increased and its scale steadily expanded. Once it developed into the largest free market, other nations had in fact no alternative but to join it. All other independently formed market systems were ultimately less efficient, and they fell behind with the passage of time so that in the end, they either deliberately chose to or forced into choosing to join in the largest market. By the time this process played out through the early 1990s, the Cold War had ended, the Soviet bloc had disintegrated and joined the international free economy, and China had also fully entered the international markets. At this point a single, unified international free market system was formed around the world, a process known today as globalization. It was a predictable outcome, an inexorable result of the iron law of Civilization 3.0. After globalization, the markets for goods, services, S&T and finance will be further integrated, expanded and deepened all over the world, making the price for leaving this market ever higher.

Herein lies an interesting question: the economies of scale resulting from market exchanges were also present in agrarian Civilization 2.0, so why did that era not produce such extreme globalization? The primary reason was that in Civilization 2.0, there was still no modern S&T, product variety was extremely limited and so was room for cost reduction. When there was trade, particularly private sector trade not subject to government regulation, wealth would increase, and so would division of labor. However, such increases were not unlimited. Once factors of production such as land and money reached certain levels of concentration and a further social division of labor was required, some social turmoil and instability would appear. Governments would then often intervene in the name of maintaining social stability and heeding public opinion. For example, in an attempt to spread the wealth and

achieve social stability, China often used various forms of state monopolies to compete with the private sector. This not only filled the public coffers, but also allowed the officials in charge of these operations to line their own pockets, thus killing 3 birds with one stone. Chinese history is replete with examples of such measures.

Because there is an inherent ceiling for the amount of energy conversion made possible by photosynthesis, Agrarian Civilization 2.0 was unable to overcome the five major challenges as discussed in previous chapters. The most effective way to address the five major challenges was still to establish a strong government, so regulation of the private economy by a strong government was almost inevitable. In China, for instance, over the past few millennia the private economy was often caught in cycles of “freedom-prosperity-regulation-decay-re-liberalization” because of government controls. The interests and wealth of merchants would also change unpredictably along with the visible hand of the government, so that trusting to luck has become part of the coerced collective memory of the business class. This psyche has permeated Chinese culture so much that to this day, in all the casinos of the world one can always find disproportionate number of Chinese exercising their faith in luck. Along the same lines, from the government perspective, economic intervention by the Chinese government has become a traditional part of its functions. Even today, the direct control of economic activities by the Chinese government is nearly a reflexive choice resulting from thousands of years of history.

So where is China now in terms of its modernization process? Here we define that when the coupling of constantly-advancing S&T and a free market causes an entire economy to enter a stage of sustainable, compound growth, such a society will have arrived the modern era of Civilization 3.0. The market economy in China today has already taken embryonic form, but is not yet completely free. Both the visible and invisible hands are still at work, and often at odds with each other.

Modern S&T is already widely studied and widespread, but innovativeness is still wanting. A seamless integration between S&T and the economy has not yet been fully achieved. Although economic growth has been sustained for more than 3 decades, it has not yet reached a state of automatically sustainable compound growth. It is obvious that China is not yet a fully modernized state but it already has the embryonic forms of modernization. We can therefore say that China today has moved beyond Civilization 2.5 and is evolving towards Civilization 3.0.



Chapter 12 China in the coming decades – Economics

Introduction : *The most important transformation of China’s economy in the coming decades will be moving from a government-dominated market economy to a mostly free market economy where the government plays only a supporting role. Domestic consumption and services will account for the bulk of its GDP. During this transition, it will still be possible for China to sustain growth for a long period at a rate higher than the global average until it has roughly reached the level of developed countries.*

China, a nation with deep roots, has a history of great success, and its ruling party exerts strong leadership. Therefore, what will most likely happen in the coming decades is often what China most needs to happen. Based on this understanding and assumption, I would like to share my predictions about China’s future from economic, cultural and social perspectives.

China’s economic growth over the past 35 years has been almost unprecedented for its scale, duration and speed. During this period,

foreign trade and direct investment have been the two main engines driving economic growth. At the outset of China's reforms, on the one hand it had a large pool of inexpensive and highly disciplined labor, and at the same time, it had a ruling party with exceptional ability to execute, and which had assembled a group of highly talented people. After reforms and opening up began, what had been weaknesses in the past became great strengths as China sought to catch up. The government used its exceptional ability to execute to formulate a series of policies on issues ranging from foreign exchange and capital to land and labor. These policies made possible to integrate hundreds of millions cheap Chinese labor into the global economy and ultimately turned China into the "factory of the world." Foreign trade therefore became one of China's greatest economic drivers. Even though intellectual property, design and the consumption of products all resided in foreign countries, China still enjoyed unique advantages in the intermediate processing stages. During this period, Chinese government played a dominant role in formulating and implementing this growth strategy, with the market forces playing a secondary role. In other words, market behaviors were guided by a visible hand. This was particularly evident in the two engines of economic growth, foreign trade and investment. For instance, for the Chinese-style urbanization, local governments often played the role of a master real estate developer.

Why could such a hybrid economic system achieve such great success? First of all, Chinese foreign trade is in fact just a part of the international trade operating on essentially free market principles. China only participated in part of this larger cycle, and it was possible for the visible hand to dominate this small part. After all, designing and marketing iPhones is very different from manufacturing them. Secondly, circumstances are also different when an economy is catching up from behind. Once leaders have already paved the way, and directions and goals are clear, the catchers simply need to follow the original path or

take some shortcuts when possible. During this stage, the visible hand of government can even push the process of economy development faster. However, this model of development has its limits once it passed the initial stage of development. Though no one knows with any certainty where these limits lie. What we do know is that once China surpasses US as the world's largest exporting country, its foreign trade will obviously no longer be able sustain a double digit growth rate, or any rate substantially higher than the global average. Likewise, once investment approaches 50% of GDP and investment wastes such as "ghost towns" began to appear across the country, the investment-driven GDP growth will also encounter a bottleneck. Over the long term, truly sustainable long-term growth of a large economy like China's can only be coming from domestic consumption. There, entrepreneurs will have decisive advantage over government in inducing consumption. And since the domestic consumption market will no longer have the benefits of international free markets mechanism the way foreign trades are, fundamental adjustments will have to be made between government and markets, between the visible and invisible hands.

The chief role of free markets in S&T Civilization 3.0 is to most effectively allocate resources through creative destruction, and this is contrary to -the basic function of a government. A government is by nature a bureaucratic leviathan which requires consensus building and coordination across different levels in order to move forward. A government needs predictable targets and acts constructively through budgeting and planning. When a government is leading economic development to catch up from behind, it had clear goals and path forward, therefor it is able to marshal powerful social forces push forward more forcefully. For example, a government is more capable of long term infrastructure building (highways, high-speed railroads, airports, ports, etc.), or in helping to build traditional industries such as coal, oil and chemical products. Modern economies cannot develop

without infrastructure and traditional manufacturing industries – this has been the path taken by every successfully modernized country. When a backward nation begins to catch up, a capable government can accelerate this process as this is still within the basic function of government.

Yet once a country has caught up to a certain degree, to continue to lead the economy, the government will have no choice but to anticipate future competitive conditions. There, in the face of rapidly changing market competitive environment and the constant need to pick winners and losers, the advantages of the market over government becomes obvious. In a freely competitive market without any external interference, countless individuals driven by capitalistic interests are willing to take risks and accept failure. Those who are ultimately successful can only be those most needed by the market, and thus receiving the most resources from the society. This process, while messy, guarantees efficient allocation of resources. But if this process had to be done by government, it would be like making bricks without straw, as it would be contrary to the basic functions and features of government. Eastman Kodak, for example, was at one time among the greatest companies in history. It invented the technologies of photography and video camera, and was once one of the most valuable companies in the US, yet it no longer exists. Likewise, Xerox invented photocopying and owned many patents in a wide variety of fields (some of which have been keys to Apple's success), but its glory days are long gone and it is barely scraping by as a small company. Again, AT&T was the inventor of the telephone, one of the greatest inventions in human history, and its subsidiary Bell Labs was once the cradle of the world's communication technologies as well as the place with the highest concentration of Nobel laureates. Still, Bell Labs eventually disappeared and its equipment business also no longer exists. AT&T was bought out by other companies and only its name survives. There are profound

contradictions between such forces of creative destruction and the basic role of government. It would be hard to imagine that a government would have chosen to completely destroy AT&T while making Apple, a computer company on the verge of bankruptcy, the winner with the largest market capitalization in the world. In China, this would be comparable to the government allowing China Mobile and China Telecom to go bankrupt simultaneously, while choosing Stone Technology Corporation (a marginal computer maker most active in the 1980s) to become the largest telecommunication company in China. When a government chooses the future direction of the economy, the most likely result will be that the economy gets into a rut, or the wrong choices are made, or both. This is why economic models which deviated from the free market economy over the long term all eventually failed.

The most important transformation of China's economy in the coming decades will be moving from a government-dominated market economy to a mostly free market economy where the government plays only a supporting role. Domestic consumption and services will account for the bulk of its GDP. Economic resources will become accessible to everyone. Financial, energy and land resources will no longer be skewed toward foreign trade and SOEs (state-owned enterprises); rather, they will become accessible to everyone through market mechanisms and circulate throughout the entire country at fair prices. The special operating privileges of SOEs will be abolished and free competition between them and private companies will gradually take place. Ownership and management of SOEs will also be gradually separated. Private capital will be mixed into SOEs, and their management will be entirely market-driven. Large part of state-ownership of SOEs will gradually be added to the country's social security system to buffer a social safety net. As the social security system is gradually refined, private savings will also flow effectively into the real economy through financial intermediaries such as gradually matured securities markets

and banks. Hence, a virtuous cycle of capital, enterprises and consumption will be formed. The distinction between urban and rural citizens will be eliminated so that all citizens enjoy equal rights. Urbanization will continue to take place rapidly, and the government will gradually relinquish the central role it played in the early stages of economic development. In the mid to long term, the government will gradually transition away from being a star player in the economy and focus instead on drawing up the rules of the game and serving as an impartial referee. Its economic management powers will be exercised primarily through a negative list rather than a positive list.

During its transition from a government-guided market economy to a government-supported fully free market economy, it will still be possible for China to sustain growth for a long period at a rate higher than the global average until it has roughly reached the level of developed countries.



***Chapter 13* China in the coming decades - Culture**

Introduction: *China's future culture will most likely develop as a renaissance of traditional culture accompanied by its modern transformation.*

China's future culture will most likely develop as a renaissance of traditional culture accompanied by its modern transformation.

First, China has no choice but to restore traditional culture to its legitimate position. Any culture is shaped by time and place. People from different places have different histories, religious beliefs, lifestyles and customs living habits, which collectively makes people feel "at home." This is culture. Culture penetrates deeply. Culture is faith. And it takes thousands of years to form, and it cannot be changed quickly. For some 60,000 years before the Age of Discovery and the emergence of modern transportation methods, human beings lived in isolated

geographic locations. The cultures, fundamental beliefs, living habits and lifestyles formed over such a long period are very difficult to change.

Thus it is truly a peculiar phenomenon that the Chinese people would abandon their traditional culture and embrace a non-mainstream western culture in modern times, and it can only be understood through its own unique modern history. However, under today's peaceful circumstances, just as Chinese cuisine suits Chinese appetites, Chinese people really have no choice but to return to their traditional culture. They will need to re-establish their "Chineseness" as the first ingredient necessary for China's cultural renaissance. The modern reform of the Chinese writing system has made it very difficult for today's Chinese to read traditional classic texts, thus creating a fault line between people and their traditional culture. With their rising economic levels, people are pursuing ever-greater cultural and spiritual needs. It is very likely that a Chinese-style cultural renaissance will take place, one which allows today's Chinese to rediscover the best of Chinese culture and their long cultural heritage, and which renews their understanding of why Chinese culture has provided complete spiritual nourishment for generation upon generation of Chinese over the past two to three thousand years. On an individual level, the best of Chinese culture lay in how it shaped the characters of "Confucian Madeirans" by deliberate and constant self-cultivation. On a societal level, China's cultural renaissance has to provide its people and society with a common set of morals and ethics to abide by, as well as beliefs and faith with which to console the soul. Without such a foundation, no society can sustain long term prosperity, progress and peace.

Secondly, in order to keep pace with S&T Civilization, traditional culture itself must modernize by evolving. During its course of modernization, the culture of the western world also underwent the Renaissance, religious Reformation and the Enlightenment. These process allowed cotemporary Western culture to become an organic

component of (S&T) Civilization 3.0. Many concepts in traditional Chinese culture, such as industriousness and an emphasis on education and family, are not only suited to (Agricultural) Civilization 2.0, they can also shine brightly in the age of S&T Civilization. With the economic success stories of the countries in the East Asian Confucian cultural sphere, these traditional values are once again attracting attention. However, (S&T) Civilization 3.0 also poses some new problems and challenges for traditional culture, which must be reexamined and further developed. Culture renaissance and evolution is a prolonged and difficult process, one that can take place only with rational thinking (reasoning) and scientific methods, and can only bear fruits after a long-term, sustained efforts.

Rational thinking (reasoning) and the scientific method are notable characteristics of a S&T civilization society, particularly when it comes to cultural and social issues. Scientific and technological innovations require freedom of thought, and the unshackling of thought will inevitably cause people to use rational thinking to critically consider and examine all the established assumptions of traditional society. They will rely on facts and logic rather than authorities and dogmas. This process began in the Enlightenment movement in the West during the 17th and 18th centuries. One of its core drivers came from the unprecedented confidence in rationality and the scientific method resulting from the modern scientific revolution exemplified by Sir Isaac Newton. Meanwhile, Europe was at the time confronting a series of epochal changes brought about by the Trans-Atlantic economy and colonialism, and the traditional conceptual resources of the Axial Age were utterly inadequate for meeting these new challenges. The Enlightenment movement in Europe was an attempt to use rational thinking to reexamine and reconsider all the issues of life, society, politics, religion, philosophy, arts and the humanities. This “brain storm” nominally lasted for a century, but in a certain sense, it has never actually ended because

from that time on, rationality, the scientific method and the free marketplace of ideas have become the norm in S&T civilization. Progress in the natural sciences has continued to deepen the impact of rational thinking and the scientific method on the humanities and society.

As knowledge based on commonly accepted facts and logic accumulates, social consensus will continue to grow. During the two or three centuries of modernization in the West, efforts to modernize culture never ceased, and this was how society developed the strong spiritual underpinnings which enabled it to absorb the psychological trauma caused by dramatic social and economic changes.

From the Yuan Dynasty (1271-1368) on, the Keju system focused on the teachings of the school of reason (“Li”). The Commentaries on the Four Books (four authoritative books of Confucianism in China written before 300 BC) By Zhu Xi (1130 – 1200, a Song dynasty Confucian scholar who was the leading figure of the School of Principle and the most influential rationalist Neo-Confucian in China) became the official ideology and was the only subject content of the Keju exams. During the Qing Dynasty (1636-1911), the “eight-legged essay” (Baguwen, a style of essay writing that had to be mastered to pass the Keju examinations during the Ming and Qing dynasties) was also set as the format for the exams, greatly narrowing room for (new) ideas and to a certain extent stifled the thinking of scholars. Although Confucian studies had continued to develop during the Ming (1368-1644) and Qing dynasties, it lacked the vigor, inventiveness and breadth it once had during the Tang (618-907) and Song (960-1279) dynasties. A brief enlightenment movement appeared in China after 1840. However, under domestic and foreign pressures and the threat of regime collapse, the "enlightenment" soon gave way to “nation-saving”. The cultural enlightenment was also limited to criticizing traditions and there was little time for cultural rebuilding. In fact, even today the situation in China has not fundamentally improved; rational and scientific thinking are still not in

the mainstream of discourse of social issues. Today, scholars might manage to be objective and professional in their own narrow disciplines, but when it comes to social and humanistic issues in the public domain, there is much less rational thinking. Because there are no commonly accepted facts and logic and no basis for consensus, arguments between different viewpoints seem to be on parallel tracks, never converging. Various strange new ideas float through society like duckweed blown about by the wind, creating volatility in people's minds. This situation has created many problems. Of these, the most damaging to society is the inability to cumulate knowledge effectively. Without the long term buildup of social and cultural knowledge and without a mechanism of free market of ideas, it is almost impossible to create wisdom on which a society can rely, and in turn to create a social consensus for people to abide by and to maintain peace and order.

China, in its course of modernization, will likely follow the path of the West. It will also have to lay a new spiritual cornerstone on which the society can renew itself. This journey will be a long and arduous one requiring hard work, patience and persistence. An enlightenment movement in China does not simply mean translating and introducing western classics to its society. It certainly does not mean a wholesale rejection of Chinese traditional culture. Rather, it should begin by taking stock and arriving at an objective understanding of the current state; in other words, by accepting the fact that we may not have all the answers. A modern version of the "adjustment of national cultural heritage" (an initiative taken by Hu Shi in 1919) may be called for to rediscover the radiance and brilliance of Chinese tradition. Only by standing on the solid foundation of that tradition can China critically embrace foreign cultures, and gradually and slowly build social consensus. Rational thinking and the scientific method will remain the only effective way to build credible consensus in the social and cultural sectors.

Now I would like to offer a concrete example.

Traditional Chinese culture described five cardinal relationships between people: ruler & subject, father & son, husband & wife, friends, elders and juniors. Culturally, each relationship is governed by its own moral code: closeness/filial piety between father and son, loyalty between ruler and subject, separation of roles between husband and wife, order between elders and juniors, and trust between friends. These five cardinal relationships basically apply to people who know each other, so Chinese culture is a culture of personal relationships among acquaintance. It has a complete set of rules governing relationships between people familiar with each other and observed by all, but there are no rules regarding strangers. In traditional society, there were few opportunities to interact with strangers, and therefore no need to establish such codes of conduct. The five cardinal relationships were sufficient for an agrarian society, but in the age of Civilization 3.0, in the age of free market economies, many interpersonal relationship are between strangers, so this has created a host of problems for modern society.

In a society of personal relationships, relationships are more important than laws, and this poses great challenges to social order. Also, the time spent on interpersonal relationships is a waste of social resources. Even more detrimental is the lack of a moral code to govern conduct between strangers. This is a major reason for the lack of trust in business dealings, and trust is precisely the lubricant of a free market economy. If one can deceive strangers without any sense of guilt, then a “good” person who observes all the principles of the five cardinal relationships could still become an evildoer in the business world. The loss of trust has a destructive impact not only on the business environment, but also on the development of science and technology. The latter is a process of continual buildup and gradual progress which needs broad-based and long-term cooperation among lots of people. Without a foundation of trust, it is very hard to establish such a trust-based cooperative system.

China today still lags far behind the world's advanced levels in its research both in S&T and in the humanities. This is also a key reason why lack of trust has become a major drag on the course of China's modernization. It is easier than ever to see the damage it has done to China's society and its interpersonal relationships.

An important aspect of a cultural renaissance is the reestablishment of a value system that is based on tradition but suited to modern civilization. Hence, Chinese culture must propose a 6th cardinal relationship to define and govern relationships between strangers. The moral and ethical principles of this relationship should rebuild the foundations of a trust-based society and be organically integrated with the traditional five cardinal relationships.

So how should a righteous, trustworthy, loving and respectful person treat a complete stranger? I feel the best answer is with honesty. Honesty does not mean telling all that is truthful, but it definitely means telling no lies and not deliberately misleading others, to say nothing of deliberately deceiving others. The opposite of honesty is deceit. It is possible to have honesty as a moral basis between strangers, and this would also yield many benefits. When there is honesty, it is easier to build trust between strangers. With a foundation of mutual trust, exchanges become easier, which in turn create surplus value. With honesty comes trust, which causes the relationship to approach the level of that between friends, to become one of the traditional five cardinal relationships, and to become part of one's personal relationships. The web of relationships is immediately enhanced and gains in value. If there is a commercial exchange, value is added twice. It is not hard to have honesty between strangers, and once this is achieved, there will be a multiplier effect. One positive example of this multiplier effect can be found in today's social network economy, as exemplified by Facebook and WeChat. Also when society accepts honesty as the code of conduct between strangers, the multiplier effect will also magnify the losses

caused by dishonest behavior. For example, if A and C are strangers in a world without rules on honesty, they will deceive one another. Later, through an introduction by mutual friend B, A and C can become friends. When the two look back and talk about their prior deceptions, they can simply laugh it off and forgive each other because they were strangers at the time. But once honesty is accepted by society as a code of conduct between strangers, even with an introduction by mutual friend B, A and C would feel very embarrassed upon meeting again. They would be unable to become friends because of their mutual distrust. Even worse, they might exclude each other from their respective relationship networks, causing multiple losses. In today's society, examples of this negative multiplier effect can be found in the public condemnation of and damage actions against counterfeit products and disreputable merchants.

Because the 6th cardinal relationship of honesty has a multiplier effect on rewards and penalties, if China's society and its government strongly promote this concept, it may well become one of the core concepts of Chinese culture. This would enable honesty to accelerate the pace at which China enters into the age of Civilization 3.0 and better integrate with international social and business norms.

In Western societies, Christianity established a code of conduct between strangers, but this lacks the multiplier effect of personal networks. One can imagine that once the 6th cardinal relationship's moral principle of honesty between strangers is established in China and woven into the relationship networks of the 5 traditional cardinal relationships, it will provide even greater impetus to the development of a S&T economy.

Another example in the course of modernization of Chinese culture is the role of the individual. The family was the basic unit in traditional Chinese society, and cultivation of the individual emphasized sacrifice and dedication to the greater good. The imperial examination system

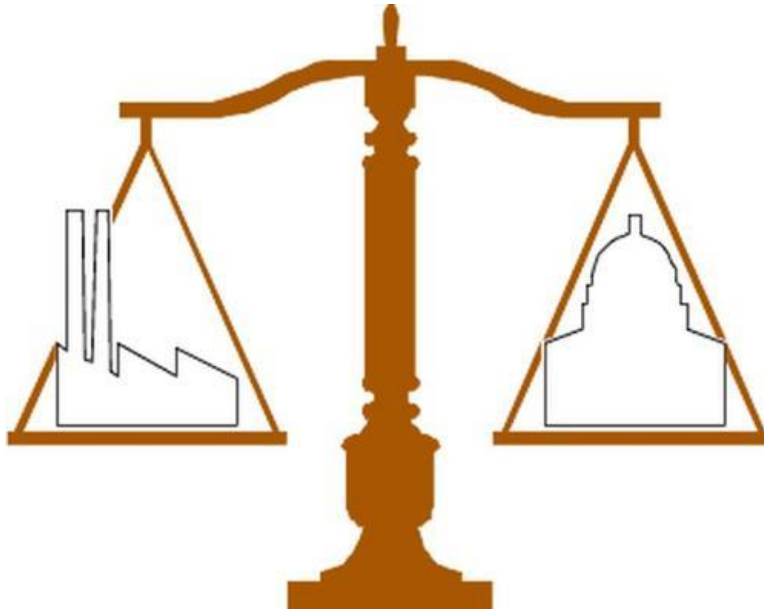
also caused most intellectuals to focus their attention on the very narrow area covered by the examinations. In the age of S&T civilization, the ability to innovate has become the most important ingredient for success. Innovation is an extension of individuality. Thus, future (Chinese) culture will place greater emphasis on individualism, have greater respect for differences between people and encourage personal growth, thereby accelerating innovation.

Moreover, the modernization of Chinese culture will require further linguistic convergence with English.

In the era of Civilization 3.0, the global spread of economic activities and knowledge and the exchanges between people from countries around the world will require a common language. As in the free market, language enjoys economies of scale, and the first to be used by many will become the language of all. At present, English is such a common and open system. Like the Microsoft OS or Android, everyone uses the same system to write apps. Today, almost all important innovative ideas first appear in English, whether they are in natural sciences, social sciences, commerce, culture or the arts. English is no longer the exclusive province of the USA and Great Britain. It has long since become the common language of world business and of professionals in creative fields. Chinese and other languages probably will not have a chance of becoming the common language. Therefore, the modernization of culture will include the embrace of the English language. This will allow the latest knowledge to be immediately and seamlessly integrated into the Chinese language, and enable the latter to gradually transition from a user to a creator of new knowledge.

To sum up, the renaissance and evolution of China's culture will take place against the backdrop of S&T Civilization. Through rational thinking and the scientific method, there will be “adjustments of the national heritage” in traditional culture. It will continue to evolve and

develop, and over a long period of sustained buildup, a social consensus will be gradually established. This will also provide the Chinese people and Chinese society with a moral code which all will abide by, as well as common beliefs and faith to console the soul. With such a foundation, China will be able to stay in the forefront of advances in the global S&T civilization and gradually make the contributions to the world that a country with one-fifth of the world's population ought to.



Chapter 14 A Forecast for China in the Coming Decades - Politics

Introduction: *In spite of its weaknesses, the Keju system was still the greatest institutional innovation of Civilization 2.0. It was one of the most fundamental reasons why China was a country able to maintain a relatively stable society with a large population and vast land area over its long history. Chinese politics today are still influenced by the Keju system, and the importance of credentials is a concept deeply rooted in the minds of the Chinese people. However, the Keju system was unable to solve the problems of how those with supreme power were selected and their legitimacy. As the product of Agricultural Civilization 2.0, it was somewhat inadequate for meeting the special challenges posed to governments by Civilization 3.0. Constitutional democracy on the other hand, was born during Civilization 3.0 and offers valuable experiences which address the weak points of the Keju system. Therefore, the most likely development in China's future political evolution will be an organic integration of the two major innovations of institutions of the east and west, that is, the Keju system with constitutional democracy.*

Politically, one of the great institutional innovations which emerged during the course of modernization in the west was constitutional democracy. Conceptually, this system originated in the Enlightenment doctrine that the power of the ruler is delegated by the people, that is, the power of a government comes from the consent and empowerment by its citizenry. This was an expansion of Axial Age concept that emphasizing people over rulers.

A constitutional government means a restricted government, one where the constitution limits government power. On the one hand, no individual rights are above the constitution, but at the same time, individual rights and liberties are safeguarded by the constitution from arbitrary government interference. A democracy under a constitution is a system in which citizens participate in the election of the government and in the institutions which allocate political powers. In terms of political progress and evolution, the emergence of a constitutional democracy coincided with the arrival of Civilization 3.0, reflecting the rise in the social position of the business class and the changing role of government in the economy and in society. New free market economic forces began to enter into government, gradually changing its role from one of controlling and excessively interfering with economic activities to one of supporting them, of protecting the property rights of its citizens, and of providing and securing room for the freedom of ideas and speech required for technological innovation.

Constitutional democracy is a gradual process. In the most successful constitutional democracies in history, a constitution preceded democracy, and property rights and economic freedom preceded voting rights and political freedoms. Take, for example, Great Britain -- the earliest and most successful constitutional democracy. By 1830, Great Britain had already entered the age of Civilization 3.0. Constitutional rule had been in place for over a century and its citizens enjoyed ample freedoms. Yet at this time British voters could only vote for members of the House of

Commons, and those eligible to vote accounted for less than 2% of the total population. Although it was accepted that the rulers' powers came were given by the people, the evolution of people's powers was a very gradual process. Political power was initially shared by kings with their feudal lords. Later, the propertied classes gained voting privileges. Within the propertied classes, major landowners were the first to have voting rights. This was subsequently extended to medium and small property owners, then to white males, women and people of color. Finally, anyone who had reached the age of adulthood could vote. From the experiences of Great Britain and the USA, we can see a direct link between citizens' level of political participation and their level of economic development, and the higher the level of economic development, the greater the rate of participation. Equality of voting rights also started with equality of eligibility and was then gradually extended. It was only after Western societies had reached a certain level of social development, when almost everyone had become a member of the middle class and received a basic education, that there was finally universal suffrage "one man, one vote" and everyone had the right to elect and be elected. This process did not truly become a reality until the late 1940s, after the end of WWII.

When the distribution of social and political power is determined by election outcomes, everyone has a chance. There is openness, transparency and equality of opportunity, so this system has an inherent legitimacy, and is also relatively fair and sustainably viable.

The greatest contribution made by constitutional democracy to Great Britain and the USA was to move the two societies steadily and gradually into civilization 3.0. The government basically did not interfere with market activities and promoted free trade internationally; citizens enjoyed ample freedoms and protection of their property rights; their democratic rights to participate in politics increased along with their incomes and were gradually and slowly opened up. The British and

American free market economies coupled with their constitutional democratic systems gave rise to equal economic and political opportunities, shaped the Western model of Civilization 3.0, and created the most effective and largest free market system of the day. Because of Civilization 3.0's iron law regarding economies of scale, this market ultimately became the large globalized international market of today.

However, constitutional democracy has its own share of shortcomings. Under fully democratic circumstances, the politics of public opinion are better at representing small group and short term interests, but are often at odds with the overall and long term interests of society as a whole. The corrupting effect of money in the election process only exacerbates the problem. When conflicts cannot be resolved, they can almost paralyze long term policies which safeguard overall public interests (as is the case with the current U.S. Congress.) Winston Churchill's famous saying that "democracy is the worst form of government except all the others that have been tried" is not merely a humorous remark.

Let us now look at China's Keju system. One of its features is that it was a system for qualifying people to enjoy political power. Through open, transparent, and fair examinations and a competitive assessment mechanism, anyone could become qualified to enjoy some political privileges. By evaluating candidates for their abilities to learn and govern and thereby selecting the most outstanding ones, the government could appoint people based on their abilities and place the most capable talents in the most important positions. Everyone had an equal opportunity to enter government service, and the government in turn could select a large number of the politically gifted from among the populace, thereby giving it exceptional vision and ability to execute. This great institutional innovation allowed China to surpass the West for over a thousand years. Today it still has robust vitality. Many of the successful civil service systems and professional armies the world over,

including those in China, have to some degree or other been impacted in some aspects by the Keju system.

This system likewise has its weaknesses. First, it was only limited to (selecting) bureaucrats. It was subordinated to imperial power, and imperial power was a hereditary system, not a merit-based one. There is no necessary link between lineage and ability, and as a result, throughout its history all politics in China was limited by the abilities of its emperors/empresses. The differences between wise and incompetent rulers were enormous. One can only wring one's hands when examining the contrast between the 50 year reign of the Express Dowager Cixi and contemporary (developments in) Meiji Japan and the West. Moreover, because politics was often the only avenue for talented commoners to advance themselves in an agricultural civilization, officials had even stronger motivation to translate their political privileges into economic benefits, and corruption became an incurable flaw of such a system.

In spite of these weaknesses, the Keju system was still the greatest institutional innovation of Civilization 2.0. It was one of the most fundamental reasons why China was a country able to maintain a relatively stable society with a large population and vast land area over its long history. Chinese politics today are still influenced by the Keju system, and the (importance of) credentials is a concept deeply rooted in the minds of the Chinese people.

The Keju system was unable to solve the problems of how those with supreme power were selected and their legitimacy. At the same time, it was confronted by the challenges of an Agricultural Civilization 2.0 and somewhat inadequate for meeting the special challenges posed to governments by Civilization 3.0. Constitutional democracy was born during Civilization 3.0 and offers valuable experiences which address the weak points of the Keju system. Therefore, the most likely development in China's future political evolution will be an organic

integration of the two major innovations of institutions of the east and west, that is, the Keju system with constitutional democracy.

A S&T-based economy 3.0 needs a government which will protect private property rights, provide the free space necessary for scientific and technological innovation, and minimize its direct economic intervention. To this end, the judiciary must gradually become independent, so that laws can both constrain the executive power of the government and protect individual rights and freedoms; instruments of the state such as the military must be subject to constitutional limits. A constitutional government can then be gradually established on this foundation.

At the same time, political participation should be gradually opened up to the citizenry, but compared with the West, the mode of participation should be more suited to Chinese history and cultural traditions. For example, the government should acquire legitimacy through elections, but people must first have credentials in order to elect and be elected. The higher the position, the more stringent the credential requirements and the smaller the number of those eligible to elect and be elected, and so on progressively, level by level. For instance, at the village or neighborhood level, there would be one-person-one-vote for adults and self-government. To become a civil servant, candidates would have to pass rigorous examinations. High offices would have even higher requirements for education, previous achievements, integrity and popular support. Credentials should be commensurate with positions. By the time we get to the highest state leaders, they would have to be selected from a very small pool of the most highly qualified candidates. This would be a type of credentials-based election: that is, the best people would be selected using a hybrid method involving examinations, evaluations, and limited elections. In practice, it would mean that the degree of political participation by citizens would approximate their level of economic development. Judging from historical experience, the

enthusiasm of citizens for political participation is directly correlated to their level of economic development. When an economy is at a low level of development, growth is the foremost demand. Environmental protection and personal safety become more important when an economy reaches a medium level of development (as in mainland China today.) When it becomes highly developed, the demand for political participation reaches its apex (as in Hong Kong and Taiwan today.)

In order to attract the best and brightest and provide equal opportunities to all citizens, the ruling party, as China's only modern political party, must be opened up to the entire society, and, through examinations, assessments and fair competition, it must give everyone who has the ability an opportunity to participate in the allocation of power within the party. At the appropriate time, it should bring the compensation of high-level officials in line with that of their counterparts in the private sector, develop an index for corresponding relationships and promote clean government through the combination of high salaries (for civil servants) and strict laws of punishments. At the same time, government powers should be greatly reduced, particularly in the economic sector.

Management powers should gradually transition from a positive list to a negative list. Upon such a foundation, zero tolerance for corruption should be enforced. To keep corruption as limited as possible, a multi-pronged approach should be used, including measures such as very strict laws, merciless party discipline, media scrutiny and whistleblowing by concerned citizens.

Having completed such a series of reforms, China will have created channels for economic and political upward mobility that are open to all and with equal opportunities for all. Many people will engage in free market economic activities, competition will be fair and winners and losers will be determined by their abilities. At the same time, many public-spirited and talented people will go into government. Through credential-based examinations, the best people will be appointed and

these elites will govern the country subject to the limits of the constitution.

Pursuing equality of outcomes but accepting equality of opportunities is human nature. Any society that can offer equal opportunities will be able to develop sustainably and achieve long lasting peace and prosperity.

Ever since the Opium War of 1840, China has mostly been blighted by wars and incompetent governments. It was not until the late 1970s that changes in the domestic and international environments gave China, for the first time, an internal and external environment where it could focus on modernization. In the ensuing 30-plus years, it has achieved unprecedented results. As China moves from Civilization 2.5 to Civilization 3.0, it will naturally encounter the various challenges discussed earlier. However, in the 170 years since 1840, China has never been in a better position. In the coming few decades, it will confront challenges, solve problems and ultimately evolve into Civilization 3.0, thereby achieving the complete modernization of the most populous country in the world.



Chapter 15 East-West Relations in the Age of Civilization 3.0

Introduction: *Because of common interests, the Iron Law of Civilization 3.0, the common challenges facing all humankind and the lessons of history, the differences, conflicts and misunderstandings between East and West are more likely to be localized, transitory, manageable, and not prolonged. Over the next several decades, mutual trust, cooperation, common interests and co-development will still be this century's mainstream.*

First, I'd like to discuss some of the fundamental hard constraints on east-west relations in the age of Civilization 3.0. No government, nation or leader can avoid these constraints.

The first constraint is the Iron Law of Civilization 3.0. Once a robust international market has been formed, no nation will be able to leave it. Any nation that does so will fall behind, and the longer it stays away, the more quickly it will fall behind, until it is finally forced to rejoin. This is the first constraint.

The second constraint is due to the fact that in the age of nuclear weapons, major powers all possess nuclear strike capabilities that can destroy each other many times over, and in the process destroy all the living things on earth. Thus in this era relations between the great powers are guided by the principle of mutually assured destruction (MAD). Under such a mechanism, an all-out war with no bottom line is unlikely between major national powers.

The third constraint comes from the unique challenges posed by the age of Civilization 3.0 to the entire human race. These can only be addressed through international cooperation, particularly cooperation between major powers. One example is global climate change caused by the greenhouse effect from carbon dioxide, which directly threatens the existence of all people. Without a joint response from all countries, and especially without the active participation of China and the US, any response will basically be ineffective. The same is true in dealing with terrorist extremists with suicidal tendencies, especially those organizations and individuals with weapons of mass destruction (nuclear, chemical, or biological weapons). Likewise, the globalized economy of today requires globalized collaborative management. Particularly during crises such as the financial crisis of 2008-2009, international cooperation, especially cooperation between economic superpowers, is absolutely essential. Looking farther ahead, a fundamental need of long term human survival will be to relieve Civilization 3.0 from its total dependence on fossil fuels, reserving fossil fuels for the agricultural fertilizers which only they can provide. This will also require the joint efforts of all countries.

East-west relations today have been developing under these three major constraints. Because of these hard constraints, it is very unlikely that all out, protracted war will break out between major powers. No nation is willing to leave the international market, and major powers will endeavor to safeguard the current system to serve their own interests.

They will also deepen cooperation in areas of common interests for their own sakes and for the sake of all nations.

However, peace and cooperation do not mean the absence of competition. Unlike the case of struggles between traditional countries, land and population will no longer be the primary objects of contention. Of course the fight over fossil fuel resources will remain an exception for a relatively long period. Today, competition between countries mainly takes place in the economic arena. The most important competitions are often invisible, and they are over the levels of science and technology, the attractiveness of institutions, market capacities and educational levels. The most successful countries will be the ones that can maximize the potential of their citizens and attract the most talented people from around the world. But where there is competition there will be winners and losers, and there will be conflicts.

Objectively speaking, there are still many uncertainties in east-west relations today. The rise of China still produces a profound uneasiness in the West, and both East and West continue to harbor mutual distrust. Under certain conditions, such uneasiness and suspicions can deteriorate into hostility, conflict and confrontation.

Because China was subjugated by the West for more than a hundred years in its recent history, China's deeply rooted mistrust of the West is entirely understandable. To those in the West, there are many reasons why east-west relations are filled with uncertainties. At first glance, these reasons include that of cultures and psychologies. Chinese and Westerners belong to different races with different cultures, histories and customs. China's population is several times larger than that of the West. Thus, at a time when China's economic and international status and influence are relatively rising, and when the US and the West are relatively declining, the sense of unease (about China's rising) and denial (of China's rising) in the West is entirely predictable. When

China's overall economic output surpasses that of the US to become the largest in the world, this psychological reaction will become even stronger. At a deeper level, the unease of the West stems even more from differences in political and economic institutions and value systems. Today, China's economy is still, to a large extent, state capitalism, with the visible hand still in a dominant position. Politically, it has a one-party system where citizens still do not enjoy adequate freedoms. Given these circumstances, the West will easily assume the worst and associate today's China with pre-WWII Japan and Germany. The intertwining of these two reasons deepens the mistrust between East and West.

Psychologically speaking, the sense of fear in the West is understandable. Nevertheless, the worst case scenario basically cannot happen because no man ever steps into the same river twice and history can hardly repeat. Today we already know what happened to Japan and Germany, and we already know that given the iron law of Civilization 3.0, China cannot leave the international market for too long. Even if Japan and Germany had emerged from WWII victorious, they would still eventually fail economically, just as the former USSR did. Besides, China has tried the path of isolationism and self-reliance before. It is very clear that this path is unworkable, and given the intelligence of the Chinese, they will certainly not go back onto this path again. More importantly, China's current economic and political systems are transitional ones. In the coming decades, China will more likely implement a fully free market economy and develop a political system with Chinese characteristics, one which combines Keju with constitutional democracy. Once China has accomplished this modernization in economics, politics and culture, much of its experience can be also useful to Western societies as well.

Against this backdrop, from a long-term historical perspective, unease, suspicions, misunderstandings, even hostility and conflicts are transitory. If, during China's transition to modernization, Chinese and Western leaders are rational and wise in managing their conflicts, and if they

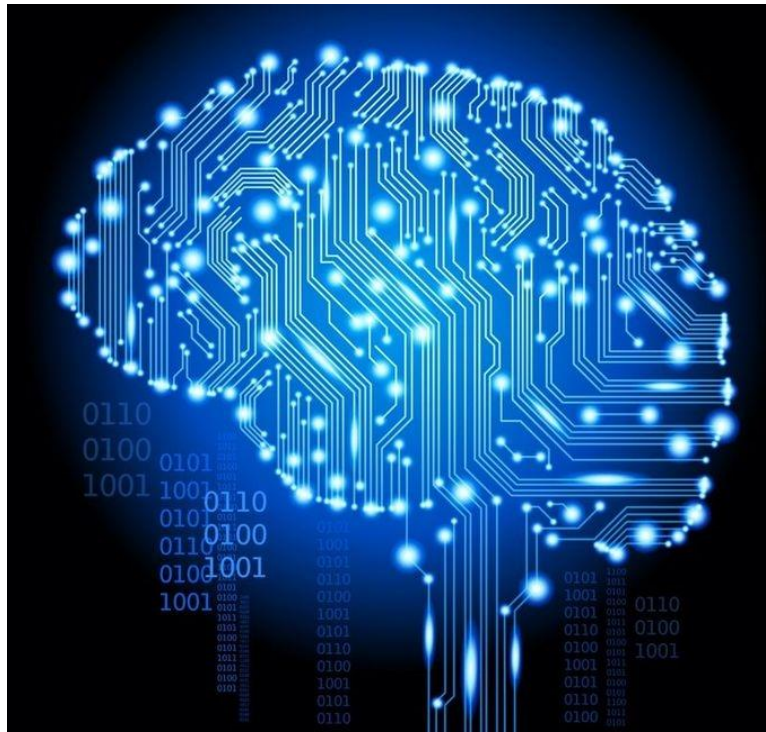
maintain East-West relations on a basis of cooperation and mutual benefit, then after the reforms are successful in the next few decades, the relationship will naturally grow closer, and mutual trust and cooperation will be strengthened.

From China's vantage point, the next few decades will be the best period for comprehensive modernization. Its greatest national interest should lie in an effort to create an optimal international environment. China's foreign policy should focus on maintaining the international free market economic order, maintaining world peace, avoiding direct conflicts with other countries, particularly major economies, and actively participating in international cooperation to address the common challenges facing all humankind. Compared to obtaining the best possible international environment for modernization, any gains from international conflicts will pale into insignificance.

To maximize China's national interest, Sino-American relations will be of the utmost importance. China and the United States not only share many common interests, they also face many common challenges, and they have strong complementarity in their economies and many other areas. Because science and technology are the foremost economic drivers of Civilization 3.0, the leading status of the US in the global economy will remain unchanged for many years to come. Although China may eventually have the world's largest economic output, the U.S. will still lead in GDP per capita and S&T development. China's manufacturing capability and market depth all complement those of the US. Sino-American relations are the cornerstone for the maintenance of regional peace and for the promotion of sustained global economic development. Also, at the appropriate time, China should engage in more direct dialogues with the peoples of the world. It should use language common to all countries to articulate the current and future directions of its reforms, its goals and its vision for post-modernization China, thereby gradually enhancing understanding and dispelling

misunderstandings. As China grows, it can also begin to assume more responsibilities on global issues and maintain the existing global economic order.

Because of common interests, the Iron Law of Civilization 3.0, the common challenges facing all humankind and the lessons of history, the differences, conflicts and misunderstandings between East and West are more likely to be localized, transitory, manageable, and not prolonged. Over the next several decades, mutual trust, cooperation, common interests and co-development will still be this century's mainstream.



Chapter 16 Humanity's Common Destiny

Introduction: *Over the past 60,000 to 70,000 years, the human race has faced countless threats and experienced countless changes. What has not changed has been the great creativity and enterprising spirit humans have displayed in the course of dealing with challenges. This powerful force has always been the dynamite behind the development of human civilization.*

The most fundamental driver of Civilization 3.0 is the organic integration of limitless S&T development and endlessly growing human needs. However, these S&T advances often lead us in some unexpected directions.

For instance, people attach great importance to the way they look and they love to follow the latest fashion trends. These desires have caused cosmetic surgery to develop to the point where people have increasingly

greater choices regarding their physical appearance. Future developments in science and technology will turn differences between people into personal preferences and choices. Take skin color, for example. Some may prefer a fair skin, some a brown skin, and some a black skin – these can become personal choices. External appearances and even gender can be freely selected. Because of the integration of S&T development and the markets, as long as people have a demand for something, it will happen.

There will also be changes in other cultural differences. In the past 60,000 years since humans first ventured out of Africa, culture spread to all regions of the world, and it is the sum total of unique beliefs and lifestyles which developed in order to adapt to local geography. Culture is what distinguishes people from different regions, but in the future, these distinctions will become choices and preferences pursued by individuals.

In the future, language will be almost instantaneously translatable. This will allow people from all over the world to communicate with each other in their own languages through the use of simultaneous translation technology. However, in terms of linguistic development, language itself also has economies of scale. English has already become the largest open system in the world. As was the case with Microsoft Windows in the past and Android today, the most numerous applications are those with English as the common platform, and the most creative people are all using English. Therefore, while creative collaborations will still have to use a common language, this language will become increasingly easy to learn and it will become increasingly easy to translate into other languages. The same is true of foods – living habits can change. For example, many Asians still suffer from lactose intolerance, but this will soon be changed by science and technology, and anyone will be able to enjoy all different types of foods.

The purpose of all these examples is to show how the basic differences which distinguished people from one another for tens of thousands of years will eventually become personal choices rather than historical carryovers. Thus the foundations of traditional states such as nationality, culture and religion will be shaken, and these existing foundations will slowly disappear. As for religion, all of its highly specific predictions will gradually be proven wrong by science, but its basic significance will remain. The ultimate questions which religion must answer are those of a fundamental world view: where do humans come from? what is their inherent nature? what is the *raison d'être* of human existence? where do people go after they die? Science will provide increasingly good answers to these, and may even one day take the place of religion in answering them. However, another function of religion is to provide spiritual comfort, soothe suffering and pain, give meaning to life, and fill people with faith and hope in the future. In this role, religion, traditional art, faith and philosophy will all gradually converge, and the experiences shared by people through art, religion, philosophy, love and empathy will grow increasingly powerful. The commonality in all religions which will survive is empathy between people, particularly compassion. A universal religion will take shape based on such a foundation, and the arts will increasingly become the source of spiritual sustenance common to all humanity.

At the same time, the Iron Law of Civilization 3.0 will create a single global common market, and as a result, it will be necessary to manage the challenges of a common global economy. The state institutions which originally developed during Civilization 2.0 will become inadequate because the foundations of these states will have disappeared, so a new global state is not only a possibility, but a necessity. A global government will manage a common global economic market and jointly coordinate financial and fiscal policies (with member nations). Such a global government will be better able to deal with the challenges

confronting all humanity, be they nuclear weapons, biological terrorism, global climate change or the complete depletion of fossil fuel resources. Climate changes will become more extreme, the greenhouse effects of anthropogenic carbon dioxide will become more obvious, and this will have an enormous impact on all people, all countries and all regions. Milankovitch cycles will continue to exist for a long time to come, and may even become stronger due to human activities. We now have climate data for the last 700,000 years and understand that changes in climate can be very large over long periods of time. Only a global government can deal with this.

Another long term challenge involves resources. The Industrial Revolution started with the combination of coal and steam engines, followed by the combination of the internal combustion engine and petroleum, and that of fossil fuels and electrical power. All of today's civilization is based on a foundation of electricity. We could say that all of Civilization 3.0 is based on the use of fossil fuels, and the reason why S&T 3.0 is so powerful is because fossil fuels have a much higher energy conversion rate than photosynthesis. Fossil fuels were also originally formed through photosynthesis, but they were stored underground for hundreds millions of years as organic debris and underwent chemical reactions. Their very high energy density per unit is a result of millions or even hundreds of millions of years of accumulation and concentration. They are a precious legacy given to humanity by the earth after being stored up for hundreds of millions of years. However, despite the abundance of this legacy, it is still finite and will surely one day be exhausted by our current wasteful use. This might take a few centuries or it might take over a thousand years, but it will definitely be used up. So what will be the future energy sources? Agriculture must rely on chemical fertilizers based on fossil fuels, so how will the human race feed itself? This is a daunting challenge confronting all of humanity.

S&T will strengthen the sense of common identity between people and dissolve those differences between them which form the basis for the existence of traditional nation-states. The global common market of Civilization 3.0 will also deepen our common interests, and the challenges shared by all humanity will have to be dealt with jointly. Hence a global government will be the inevitable result. In fact, throughout history people have already done many useful experiments in this regard. For instance, through the conquest, colonization and assimilation of over a hundred ethnic groups, the Chinese people were ultimately formed in early China. The U.S. successfully became a multi-ethnic, multicultural melting pot over the past several centuries. Likewise, after centuries of internecine warfare, Europe finally transitioned from a common market toward a common government. These are all very successful experiences. The international organizations which developed after WWII are all models of successful cooperation between countries, whether they be the UN, the World Bank, the IMF, the WTO or the G20. Therefore, in the coming decades or the coming century, a movement toward global government is entirely to be expected.

Over the longer term, another daunting challenge that will confront the human race will be the capacity of the earth to accommodate humans. Since the discovery of silicon-based computing 50 years ago, its processing speed has doubled every 18 months. At this rate, within a few decades the intelligent computing power of silicon-based materials will be comparable or even superior to that of a human brain. Then human brains will, for the first time, become compatible with mechanical ones, or perhaps people will be able to store all the contents, memories and DNA of their brains in computers, thereby extending the lifespan of their own brains. Of course the human brain is not only a carbon-based organic supercomputer -- it is also an organic transmitter of signals, and we currently know very little about this aspect. However, we have

already achieved compatibility of mechanical device with other human organs and will continue to get better at doing so. For example, bionics allows signals to be transmitted through the bloodstream, enabling prostheses to move like natural limbs. Scientifically developed mechanical force can increase muscle power by endless multiples. If the processing speed of mechanical brains becomes comparable to or even greater than that of human brains, and if we better understand the organic chemistry of the human brain, then mechanical brains may become extensions of human brains. It will then be highly likely that brains can be repaired or replaced without losing their identities. In other words, mechanical brains will be able to replace carbon-based brains. The most fundamental difference between silicon and carbon, between inorganic and organic, is lifespan. Organic brains have limited lifespans, whereas inorganic ones have much longer lifespans. Human lifespans will therefore also undergo some changes and acquire some new meanings. If humans and machines become one, or if the ability of people to repair their organs allows their lifespans to be extended indefinitely – at least in a certain sense of “life” – then sooner or later the human population will grow beyond the carrying capacity of the earth. From a population of twenty thousand over a hundred thousand years ago, the human population has grown to 7 billion today, which is already an enormous change. We can imagine that if life expectancy can be infinitely increased, then within hundreds or thousands of years, the earth’s capacity will at some point reach a state of saturation. At that time, people will have to leave the earth to seek living space on other planets, just as they left Africa some 60,000 years ago.

Over the past 60,000 to 70,000 years, the human race has faced countless threats and experienced countless changes. What has not changed has been the great creativity and enterprising spirit humans have displayed in the course of dealing with challenges. This powerful force has always been the dynamite behind the development of human

civilization. It is true of course that humans still have their primal instincts. As (Ian) Morris says, history is indeed created “by lazy, greedy, frightened people looking for easier, more profitable, and safer ways to do things.” All animals are like this, but we differ from all other animals because of the extraordinary tools we use. The powerful creativity and spirit of enterprise unleashed by human brains and the extraordinary spiritual power expressed through art allowed us to embark on a very long journey from the time of our earliest ancestors in Africa. In the course of over a hundred thousand years, we have completely conquered the earth, and in the not too distant future, we may go beyond earth toward the vast universe in search of a new home. The future is still worth looking forward to.

(The End)

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