The Scientification of China

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By

Zhaohao Sun and Paul P. Wang

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To our motherland, China,

Our beloved countries, Australia, Papua New Guinea,
and the United States

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ABSTRACT

This book investigates the scientification of China, which is a process of developing China into a scientific country. More specifically, this book examines China, Chinese words, Chinese language, and Chinese culture, as well as Chinese civilization and Chinese people from a scientific perspective. Synergistically, Chinese words, Chinese language, and Chinese culture form the Chinese trinity. Similarly, scientific Chinese words, scientific Chinese language, and scientific Chinese culture in turn, constitute the scientific Chinese trinity of scientific Chinese civilization, which eventually creates a scientific China a few decades ahead. The scientific Chinese trinity is closely related to the modernization of Chinese society, economy, and the formation of a knowledge economy and knowledge society, as well as a digital economy in China and all Chinese communities all over the world. Besides this, the book also investigates the Chinese web trinity consisting of Chinese web words, Chinese web language, and Chinese web culture, as well as China's web economy, based on web technology.

This book covers many diversified topics, such as the essence of the scientific Chinese trinity, science and computing, ten computing paradigms and their impacts on Chinese trinity, the scientific Chinese trinity, the Chinese web trinity, computing of the Chinese trinity, scientific Chinese civilization, smart China, and the scientification of contemporary Chinese, as well as the scientification of China and digital China.

The approach proposed in this book intends to benefit readers to understand the Chinese trinity, Chinese people and their heritage, culture and their civilization, and China's society and economy, as well as technologies from a scientific perspective. More importantly, this book will facilitate the comprehension of the Chinese phenomena, the rapid growth of her economy, the globalization of the Chinese trinity, and Chinese civilization in this fast paced, digital age.

PREFACE

The rise of China since 1949, and the growing impact of China and great China (which includes Hong Kong, Taiwan, and Macau) on world politics and global economic development over the past seven decades (particularly evidenced by the past four decades) have been written about extensively by politicians, historians, economists, business, and management scholars, as well as consulting professionals, among others. All the authors have sought to explain the extraordinary and remarkable phenomena that occurred in China's history, economy, business, society, and the lives of its citizens, in books that have been published by a significant number of publishers worldwide. However, there are no books written on the scientific Chinese trinity and its relationships with scientific Chinese, scientific China, and digital China.

The Chinese trinity consists of Chinese words, Chinese language, and Chinese culture. Scientific Chinese words, scientific Chinese language, and scientific Chinese culture form the scientific Chinese trinity of scientific Chinese civilization. The scientific Chinese trinity as an important component of China's modernization wasn't introduced or proposed until 2010, although science was proposed to be an important mechanism for China's modernization in 1919, through the May Fourth/New Culture Movement (*wusi/xin wenhua yundong*). If Dr. Sun, Zhongshan (Yat-sen) completed the overthrow of the feudalism and the Qing Dynasty in China, then the modernization and scientification of China started from 1911 onwards. Since then, China has experienced dramatic socioeconomic transformation, from an extremely poor country, to a big country with the second-largest economy in the world. This historical transformation can be considered as the consequence of the Chinese pursuing science and technology to develop a scientific China with the scientific Chinese trinity. It can be also considered as the consequence of Chinese scientific engagement with the people of other countries. It can be considered as the consequence of the contribution of science and technology of the world to Chinese people, Chinese society, and the Chinese economy.

This book examines China, Chinese words, Chinese language, and Chinese culture as well as Chinese economy and technologies, Chinese civilization, and Chinese people from a scientific perspective. Chinese words, Chinese

language, and Chinese culture form the Chinese trinity. Scientific Chinese words, scientific Chinese language, and scientific Chinese culture, all three together, form the scientific Chinese trinity of scientific Chinese civilization. The scientific Chinese trinity is closely related to the modernization of Chinese society, economy, technology, and the formation of a knowledge economy and knowledge society in China, and in Chinese-spoken communities in the world. This book uses ten scientific paradigms to examine Chinese words, Chinese language, and Chinese culture, and their impacts on Chinese civilization and the Chinese economy. This book also investigates the Chinese web trinity, consisting of Chinese web words, Chinese web language, and Chinese web culture, based on web technology.

This book also covers exclusively the issues associated with the scientific Chinese trinity, science and computing, and their impacts on the Chinese trinity, scientific Chinese trinity, Chinese web trinity, the computing of the Chinese trinity, the scientification of Chinese, scientific Chinese civilization, smart China, scientific China, and digital China.

The approach proposed in this book will help readers to understand the Chinese trinity, Chinese people, and Chinese civilization, as well as scientific China, from a scientific perspective, and to facilitate the development of the Chinese economy and Chinese society, the globalization of the Chinese trinity, and Chinese civilization in the digital age.

We choose to abridge the nomenclatures of the Chinese people, the Chinese trinity, Chinese society, and Chinese civilization simply as Chinese. The Chinese trinity consists of Chinese words, Chinese language, and Chinese culture. The scientific Chinese trinity, in turn, consists of scientific Chinese words, scientific Chinese language, and scientific Chinese culture. As a further specialization of scientific Chinese, the computing of Chinese means the computing of Chinese people, the computing of Chinese trinity, the computing of Chinese society, and, finally, the computing of Chinese civilization.

The Chinese web trinity can be considered as another further specialization of the computing of the Chinese trinity, and the scientific Chinese civilization which has been brought to the center stage for the world to take notice.

Ten scientific, strategic thinking, paradigms consist of the structured paradigm, the hierarchical paradigm, the process-oriented paradigm, the engineering paradigm, the intelligent paradigm, the humanized paradigm,

the mobile paradigm, the service-oriented paradigm, the networking paradigm, and the digitalization (informatization) paradigm. These ten scientific paradigms have played a significant role in the research and development of computing in general, and information communication technologies in particular, over the past seven decades. In the next few years, these ten scientific paradigms are expected to penetrate more fields of academics. The aforementioned scientific Chinese, scientific Chinese civilization, scientific Chinese trinity, scientification of China, and scientification of Chinese will become even more significant for the Chinese economy, Chinese society, Chinese civilization, and the globalization of Chinese.

During the past century, Chinese people have understood exactly what science is. In the 21st century, we believe that the Chinese people will be anxious to build a scientific China and scientific Chinese civilization loaded with powerful science and technology, and a scientific economy, as well as human resources for the world. This book is intended to contribute to this grand mission of Chinese, the scientification of Chinese, and the scientification of China. For this very inspiration, it is also for all the people of the world. This is, to our knowledge, the very first book devoted exclusively to the subject, which addresses Chinese civilization, Chinese culture, Chinese words, Chinese language, and the scientification of Chinese completely from a scientific perspective.

The scientific Chinese trinity and its relationships with scientific Chinese and scientific Chinese civilization can facilitate the understanding of Chinese people, Chinese culture, Chinese civilization, and the Chinese economy. The relationships between the Chinese trinity, the scientific Chinese trinity, the computing of the Chinese trinity, the Chinese web trinity, and the scientification of Chinese can facilitate the evolution of Chinese civilization, Chinese culture, and its development in the decades ahead. The scientific paradigms and their interrelationships will facilitate the update of the understanding of computing from the viewpoint of a research methodology.

This book explores the scientification of China, Chinese, Chinese civilization, and the Chinese trinity in terms of scientific paradigms, and investigates the Chinese web trinity and the computing of the Chinese trinity as well as digital China, as an important infrastructure for building the scientification of China, of the Chinese, of scientific Chinese civilization, and the scientific Chinese trinity.

The book aims to help readers to understand the Chinese trinity, Chinese people, and Chinese civilization from a scientific perspective, and to facilitate the development of the Chinese economy, globalization of the Chinese trinity, and Chinese civilization in the digital age.

There are a considerable number of books already available in the public domain; for example, P. Elbrey's *Chinese Civilization: A Sourcebook* (2nd edition) (The Free Press 1993) is the translation of original works in Chinese and comments by the editor. Ebrey selected original works written by Chinese scholars, ranging from the classical period, the Qin and Han Dynasties, the Tang Dynasty, the Song and Yuan Dynasties, the Qing Dynasty, and modern Chinese history to the 1990s, based on his viewpoint in terms of culture, economy, customs, values, and the military. K. Louie's *The Cambridge Companion to Modern Chinese Culture* (Cambridge University Press 2008) is a brief history of Chinese culture. These existing books emphasize the description of Chinese language, Chinese culture, Chinese economy, Chinese society, and Chinese civilization, or investigate them from the viewpoint of social sciences, philosophy, public media, music, and economics. Moreover, Henry Kissinger examines China's civilization and culture from a politician's viewpoint (Kissinger 2011). His book, entitled *On China*, can be considered as a modern history of Chinese politics from the perspective of a US politician. Unlike previous books, this book addresses the Chinese trinity and the scientification of Chinese, based on the proposed scientific paradigms. This book is also based on our experience and knowledge of both computing and Chinese culture in the past four decades in general, and intensive research on this topic in the past decade.

During the past decade or so, we have browsed or watched many public media and multimedia, including documentaries, with the following footage in video reports on China in TV programs, and on the web (For example, Jacques 2018, Rudd 2015, Rudd 2014, Rudd 2018, Mahbubani 2018, and Stiglitz 2018). We have received a lot of information and motivation from them. However, these have not all gone into *The Scientification of China* although they have provided many valuable explanations on the past and present of China, different solutions on where China will go in the future, and discussions on the relations between China and the US, as well as the world. This is also the reason why we developed this book, and address the scientification of China as a solution to where China will go. The core idea behind this book is that the scientification of China is a unique common interest, which could be shared not only with Chinese people, and people in other countries, but also with their policymakers, for today and in the future,

to realize the common dream of humankind. Briefly, the scientification of China is a novel solution to where China will go in the coming decades.

This book's primary aim is to convey the ideas, thoughts, and methods, as well as results, to readers who have an interest in knowing and understanding Chinese civilization, Chinese language, Chinese words, Chinese culture, scientific Chinese, and digital China. The primary intended audiences for this book are undergraduate and postgraduate students who are majoring in the study of China and Chinese culture programs, and a variety of professionals who are interested in knowing Chinese culture, Chinese language, Chinese civilization, the make-up of the Chinese society, and China's science, technology, and philosophy, as well as politics. The secondary possible audiences for this book include a variety of professionals in a wide range of fields of government, industry, business, finance, and international trade, as well as nearly all the social strata. The third possible audience includes all the people of the world from all social strata who are fascinated with China's past, present, and future, and its relationship with the whole world.

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—Zhaohao Sun; Paul, P. Wang

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—Zhaohao Sun
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June 2021 (revised)

ABOUT THE AUTHORS

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Dr. Paul P. Wang has been a Professor Emeritus of the Pratt School of Engineering at Duke University since 2005. He was born in Xian You, Fujian, China in 1936. He received a BSc degree from National Taiwan University in 1958, an MSc degree from the University of New Brunswick, Canada in 1963, and a PhD from the Ohio State University, in the US, in 1965, all in electrical engineering. Dr. Wang was a member of the technical staff at Bell Telephone Laboratories, Inc. from 1965-68. He joined the ECE department at Duke University in 1965 as an Assistant Professor, and was promoted as an Associate Professor in 1970, and full Professor in 1974. Professor Wang has created ten courses at Duke University, and graduated many MSc and PhD degree students. He has also published more than 200 journal papers, and edited, authored, and co-authored, 19 books in high technology. His research interests include control, communication, computer, pattern recognition, AI, and bioinformatics. He has served as an Editor in Chief for *Information Sciences* (Elsevier) for 19 years, and as the founder of the NM&NC (WSPC) since 2004. He also served as a consultant and as a director of the BoD for numerous US companies.

1 INTRODUCTION

In 2012, Professor Niall Ferguson of Harvard University directed a famous TV episode, *China, Triumph and Turmoil* (Ferguson 2012). In this episode, Ferguson did not go far enough in providing answers to the essential and necessary challenges which China must face in the future, because he has been confused about China's triumph in the past 40 years. We are fully aware of, and convinced by, what Ferguson has already explained, and his position taken in the TV episodes. What China needs is not only triumph, but also to avoid the turmoil which has always beset Chinese society. What China needs, as it turns out, is to be a scientific China, including scientific Chinese, scientific Chinese society, and scientific Chinese culture, as well as scientific Chinese civilization.

Decades ago, when China had its share of deterioration, as a predominated agricultural country, the paramount leader Mr. Mao Zedong, encouraged Chinese people with the following statement: "Chinese people have the wisdom and the will to be able to catch up, even overtake the most developed countries in the world in not-too-distant future!" (1966, http://bbs.tiexue.net/post_9365758_1.html, retrieved on November 1 2019). His prediction, to a large extent, has come true. Since then, this has allowed the Chinese people to enjoy the fruits of Mao Zedong's leadership and of their hard work. During this very special epoch, the Chinese nation has taken off, and has even strived in all aspects. Here are some examples which are regarded as specific accomplishments or miracles:

- The fastest trains in the world are running in the high-speed railway network of China as we write.
- The fastest digital supercomputers (including Taihulight and Tianhe 2A) are blinking in China (https://www.top500.org/, accessed on 13th May 2020).
- The most delicious foods are enjoyed all over the globe and are still being created and improved in China.
- The best wine, Maotai, is consumed in China and beyond.
- The best infrastructure for a contemporary university has been conceived by China.
- China has surpassed the western developed countries in terms of the national UHV power grid, high-speed railway network with speeds

> of 350km/hour, communications networks with 4G and 5G technology, and logistics networks deliverable within 24 hours (Ning 2020).

A pertinent question ought to be asked "What else does China need then?" Most people may jump to say 'nothing'. Let us not lose sight of the status and condition of the Chinese only 180 years ago, or even 80 years ago, as a short history reveals the humiliation the nation suffered. China and the Chinese endured dismal conditions which would cause most people to feel sick. The main reasons for such a deteriorated and shameful situation were that the Chinese people felt too comfortable with their lives, and were complacent with the illusion that they felt satisfied, and there was nothing else they would need. Instead of looking into the past, let us now examine what might have happened to China and the Chinese people with the current state of affairs. The important point we would like to emphasize here, is that we should never be too complacent, and ought to avoid the possibility of repeating the same mistake again and again. It is very easy to look at the other side of the coin, that China is facing quite a few time bombs which are deemed to be capable of triggering large-scale calamities. These are some significant points: the income gap between the rich and poor, and between rural and urban residents, is widening; at least 600 million Chinese have a monthly income of ¥1,000 or less per capita. Corruption is still common among public servants, and resentment of the general public has escalated; housing and living prices are still high and can't be efficiently controlled; medical and health care is still a big problem for the general public; the problems of environmental damage, including smog and polluted water, have been laid out right in front of everybody, and there are others too numerous to be explicitly spelled out here. Who can really and consciously deny that any of these calamities will have some major influence on the daily life of every Chinese? The outbreak of COVID-19, or coronavirus, first broke out in China at the end of 2019. It brought about a pandemic worldwide in early 2020. All these have meant that China and the Chinese have to accept the irony that China is still a developing country, facing challenges from at least 70 more advanced or developed countries, based on the GDP per capita from the IMF, the UN, and the World Bank.

Unfortunately, there is another hidden major issue that is not so visible, or, perhaps, understood. What we try to point out here is the issue of the Chinese language. The Chinese language has continued to linger on, and could cause every Chinese, eventually, to feel the pain of all the troubles (Sun and Wang 2017). Knowingly or unknowingly, most people's attitudes

toward the language would be: we are using it every day and we can get around just fine and, frankly, there is nothing wrong, and why don't you just leave it alone? Well, that is precisely what we mean by the 'hidden danger', which is not visible at all. It is our ultimate desire and intention to show the reader precisely this very important point. Furthermore, it can be done correctly only through careful analysis and rigorous examination, not only of the current status but also on historical evolution, as well as the possible impact of the Chinese language on future generations.

One of the most important issues facing us is that Chinese words (G. Fu 2021) are in danger! However, this viewpoint is not that of most Chinese people who use Chinese words in their daily lives. Some scholars, in and outside China, are trying to push Pinyin (the Roman alphabet) of Chinese words to replace the Chinese words (characters or so-called ideography). From their perspective, Pinyin is the official Chinese, rather than the words (characters) which have been used over thousands of years. In this sense, it is obvious that Chinese words are in danger.

Is the Chinese language in danger? Most Chinese do not think so, because they feel that more than 1.4 billion Chinese are using it, so how could it ever be in danger? Furthermore, there is no other natural language on the earth that has more people using it as their natural language. One needs not to look very hard to discover that the English language has emerged to be the Latin of the globe, replacing it as the dominant language of the world in the 21st century. The great majority of international journals, as well as the public media, are already dominated by the English language, and this has been undisputed, because English is the official language in the scientific community. In other words, the English language is indeed the dominant force in world culture landscaping. Furthermore, the Chinese language has never been in any shape or form considered as any force to be reckoned with. For example, Facebook has 2.3 billion users, whereas its Chinese counterpart, WeChat has only 1.21 billion users (Tencent 2020). Furthermore, more and more scholars in China publish academic papers in English rather than in Chinese. The measurement systems of Chinese universities and institutes also encourage this trend to develop world-class universities in China. This is even more profound, as one may recall, around the end of the millennium, one of every two people in the world was Chinese. Based on this observation, the Chinese language may be argued to be in some kind of danger; especially as China's economy has been emerging as the second-largest in the world, next only to that of the US.

Our observations of the above-mentioned issues have inspired us to examine them closely in the light of a new paradigm, by adding the keyword 'scientific' to our trinity. Before we bring out our new paradigm, we must ask a relevant question: "Will the western world accept the dramatic economic development of China in the light of culture, language, and the larger framework of civilization?" In terms of reality, it is hard to say that western people have accepted the peaceful economic development of China. In other words, the traditional trinity of China is still a puzzle for western people. One never loses sight of the fact that it is the science and technology that has transformed China and the Chinese from the old traditions into the 21st century, hence we must re-examine the new scientific trinity closely. This is the grand challenge for our endeavor toward a new paradigm of the scientific Chinese trinity (Sun and Wang 2013).

More generally, we endeavor to examine Chinese words, language, and culture using scientific Chinese words, language, and culture as our motivation. Scientific Chinese words, language, and culture form the trinity of scientific Chinese civilization; we call it the scientific Chinese trinity. The scientific Chinese trinity is closely related to the modernization of Chinese society, its economy, and the formation of a knowledge economy and knowledge society in China in particular, and in Chinese-spoken communities in the world in general. Chinese words and the Chinese language are the carriers of Chinese information, knowledge, wisdom, and Chinese culture in particular, and Chinese civilization in general. They are also important components of Chinese culture. This is the significance of our engagement and vision.

A New York Times Best Seller entitled *The Singularity Is Near* (Kurzweil 2006) has this to say on the back cover:

> At the onset of the 21st country, humanity stands on the verge of the most transforming and thrilling period in its history. It will be an era in which the very nature of what it means to be human will be both enriched and challenged as our species breaks the shackles of its genetic legacy and achieves inconceivable heights of intelligence, material progress, and longevity. While the social and philosophical ramifications of these challenges will be profound, and the threat they post considerable, [...]

The keywords 'social' and 'philosophical' stand out. First of all, we need to understand their ramifications, and then, secondly, we must also prepare for the threats which can't and should not be ignored. Especially true, is the traditional indifference from most Chinese people about Chinese words, language, culture, and that they never systematically tackle their pitfalls.

Inevitably, they will suffer the threats that R. Kurzweil articulated in his book (Kurzweil 2006). In contrast to this, we explore the scientification of China and provide a strategic solution to where China will go in the coming decades, utilizing the common interest shared by the Chinese people and the people of other countries in the world to realize the common dream of humankind. To this end, the chapters of this book are organized as follows:

Chapter 1	Introduction
Chapter 2	The Fundamentals of Chinese and China
Chapter 3	The Scientific Chinese Trinity
Chapter 4	Chinese Information and Communications Technology
Chapter 5	Scientific Paradigms
Chapter 6	The Scientification of Chinese Words
Chapter 7	The Scientification of Chinese Language
Chapter 8	The Scientification of Chinese Culture
Chapter 9	The Scientification of Contemporary Chinese
Chapter 10	Towards a Scientific China
Chapter 11.	Conclusion

The basic structure and relationships between the chapters of this book are illustrated in the following Figure 1.

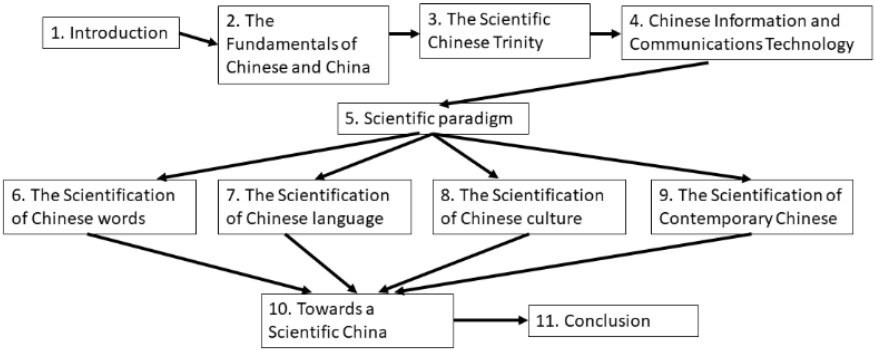

Figure 1. The basic structure and relationships between chapters

It should be noted that, hereafter, we use Chinese words and Chinese characters interchangeably in this book.

2 THE FUNDAMENTALS OF CHINESE AND CHINA

This chapter provides the fundamentals of Chinese and China. It looks at what Chinese, scientific Chinese, and computing with the Chinese language are. It also discusses the relationship between Chinese civilization and western civilization.

2.1 What is Chinese?

Under the leadership of the Chinese political leaders, beginning with Sun Yat-sen (Zhongshan), through Mao Zedong, Deng Xiaping, Jiang Zemin, and Hu Jintao to Xi Jinping, the Chinese people have consistently explored their own 'Chinese' way of building a strong, modern state and society (Schirokauer et al. 2006, 664). Firstly, we choose to examine the answers to the following two questions:

- What is 'Chinese?'
- How can we understand 'Chinese?'

The answers to these two questions are the prerequisite for us to appreciate two novel concepts, the scientific Chinese trinity, and scientific China.

Being Chinese people living in other countries for a few decades, we can easily recognize a Chinese person walking on the street. This kind of affirmative recognition is superior, compared to that of a machine recognizer, although we have many distinguishable attributes we use to recognize if someone is Chinese. A westerner can also easily recognize if someone is Chinese, but maybe he must use more attributes to do it. Furthermore, at present, it is not difficult for us to recognize if someone is Chinese, in particular, on campus, thanks to the popular culture exchange of people in the global village. However, the Chinese are not Chinese people, as a concept - if we use robots or software agents or apps to recognize Chinese, 'Chinese' includes more than Chinese people. In what follows, we look at what 'Chinese' includes.

Chinese can be specified here as Chinese people, the Chinese trinity, Chinese society, and Chinese civilization. Chinese people in the internet age

consist of Chinese netizens and Chinese digital citizens, who can be considered as Chinese web people. They are also living in the virtual world, the web world, and the mobile world, or the digital world. The Chinese trinity consists of Chinese words, Chinese language, and Chinese culture. The Chinese terms for the Chinese language are *zhongwen* (中文) or *hanyu* (the language of han, 汉语言) (Louie 2008). *Zhongwen* in the Chinese world includes Chinese words, Chinese language, and Chinese culture as well as Chinese civilization. For example, every university in China has a school of *zhongwen*, or department of *zhongwen* (中国语言文学系, for short, 中文系). The scientific Chinese trinity consists of scientific Chinese words, scientific Chinese language, and scientific Chinese culture. As a specialization of scientific Chinese, the computing of Chinese consists of computing of Chinese people, computing of Chinese trinity, computing of Chinese society, and computing of Chinese civilization.

The Chinese web trinity consists of a web of Chinese words, a web of Chinese language, and a web of Chinese culture. The Chinese web trinity is a specialization of computing of the Chinese trinity, and the most moving force for the development of the scientific Chinese trinity, and scientific Chinese civilization.

2.2 Scientific Chinese

Scientific Chinese, a magazine in China, has been published since 2007 (http://www.scichi.net/index.php). The motivation for this magazine has its origin related to a very well-known and successful magazine called *Scientific American* (www.scientificamerican.com/). This magazine, *Scientific Chinese*, does not emphasize the scientification of Chinese, but instead focuses on reporting successful Chinese scholars (they are scientists), although the latter are important for scientific Chinese culture and civilization. However, focusing on the activities of elite Chinese scholars is out of date, because without hundreds of millions of scientific Chinese commitments, engagements, or dedications, which we can call mass scientification, in contrast with elite scientification, there would not be scientific Chinese culture and civilization. In other words, scientific Chinese culture and civilization must serve all the Chinese people rather than the Chinese elite, which has been proved right by the modern history of China. For example, in 1940, Chairman Mao emphasized in his book *On New Democracy* that Chinese culture should be scientific and serve all the Chinese people. Therefore, our perspective is unique, in that Chinese people must go along the ‘scientific road’ rather than the ‘feudal and corrupt road’.

The symbol of the Chinese must be scientific, and then China can become a really strong country - as a scientific China. The elite could not salvage China in modern history, but scientific Chinese people can.

Language, Culture, and Civilization

For a layperson, it is not so obvious to relate ‘language’ to ‘civilization’, or ‘culture’ in a very direct way, even though it is embedded everywhere in people’s daily lives; hence we examine language and culture in this subsection to make our viewpoint as clear as it can be.

- Language is so important, why? If we can’t understand how language is put to work in the world, then we can’t understand the world, nor live in it effectively. Language also tells us how to connect; what could be more important! (Lakoff 2000).
- When we talk about contrasts between indigenous people and tribal people, this is an important feature in distinction; we can argue that most tribal peoples, such as American Indians, do not have good or decent language.
- Cities are a feature of civilized culture. It is unimaginable how a city could function without language. This also brings semiotics as a discipline into being.
- It is interesting to note that the first Chinese emperor was a real hero who not only unified China, but also standardized Chinese characters and measures 2000 years ago.

It should be noted that we have searched many books and dictionaries, and nearly 90% of them indicated that the basic requirement for culture and civilization is extensive record-keeping in writing. This suggests, very explicitly, that language is a requirement for culture and civilization, while all the others are, in a sense, indirect or implicit.

According to a concise English dictionary, culture is defined as “the customs and beliefs, art and the way of life and social organization of a particular country or group”. A more detailed definition, according to Guile (Guile 2002, 4), suggests culture includes language, social customs and habits, as well as its traditions of art, craft, dance, music, spiritual beliefs, social organization and the people of a particular country or group. Briefly, culture is “a people’s way of living” (Guile 2002, 4). Civilization is defined as “a society, its culture, and its way of life during a particular period or in a particular part of the world”. Then culture is a state or part of civilization (Ballantine 2001). It would then appear that one would need not worry too