Intellectual Developments in Greece and China:

Contingency, Institutionalization and Path Dependency

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To my deceased parents; and

to Yuk-ying, Miriam,

Rose, Aaron and Yeshu

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Dates of thinkers refer to their *floruit*, all dates are indicative only. The idea of this table comes from Lloyd (1970, n.p.; 1973, n.p.).

Thinkers			**Important events**
Thales of Miletus, Ionia	-585		
Anaximander of Miletus, Ionia	-555		
Anaximenes of Miletus, Ionia	-535		
Pythagoras of Samos, Ionia	-525 to -500	-520	Pythagoras' migration to Magna Graecia
Xenophanes of Colophon, Ionia	-520		
		-510	First political attack on Pythagorean societies
		-508	Cleisthenes' reforms in Athens Hippasus reputed to be a younger contemporary of Pythagoras
Heraclitus of Ephesus, Ionia	-500		
Parmenides of Elea, Magna Graecia	-480		
		-478	Delian League formed Socrates born ca. -470 Philolaus born ca. -470
Zeno of Elea, Magna Graecia Gorgias of Leontinoi, Sicily Empedocles of Akragas, Sicily Anaxagoras of Clazomenae, Ionia (but migrated to Athens)	*Fl.* of these four from -460s to -450s		
Melissus of Samos, Ionia	-440		
Leucippus of Miletus, Ionia	-435		
		-431	Peloponnesian War began
Hippocrates of Chios, Ionia (but migrated to Athens in -450)	-430		

Democritus of Abdera, Thrace	-410		
Theodorus of Cyrene, North Africa	-405		
		-404	End of Peloponnesian War
		-399	Death of Socrates
			Philolaus died around the same time
Archytas of Tarentum, Magna Graecia	-385		
Plato of Athens			
Theaetetus of Athens, born -417, died -369			
Eudoxus of Cnidus, Ionia	-365		
Aristotle of Stagira, Macedonia			
		-336	Alexander succeeded to throne
		-323	Death of Alexander
Theophrastus of Eresus, Lesbos	-320		
		-304	Ptolemy I Soter became king of Egypt
Euclid of Alexandria, Egypt	-300		
Epicurus of Athens (-341 to -270)			
Archimedes of Syracuse, Sicily (-287 to -212)			
Ptolemy of Alexandria, Egypt	-150		

CHRONOLOGY OF CHINESE DYNASTIES

The following table concerns the main period of concern of the present work only. Documented history begins with the Shang Dynasty. The existence of the Xia Dynasty has been subject to considerable controversy for almost a century, we take as an assumption that it did exist.

Dynasty	**Dates**	**Significant events**
Pre-history		
Xia Dynasty (夏朝)	Possibly founded around -2000	
Shang Dynasty (商朝)	-16th century to -1046	Writing invented during the Shang Dynasty
Zhou Dynasty (周朝)	-1046 to -256	
Western Zhou Dynasty (西周)	-1046 to -771	Documented natural philosophical began in the year -780 when a top official proposed a naturalistic explanation of a major earthquake
Eastern Zhou Dynasty (东周)	-771 to -256	
Spring & Autumn Period (*Chunqiu*, 春秋)	-771 to -476	The *Book of Changes* completed by -672 at the latest. Confucius born ca. -551, died ca. -479. Laozi was Confucius' contemporary.
Warring States period (*Zhanguo*, 战国)	-475 to -221	Confucius and Laozi only implicitly critiqued each other's position to a limited extent. Intense debate and intellectual development occurred

		during the Warring States period.
Qin Dynasty (秦朝)	-221 to -207	The First Emperor imposed state orthodoxy, private collection of books forbidden
Han Dynasty (汉朝)		
Western Han Dynasty (西汉)	-202 to +9	Marshall Emperor of Han imposed state orthodoxy, under which the *Book of Changes* became first among the Five Classics (*Wujing*, 五经)
Interregnum	+9 to +23	
Eastern Han Dynasty (东汉)	+25 to +220	
Period of Three Kingdoms (三国): Wei (魏), Shu (蜀) and Wu (吴)	+220 to +280	Third-century intellectual renaissance upon the demise of Han
Jin Dynasty (晋朝)	+266 to +420	
Western Jin Dynasty (西晋)	+266 to +316	
Eastern Jin Dynasty (东晋)	+317 to +420	

Note: During the period of Three Kingdoms, Wei was the strongest, hence the period from +220 to +420 is often collectively known as *Weijin* (魏晋). Western Jin was founded by the overthrow of Wei, but it was not until +280 that the country was reunified under the Western Jin Dynasty, hence the overlap between the period of Three Kingdoms and Western Jin from +266 to +280.

CHRONOLOGY OF CHINESE THINKERS

The following lists only thinkers who are relevant to the present study; all dates are indicative only.

Name	Date	Identity
Bo Yangfu (伯阳父)	*Fl.* -780	First documented natural philosopher
Confucius (孔子)	-551 to -479	Founder of Confucianism
Laozi (老子)	Contemporary of Confucius	Founder of Daoism
Mozi (墨子)	-470 to -397	Founder of Mohism
Guan Yin (关尹)	-440 to -360	Natural philosopher influenced by but departing from Laozi
Yang Zhu (杨朱)	-440 to -380	Leader of Yang Zhu School of Daoism
Liezi (列子)	-430 to -349	Natural philosopher influenced by but departing from Laozi
Gaozi (告子)	-425 to -339	Confucian debating with Mencius
Qin Huali (禽滑釐)	Unknown	Prominent follower of Mozi
Song Ping(宋鈵)	-382 to -330	Huanglao (黄老) School
Peng Meng (彭蒙)	-382 to -330	Huanglao-cum-Yin-Yang School
Mencius (孟子)	-372 to -289	Confucian
Hui Shi (惠施)	-370 to -300	Focus of interest in mathematical and scientific concepts in addition to philosophical concepts
Tian Pian (田骈)	-370 to -290	Huanglao-cum-Yin-Yang School
Shen Dao (慎到)	-370 to -290	Huanglao-cum-Yin-Yang School
Yin Wen (尹文)	-360 to -280	Huanglao School
Zhuangzi (庄子)	-360 to -280	Inherited from Laozi to found his particular school of Daoism
Chenzi (陈子)	*Fl.* -4th century	Astronomer

Shi Shen (石申)	*Fl.* -4th century	Astronomer
Gan De (甘德)	*Fl.* -4th century	Astronomer
Zou Yan (邹衍)	-340 to -260	Yin-Yang School
Gongsun Long (公孙龙)	-330 to -242	Focus of interest in logic in argumentation
Xiang Liqin (相里勤), Wu Hou (五侯), Ku Huo (苦获), Ji Ci (己齿), Deng Lingzi (邓陵子)	Contemporaries of Gongsun Long	These are the individuals mentioned in the *Tian Xia* chapter (on this chapter, see Glossary) as belonging to the Later Mohists (后墨).
Xunzi (荀子)	-330 to -227	Eclectic Confucian
Dong Zhongshu (董仲舒)	-190 to -105	Han-period Confucianism
Luo Xiahong (落下闳)	-156 to -87	Astronomer
Xianyu Wangren (鲜于妄人)	Contemporary of Luo Xiahong	Astronomer
Geng Shouchang (耿寿昌)	Early Western Han	Mathematician-cum-astronomer
Yang Xiong (杨雄)	-53 to +18	Polymath
Huan Tan (桓谭)	-43 to +28 (or -23 to +56)	Politician-cum-polymath
Wang Chong (王充)	+27 to +100	Philosopher, critic of Han orthodoxy
Zhang Heng (张衡)	+78 to +139	Astronomer
Wang Bi (王弼)	+226 to +249	Commentator on the book of *Laozi*
Liu Hui (刘徽)	+225 to +295	Mathematician
Zhao Shuang (赵爽)	Contemporary of Liu Hui	Mathematician
Guo Xiang (郭象)	+252 to +312	Commentator on the book of *Zhuangzi*

GLOSSARY

The following terms or titles appear repeatedly throughout the text, and are rendered in transliterated or romanized instead of translated form. They are listed here to facilitate quick reference where necessary.

Greek terms

Apeiron	Term coined by Anaximander. Sometimes inappropriately translated as "infinite" or "boundless", but it actually means without internal boundary or distinction. To both Anaximander and the early Pythagoreans, it connotes chaos.
Archê	Literally "first principle", Aristotle's term for "that from which a thing first comes-into-being and into which it is finally destroyed".

Chinese terms or titles

Dao (upper-case "D") (道)	As proper noun, this refers specifically to Laozi's concept of the ultimate non-empirical stuff that gives birth to all empirical things. Translating Laozi's concept as "Way" is fundamentally mistaken.
dao (lower-case "d") (道)	As common noun, meaning pathway originally, it later acquired the meanings of method and law or mechanism. As verb, it means "to say".
De (德)	Originally meaning moral virtuousness, it later acquired other meanings such as those of power and potent capacity.
Guoxue (国学)	Literally "national studies", it refers to the study of ancient Chinese culture and intellectual development by Chinese scholars.
Historical Records	This refers to *Shiji* (《史记》), an oft-cited chronicle compiled during the Western Han Dynasty, which contains both invaluable and false materials.
Qi (气)	Originally meaning cloud and gas, it later acquired the meanings of large-scale natural force up to the cosmic level and the equivalent of Aristotle's *archê*. In Chinese medicine, it carries multiple meanings related to the notions of causation and capacity.
Shi (史)	Title of officials responsible for various administrative duties and possessing knowledge of calendar-making, divination, etc.
Shuowenjiezi (《說文解字》)	Literally "explaining graphs and analyzing characters", a comprehensive dictionary including explanation of morphology and etymology compiled ca. +100.
Taishi (太史)	The chief *shi*, a top-ranking official close to the ruler.
Tian (天)	Originally meaning supreme deity, later extended to mean the physical sky as in the term *tiandi* (see next but two entries), or

	the natural world or nature in general.
Tian Xia chapter (《庄子・天下》)	This is a chapter in the book of *Zhuangzi* written by a disciple of the master. It provides some valuable information concerning some of the Warring States-period thinkers and schools.
Tiandao (天道)	Literally "law, regularity or mechanism of *tian* (in the sense of nature—see previous but one entry)".
Tiandi (天地)	Heaven and earth, i.e. the natural world as a whole.
Wu (无)	As used by Laozi and his successors, it means "without form", i.e. non-empirical. Some Warring States-period natural philosophers, however, used it to mean nothingness.
Wuwei (无为)	Laozi's concept of not acting in a deliberate, goal-oriented way, but in accordance with the natural course of things. When used with reference to nature, it means operating in accordance with (nature's or a natural thing's) law, regularity or mechanism.
You (有)	As used by Laozi and his successors, this means that which is real within time and space, though it is non-empirical. Natural philosophers who used *wu* as meaning nothingness (see previous but one entry), however, used it to mean the empirical world.

PREFACE

At the very end of his magisterial investigation into Classical Chinese as a language for conducting logical argument, which provides a comprehensive and definitive rebuttal of claims of deficiency of Classical Chinese in this respect, Christoph Harbsmeier (1998, 419) notes: "Political correctness, which is, of course, a factor in all sciences, constitutes a particularly serious problem for comparative studies because comparative studies must count as a highly 'politicized' and sensitive area".

Harbsmeier's scope covers the comparison between Europe and China generally, whereas our scope is with Greece and a particular period of Chinese development only.[1] Nonetheless, what he says about the former applies to the latter as well, and for the purpose of this Preface, we interchange between the two. Why should comparative studies of intellectual developments be "politicized" and sensitive? The answer should be obvious, for such studies inevitably carry "superiority-inferiority" connotations, and for centuries many Europeans have regarded non-European cultures as intellectually "inferior", a view subsequently shared by many non-Europeans alike. Such a view is sometimes simply the result of gross misunderstanding, as in the case addressed by Harbsmeier. And as he continues to point out with reference to China: "the Chinese intellectual tradition…is still ill-understood". But setting such misunderstandings aside, there is no denying that intellectual developments in Europe and non-European societies (except for some of them in certain particular periods) have, regardless of "superiority-inferiority" judgments, followed quite different trajectories, and this is something that needs to be explained.

(Before proceeding, we would like to stress that we use the terms "Europe" and its cognates, and "non-Europe" and its cognates in the purely geographical sense, according to the conventional definition of geographical boundaries. The attentive reader will have noticed that we are not using terms such as the "West" and the "East". The importance of being careful with taken-for-granted terms such as these, which are laden with ideology, is explained in the Appendix.)

However, in order to explain the how and why of these different trajectories, a pre-condition is that one firstly acquires an unbiased

understanding of their contents. Yet, as Harbsmeier laments, this is precisely what is, to a considerable extent, absent. In our view, misunderstanding is not only due to ignorance in the sense of not being aware of because of limited exposure or access to materials and data. In the early days, ignorance in this sense was likely to have been an important, though far from the only, factor. With reference to China, Weber, for instance, was clearly very ignorant in this sense about Chinese intellectual developments. However, in recent decades, both *guoxue* (see Glossary) and sinology have become veritable academic industries. In such a situation, misunderstanding can no longer be due to the above reason, but to something else. This something else are the *a priori* assumptions held, whether consciously or unconsciously, by the researcher. Let us explain.

It is a fact that in terms of certain objective criteria, the science that emerged in Europe in say the seventeenth to the nineteenth centuries is superior to the science that emerged in other societies in the same period. Taking for granted, **mistakenly**, [2] that this was an autochthonous achievement of European civilization, it has generally been taken that this is due to some **purported special features** of Europeans or some **special features** of European society or both; and because the science that emerged in Europe is indeed superior in the above sense, these purported special features or special features are assumed, consciously or unconsciously, to be "superior" or "more advanced". This latter assumption remains extremely influential in comparative studies today, and the *a priori* assumptions that we refer to in the previous paragraph refer to none other than this.

There are various illustrations of how these *a priori* assumptions pose severe hindrance to acquiring an unbiased understanding of non-European intellectual developments in the following text, one of which is straightforward enough to enable it to be briefly mentioned here for illustration. There is a widespread assumption that only the Greeks were capable of engaging in abstraction (purported "superior" special feature of the Greeks), whereas Chinese thinkers were "confined" to the empirical. Yet, the fact is that Chinese natural philosophers of the Warring States period (see Chronology of Chinese dynasties), irrespective of which particular school of thought that they belonged to, repeatedly talked about that which is "without form" (the Warring States-period term for the non-empirical). Scholars who assert that Chinese thinkers were "confined" to the empirical know the works of these natural philosophers like the back of their hands, hence it is truly amazing to find them reading these repeated statements and yet still make their assertion. This can only be put

down to the all-dominating influence of their above-mentioned assumption. And on the basis of misunderstandings such as this, how is it possible to arrive at a credible explanation of the how and why of the different trajectories in intellectual development followed by the Greeks and the Chinese?

A priori assumptions can pose severe obstacles to acquiring an unbiased understanding in yet another way, namely, by making the researcher, consciously or unconsciously, selective in research to suit the requirements of these assumptions. There is a good illustration of this in one prominent argument in the literature. In accordance with the "special feature of European society producing superior intellectual output" assumption, it claims that Greece's and China's different intellectual developments, in which comparison China's development is allegedly constituted by various purported "lacks" found in Greece, are all due to one single feature of Greek society which was absent in China. In Chapter Two and on a number of other occasions (see Note 26 of Chapter Three; Note 30 of Chapter Six; Note 30 of Chapter Seven; and Note 43 of Chapter Eight), the reader will see how its research, being skewed by the requirements of its above assumption, produces the claimed "lacks" in China.

Thus, if unbiased understanding of non-European intellectual developments is to be attained, the above-mentioned *a priori* assumptions must first be overcome. However, acquiring an unbiased understanding is only a necessary but not sufficient condition for arriving at a credible explanation of how and why different societies developed intellectually along different trajectories. Joseph Needham deserves our greatest respect and, perhaps, gratitude for stressing the need to rise above such assumptions, and for having done more than anyone else in sinology to put China back on the world intellectual map. However, we think he has been singularly unsuccessful in finding an explanation for such how-and-why questions in relation to China. Although his scope is different from ours, we do have occasions to comment on his methodology in the Introduction, Chapter One and the Concluding Remarks, as well as on a number of his substantive views that are relevant to our subject-matter.

The present work, hence, endeavours, with reference to Greece and China, firstly, to clear up some gross misunderstandings or misrepresentations, especially in relation, though not confined, to China, relevant to our consideration; and secondly, to provide, on the basis of a specially-constructed historical sociological framework, an explanation of how and why Greece's and China's intellectual developments followed

two different trajectories. These two things are done concurrently on the basis of rejecting the above-mentioned *a priori* assumptions, for, as said, without this rejection, the former cannot be achieved, and without the former, the latter cannot be accomplished.

Since, inevitably, the subject-matter of the present work is, as Harbsmeier points out, "politicized", a word should perhaps be said about our view of the relationship between politics and scholarship. No scholar is aloof of political preference, whether or not she is aware of it. However, there is today a tendency among some scholars to conflate scholarship with politics. One instance from our own experience may serve as a striking illustration of this. In a journal article submission, which incidentally adopted a discourse-theoretic approach, we referenced a scholar with regard to his emphasis on the need to respect rules of evidence in historical research, one anonymous reviewer who rejected the submission dismissed our reference to that scholar on the grounds that he is "a political conservative". In our view, while politics may, and does often, influence our choice of research topics, in the process of research itself and in presenting its findings, the only consideration should be that rules and practices concerning argument and evidence generally considered to be appropriate must be strictly observed. Otherwise, one conducts research and writes more as a political advocate, and not as a scholar. Whereas, to a considerable extent, we incorporate constructionism into our own theoretical position (as is evident in the Appendix which provides a Foucauldian genealogical analysis of the notion of the "West"), we do believe that at any particular point in time in the development of scholarship, there do exist appropriate rules and practices as just mentioned, though, of course, the understanding concerning these rules and practices may change over time. Hence, our present work is a work of scholarship, not an advocacy of any "politically correct" position, and we look forward to it to be read purely on scholarly terms.

In the present work, Chinese is romanized according to the *pinyin* system, which is the common practice today. In providing Chinese originals for terms, names, quotes, and so on, we use simplified Chinese characters, instead of traditional characters. This is for the sake of convenience determined by our inability to use any other Chinese character input system than the *pinyin* system, and not for any other reason. In referencing Chinese sources, given that there are a number of very common Chinese surnames shared by many of our cited authors, for the sake of clarity, instead of stating only their surnames, we specify their full names in the

form of "surname followed by given name" with no comma after the surname. The only exception is ourselves (Lau 2013, 2015 and 2019), since we have been publishing, inclusive of the present title, under our name romanized in accordance with Cantonese pronunciation.

The present project is an inter-disciplinary study between historical sociology and comparative studies of ancient intellectual developments, the nature of which is explained at greater length in the Introduction. We are by training sociologists, and hence are outsiders to *guoxue*, sinology, classics, linguistics, philosophy, mathematics, and astronomy; however, the subject of our present project requires us to enter these fields to varying extents. Whereas we have sought advice from university colleagues on various issues in these fields, the more substantial being acknowledged in the text, it is certain that mistakes, due entirely to us, are being made. We can only hope that they are not so fatal as to seriously undermine our general argument. Elements of our theoretical framework and their application to the study of comparative intellectual developments have been tested out at sociology conferences, receiving generally positive response, for which we are most grateful. Our new interpretations of the philosophies of Laozi and Zhuangzi (see Chronology of Chinese thinkers) have by and large been endorsed by *guoxue* scholars and sinologists in the process of anonymous refereeing of journal articles that we have published. We are particularly indebted to the *guoxue* scholar Professor Chi-Shing Chak, a student of the neo-Confucian scholars who have defined contemporary neo-Confucianism since the 1950s to 1960s, with whom we have maintained regular scholarly exchange for over a decade, in the process of which we have learned much in relation to our present subject-matter. As an exceptionally open-minded scholar, Professor Chak fully supports our application of a historical sociological framework to the analysis of comparative intellectual developments. Special gratitude is also due to the referees, Adam Rummens and Sophie Edminson of Cambridge Scholars Publishing; and, last but not least, to Ms Mary Chue, who has throughout the course of our project, provided us with untiring clerical support.

Notes

[1] The Introduction will explain the methodological issue of selecting periods of comparison.

[2] On "mistakenly", see the appendix to Chapter Eleven, the Concluding Remarks and the Appendix.

INTRODUCTION

Intellectual developments in ancient Greece and ancient China,[1] despite some basic similarities, followed two very different trajectories, the question that the present work addresses is this: **How and why did this happen?** Our research into this question is an **inter-disciplinary** study, in, if we may say so, the true sense of the term, between historical sociology and comparative studies of ancient intellectual developments, which is **without precedence** in the literature. By "true sense" is meant meeting both of the following two conditions: (1) the study is informed by specific sociological theories and concepts instead of a mere general orientation towards looking for social causes;[2] (2) the researcher's knowledge of ancient intellectual developments attains a reasonably sufficient depth instead of being reliant on a limited number of like-minded secondary sources. The value of bringing in historical sociological theories and concepts is that it can potentially inject **new interpretative perspectives with superior explanatory power** into the investigation, while the necessity of the second condition is obvious.

As yet, no historical sociologist has ventured into the present work's subject matter. A few have addressed a related but different question, namely, what has been called the Needham question,[3] invariably relying on Weber's thesis of "forms of rationalization", but, leaving aside the issue of whether or not Weber's thesis is tenable, these studies are a long way from meeting the above second condition, which, for this reason alone if for no other, renders their studies highly problematic. Investigations into the present work's subject-matter have so far been exclusively undertaken by sinologists, *guoxue* scholars[4] and, very rarely, classical scholars. Failing to meet the above first condition, hence being unable to benefit from the theoretical and conceptual insights of historical sociology, all such investigations are premised upon methodologically outdated mono-causal determinism.[5]

The lack of a truly inter-disciplinary study of our subject-matter is unsurprising. Sinologists, *guoxue* scholars and classical scholars are probably unaware that sociological concepts and theories could potentially inject crucial new interpretative perspectives into the comparative analysis

of China and Greece, whereas for a historical sociologist to delve into ancient intellectual developments in sufficient depth involves going into a completely different discipline, which requires an immense amount of research in an alien territory. The present author is by training a sociologist, our analysis in the present work is based upon an integrated theoretical framework constructed on the basis of various theories and concepts from sociology and a number of scientific and philosophical disciplines; and our research into China's and Greece's intellectual developments took a substantial part of a decade, in which in addition to secondary research we conducted considerable primary research of our own with regard to China, which has so far produced three publications in Chinese on the Daoism of Zhuangzi (see Chronology of Chinese thinkers) (Lau 2019), the Daoism of Laozi (Lau 2015), and the Confucianism of Xunzi (Lau 2013).

The scope of our subject-matter is too vast to be covered, in reasonable details, in a single monograph, hence we need to limit it. First, it's necessary to specify a particular time period for comparison. This carries immense methodological implications which will be discussed later in this introduction. For now, let it just be noted that, as far as scholarly developments are concerned, for Greece we cover the period from Thales (founder of Greek philosophy) to Ptolemy (generally taken to mark the end of Greece's golden age of scholarship); for China, we cover mainly the pre-Qin (先秦) period[6] with occasional references to post-Qin developments where appropriate. Secondly, we confine ourselves to the areas shown in Table I, which should provide sufficient coverage to ground our general argument. These are some of the most central differences between Greece and China, which are chosen because they revolve around a number of inter-related themes. For instance, cells 1(a) and 2(a) are commonly represented in the literature as involving the issue of the purported presence or absence of abstraction; rows 4 and 5 are widely represented in the literature as involving the issue of the purported presence or lack of a capacity to think theoretically; and so on.

Table I: The different trajectories of China's and Greece's intellectual developments

	(a) Greece	(b) China
(1)	Development of a so-called "complete" alphabet.	Development of a morpheme-syllable writing system.
(2)	The empirical world was non-naturalistically regarded as "unreal", the non-empirical, which was regarded as real, was understood in the sense of the transcendent.	Both the empirical and the non-empirical were regarded as real, though the former was naturalistically understood to be potentially misleading due to the limitations of sense perception. The understanding of the non-empirical corresponds to what modern scientific realism calls the unobservable.
(3)	Speculations on the ultimate constituents of all things culminated in the atomic theory, though atomism was a minority view throughout the ancient period.	Speculations on the ultimate constituents of all things began with Laozi's concept of Dao, which developed into various doctrines of *qi* (see Glossary) during the Warring States period.
(4)	The development of a theoretical in the sense of non-pragmaticist tradition in mathematics.	The development of a computational or pragmaticist tradition in mathematics despite the presence of proof and deduction.
(5)	Mathematical astronomy utilizing a geometric model of circles is based upon a physical model of a finite universe composed of solid crystalline sphere(s) to which heavenly bodies are attached and characterized by so-called "perfect" circular motions. "Perfect" circular motions constituted a non-naturalistically derived *a priori* premise, which was upheld by means of what Karl Popper (1997[1959]) calls, in critique, *ad hoc* modifications.	Mathematical astronomy utilizing an algebraic model[7] is based upon a physical model of an infinite universe of empty space with freely moving heavenly bodies. Astronomers constructed models on the basis of inductions from observation and deductions based upon them without any *a priori* premise.
(6)	The development of a scholarly tradition that prioritized theory in the sense of proceeding first from theory before considering, if it did consider it at all, application.	The development of a scholarly tradition that did not prioritize theory in the sense specified in 6(a), theoretically-minded thinkers and scientists gave equal emphasis to theory and

		application.
(7)	Rigorous argumentation was the common practice since circa mid -5th century.	Increasing rigour in argumentation during the Warring States period, which abruptly reversed trend afterwards.

A note concerning Table I is in order. Non-positivist philosophy of science shows that all observational statements or statements of fact are theory-laden (Chalmers 1999; see also *idem*. 1990). Similarly, implicit in any description of the contrasts between Greece and China concerned is an entire analysis of the issues concerned. Our descriptions are, therefore, very much different from how scholars embracing the received wisdom in relation to Greece's and China's differential developments would describe the contrasts concerned. For instance, Chinese writing is usually described as ideographic, which we show in Chapter Three to be erroneous. As another instance, in relation to Cell 2(b), received wisdom's description would be something like "China had no awareness of sense perception as problematic prior to the arrival of Buddhism"; we show in the last section of Chapter Eight how mistaken this view is. As yet another instance, in relation to Cell 5(b), received wisdom would have described Chinese astronomy as "non-theoretical", which, as Chapter Twelve shows, betrays a common misconception of what constitutes a theoretical model in astronomy. From our point of view, the descriptions in Table I are factual, but this factuality is grounded upon the analysis of the following chapters.

The above brings ups the following general issue. In the comparison between Greece and China, there is in the literature a frequent undertone or, for that matter, overtone, varying in its degree of explicitness from one scholar to another, even when this is nominally denied, namely, that the former's intellectual developments are "superior" to the latter's. Thus, for instance, Chinese philosophers are said to lack the search for ultimate foundations (see Chapter Two); to lack the Greek value placed on logic (see the appendix of Chapter Five); to lack the concept of nature (see Note 30 of Chapter Six); and so on. Such an orientation that Chinese intellectual development is constituted by various "lacks" can perhaps be called Graeco-centric in the sense that all things that are regarded as intellectually valuable are found only in Greece. For us, Graeco-centrism is problematic, not because it is "politically incorrect", but because substantive claims made from such an orientation are factually untenable. To critique such claims is to engage in a scholarly critique, not a political one. It also goes without saying that critique of such claims is necessary for unless this is done, it will be impossible to arrive at the true picture of

the comparison between Greece and China, and lacking this, it will also be impossible to undertake an analysis of the reasons why Greece and China developed along two different trajectories.

As will be seen in Chapter One, the founding, institutionalization, reproduction and further development of intellectual traditions constitute a core explanatory variable in our theoretical framework. In Table I, two traditions are mentioned. It will be useful to make a quick comment concerning them here, for simplicity, with reference to Greece alone. A mathematical tradition (Row 4) is a substantive disciplinary tradition, in contrast, a scholarly tradition in general (Row 6) is what may be called a formal scholarly tradition, the meaning of which can roughly be captured by the daily term "approach". Formal scholarly traditions are not established in the abstract, but on the basis and by virtue of the same or closely similar approaches being practiced across a number of substantive disciplines. Thus, the process of the founding of Greece's theoretical or non-pragmaticist tradition in mathematics contributed to the process of the establishment of Greece's general scholarly tradition mentioned in Cell 6(a). Although it is not immediately apparent from Table I, developments in relation to Cell 2(a) also made a crucial contribution to this process. As the approach concerned was taken up in other substantive disciplines as well, this tradition was established as a general tradition encompassing the entire scholarly community. What this implies is that in order to explain the establishment of formal or general scholarly traditions, the starting-point of investigation should be the how's and why's of the establishment of particular substantive disciplinary traditions.

Of the various contrasts in Table I, except for writing system, all pertain to scholarly development. Writing system is included in our study not only because its development is of an intellectual nature, but most importantly because the difference in writing systems between the Chinese and the Greeks (as well as Europe in general) has, for several centuries up until today, constituted a key concern in the comparison between Greece and China. Because of its great vintage, our analysis after explaining our theoretical framework (Chapter One) and a review of the literature (Chapter Two) begins with it in Chapter Three.

In the literature, there are two broad categories of arguments concerning Greece's and China's differential developments, which we call externalist and essentialist, both of which are methodologically based upon mono-causal determinism. The most prominent externalist argument argues that Greece's and China's differences are all the product of one

single external factor, namely, the presence of public face-to-face debate in the agora in Greece, and its absence in China; while the most prominent essentialist argument argues that all these differences are due to a single innate factor, namely, that the Greeks and the Chinese allegedly have different "modes of thinking" (MOT), with the Greeks having an "abstract-logical" MOT and the Chinese having a "sensuous-empirical" MOT.

Thus, for instance, in relation to Row 1 of Table I, according to the essentialist argument, the Greek alphabet is "abstract", and the Greeks were able to develop it due to their "abstract-logical" MOT, whereas Chinese writing is "concrete-bound", which reflects the Chinese's "sensuous-empirical" MOT. As another example, according to the externalist argument, because of the presence of agora debate, the Greeks were driven to search for ultimate foundations, hence they made a distinction between the "unreal" or "less real" empirical level and, what is ultimate, the "real" non-empirical level (Cell 2(a) of Table I), and it was on the basis of this distinction that the atomic theory was formulated (Cell 3(a)); in contrast, so the argument continues, because of the absence of agora debate in China, Chinese thinkers allegedly lacked any search for ultimate foundations, hence they did not make the above distinction and lacked any equivalent to the atomic theory. The essentialist argument also has its explanation in relation to the atomic theory and its absence in China, namely, that this due to the capacity of the Greeks, thanks to their MOT, to engage in abstraction and to highly value logic, which the Chinese, hampered by their MOT, were purportedly unable to do and lacked.

We observed earlier that historical sociological theories and insights can potentially inject new interpretative perspectives with superior explanatory power into the comparison between Greece and China. Let us illustrate this with reference to the above externalist and essentialist claims concerning rows 2 and 3 of Table I. But first, it is necessary to briefly explain what our integrated theoretical framework is about. Our framework is comprised of the following components: the role of contingency in historical development, inclusive of intellectual development; the critical importance of starting-point in developmental processes, a slight change of which could in time lead to hugely different developmental outcomes; the study of intellectual development from the perspective of the founding, inheritance and further development of an intellectual tradition, which shapes the goals, beliefs, values, practices, etc. of members of that tradition; the special characteristics of intellectual tradition as a self-reinforcing informal institution in the sociological sense